



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

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CALCULATION PACKAGE

June 23rd, 2025

McCullough Architects

Highlands Builders Group

Sears Plat — Lot 2
Mercer Island, WA

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

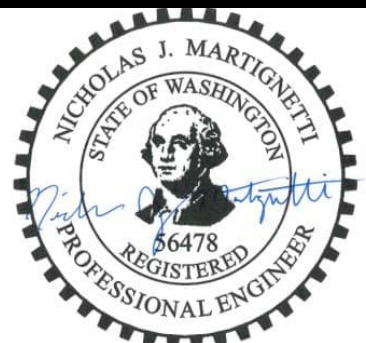
Prepared By:

Ryan Chan, E.I.T.

Staff Engineer II

Nicholas J. Martignetti, P.E.

Associate Owner + San Diego Office Director



Signature, Seal & Date



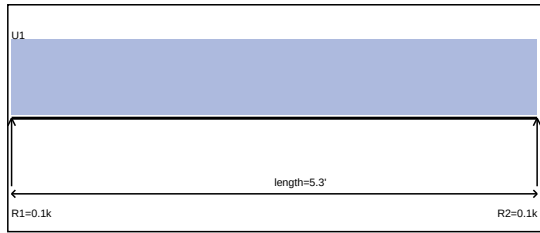
BEAM & HEADER CALCULATIONS

M+K PROJECT #: 244-25011-T01 - Sears Lot 2

ENGINEER: Ryan Chan

Date: 06/23/2025

Description - Roof Framing - H3-1 - Header



Uniform 1 = 0.02 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 = 0.05k	Vall = 4.47k	Ratio = 0.01
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M = 0.07k-ft	Mall = 5.17k-ft	Ratio = 0.01
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Deflection

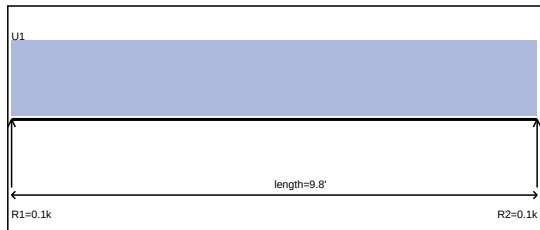
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

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

4x10 DF #2

Description - Roof Framing - H3-2 - Header



Uniform 1 = 0.02 klf (0.0'-9.8')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 0.09k	Vall = 4.47k	Ratio = 0.02
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M = 0.23k-ft	Mall = 5.17k-ft	Ratio = 0.04
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Deflection

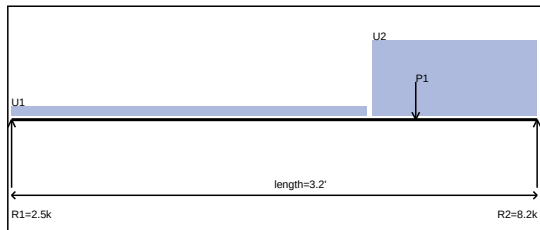
TL = 0.01" L/999+ > L/240 min

DL = 0.00"

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

4x10 DF #2

Description - Roof Framing - H3-3 - Header



Uniform 1 = 0.08 klf (0.0'-2.2')

P1 = 9.77 K (2.5')

Uniform 2 = 0.64 klf (2.2'-3.2')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 8.13k	Vall = 11.73k	Ratio = 0.69
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M = 5.92k-ft	Mall = 23.24k-ft	Ratio = 0.25
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Deflection

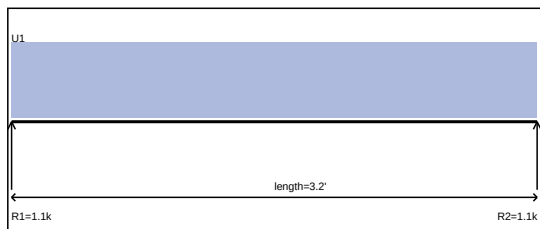
TL = 0.01" L/999+ > L/240 min

DL = 0.00"

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

5-1/2x10-1/2 GLB

Description - Roof Framing - H3-4 - Header



Uniform 1 = 0.64 klf (0.0'-3.2')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.05k	Vall = 4.47k	Ratio = 0.23
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M = 0.85k-ft	Mall = 5.17k-ft	Ratio = 0.16
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Deflection

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

DL = 0.00"

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

4x10 DF #2

Description - Roof Framing - H3-5 - Header



Uniform 1 = 0.41 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.69k	Vall = 4.47k	Ratio = 0.15
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M = 0.57k-ft	Mall = 5.17k-ft	Ratio = 0.11
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Deflection

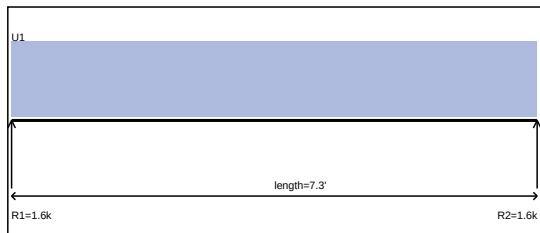
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-6 - Header



Uniform 1 = 0.41 klf (0.0'-7.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 1.51k	Vall = 4.47k	Ratio = 0.34
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M = 2.77k-ft	Mall = 5.17k-ft	Ratio = 0.54
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Deflection

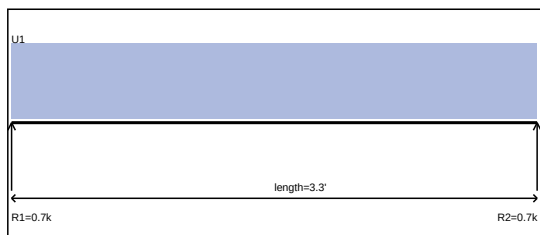
$$TL = 0.07" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.03"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-7 - Header



Uniform 1 = 0.41 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.69k	Vall = 4.47k	Ratio = 0.15
-----------	--------------	--------------

M = 0.57k-ft	Mall = 5.17k-ft	Ratio = 0.11
--------------	-----------------	--------------

Deflection

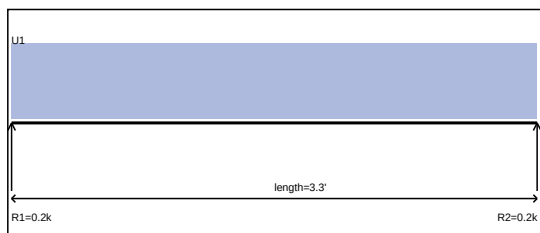
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-8 - Header



Uniform 1 = 0.08 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.14k	Vall = 4.47k	Ratio = 0.03
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M = 0.12k-ft	Mall = 5.17k-ft	Ratio = 0.02
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Deflection

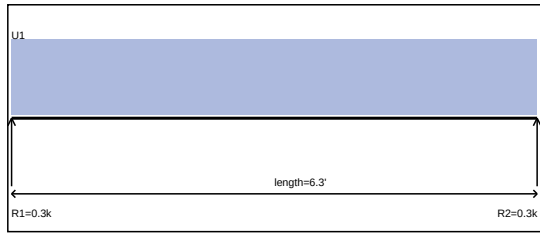
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-9 - Header



Uniform 1 = 0.08 klf (0.0'-6.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.26k	Vall = 4.47k	Ratio = 0.06
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M = 0.41k-ft	Mall = 5.17k-ft	Ratio = 0.08
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Deflection

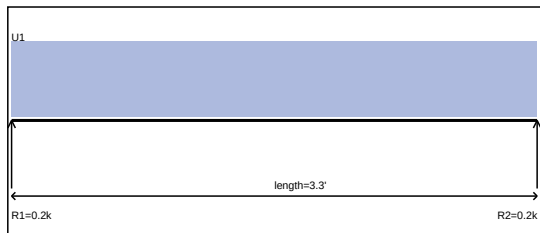
$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-10 - Header



Uniform 1 = 0.08 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.14k	Vall = 4.47k	Ratio = 0.03
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M = 0.11k-ft	Mall = 5.17k-ft	Ratio = 0.02
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Deflection

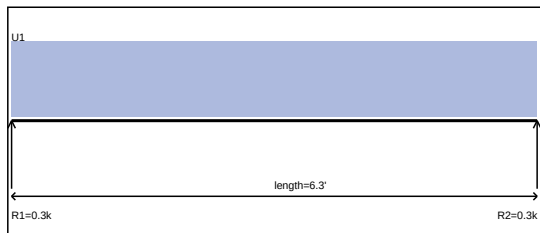
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-11 - Header



Uniform 1 = 0.08 klf (0.0'-6.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.27k	Vall = 4.47k	Ratio = 0.06
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M = 0.42k-ft	Mall = 5.17k-ft	Ratio = 0.08
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Deflection

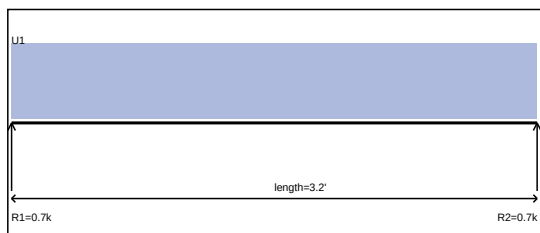
$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-12 - Header



Uniform 1 = 0.41 klf (0.0'-3.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.67k	Vall = 4.47k	Ratio = 0.15
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M = 0.55k-ft	Mall = 5.17k-ft	Ratio = 0.11
--------------	-----------------	--------------

Deflection

$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-13 - Header



Uniform 1 = 0.04 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.07k	Vall = 4.47k	Ratio = 0.02
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M = 0.06k-ft	Mall = 5.17k-ft	Ratio = 0.01
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Deflection

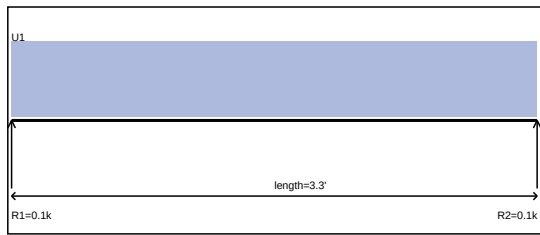
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-14 - Header



Uniform 1 = 0.04 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.07k	Vall = 4.47k	Ratio = 0.02
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M = 0.06k-ft	Mall = 5.17k-ft	Ratio = 0.01
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Deflection

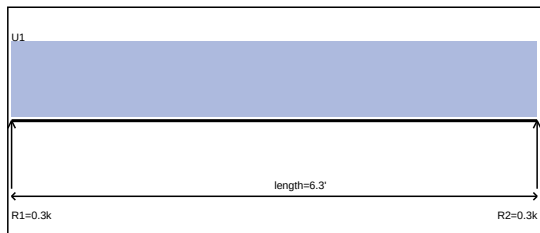
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-15 - Header



Uniform 1 = 0.08 klf (0.0'-6.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.26k	Vall = 4.47k	Ratio = 0.06
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M = 0.41k-ft	Mall = 5.17k-ft	Ratio = 0.08
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Deflection

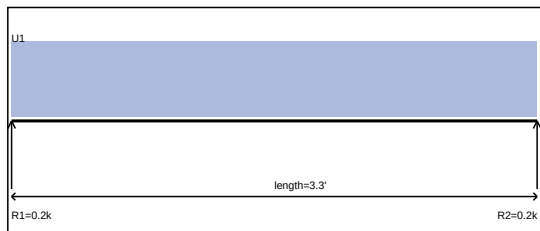
$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-16 - Header



Uniform 1 = 0.08 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.14k	Vall = 4.47k	Ratio = 0.03
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M = 0.11k-ft	Mall = 5.17k-ft	Ratio = 0.02
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Deflection

$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-17 - Header



Uniform 1 = 0.64 klf (0.0'-3.2')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.05k	Vall = 4.47k	Ratio = 0.23
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M = 0.85k-ft	Mall = 5.17k-ft	Ratio = 0.16
--------------	-----------------	--------------

Deflection

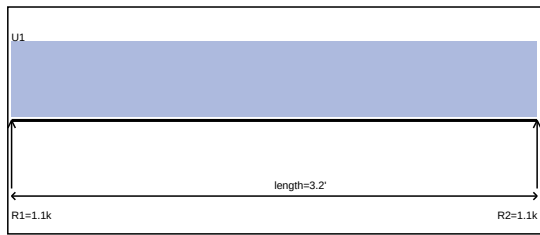
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

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

4x10 DF #2

Description - Roof Framing - H3-18 - Header



Uniform 1 = 0.64 klf (0.0'-3.2')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.05k	Vall = 4.47k	Ratio = 0.23
-----------	--------------	--------------

M = 0.85k-ft	Mall = 5.17k-ft	Ratio = 0.16
--------------	-----------------	--------------

Deflection

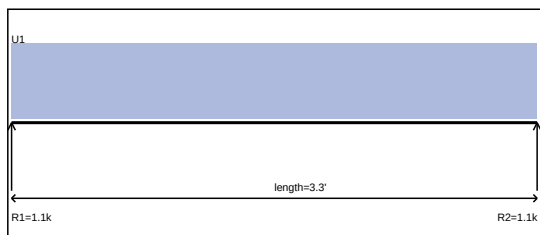
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

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

4x10 DF #2

Description - Roof Framing - H3-19 - Header



Uniform 1 = 0.64 klf (0.0'-3.3')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 1.07k	Vall = 4.47k	Ratio = 0.24
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M = 0.89k-ft	Mall = 5.17k-ft	Ratio = 0.17
--------------	-----------------	--------------

Deflection

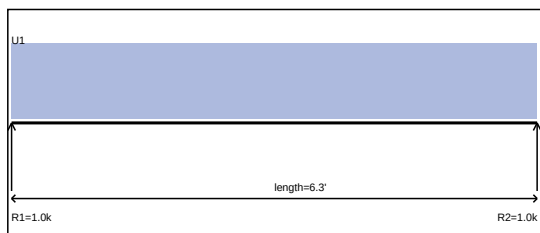
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

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

4x10 DF #2

Description - Roof Framing - H3-20 - Header



Uniform 1 = 0.30 klf (0.0'-6.3')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 0.95k	Vall = 4.47k	Ratio = 0.21
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M = 1.48k-ft	Mall = 5.17k-ft	Ratio = 0.29
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Deflection

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

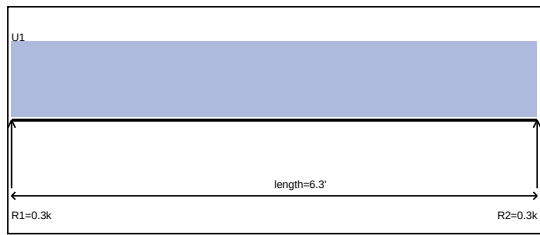
DL = 0.01"

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

4x10 DF #2



Description - Roof Framing - H3-21 - Header



Uniform 1 = 0.07 klf (0.0'-6.3')

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
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M = 0.34k-ft	Mall = 5.17k-ft	Ratio = 0.07
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Deflection

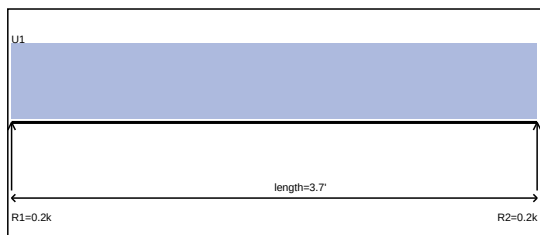
$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-22 - Header



Uniform 1 = 0.07 klf (0.0'-3.7')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.13k	Vall = 4.47k	Ratio = 0.03
-----------	--------------	--------------

M = 0.12k-ft	Mall = 5.17k-ft	Ratio = 0.02
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Deflection

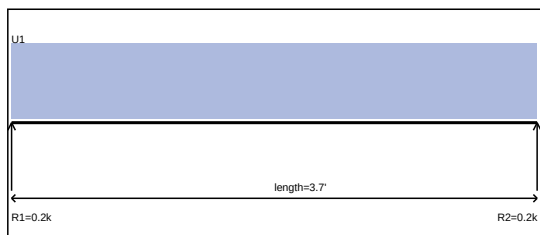
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-23 - Header



Uniform 1 = 0.07 klf (0.0'-3.7')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.13k	Vall = 4.47k	Ratio = 0.03
-----------	--------------	--------------

M = 0.12k-ft	Mall = 5.17k-ft	Ratio = 0.02
--------------	-----------------	--------------

Deflection

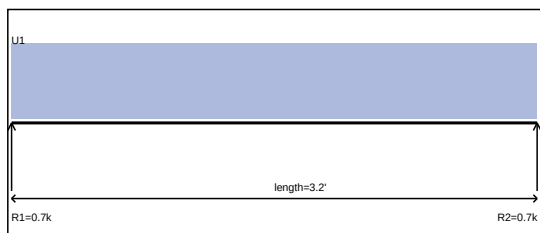
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Roof Framing - H3-24 - Header



Uniform 1 = 0.41 klf (0.0'-3.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 0.67k	Vall = 4.47k	Ratio = 0.15
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M = 0.55k-ft	Mall = 5.17k-ft	Ratio = 0.11
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Deflection

$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

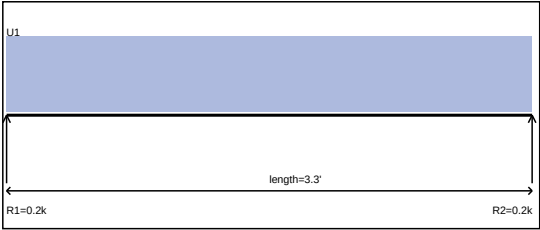
$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2



Description - Roof Framing - H3-25 - Header



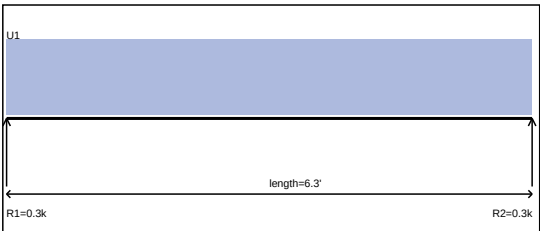
Uniform 1 = 0.08 klf (0.0'-3.3')

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

V = 0.14k	Vall = 4.47k	Ratio = 0.03
M = 0.12k-ft	Mall = 5.17k-ft	Ratio = 0.02
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x10 DF #2

Description - Roof Framing - H3-26 - Header



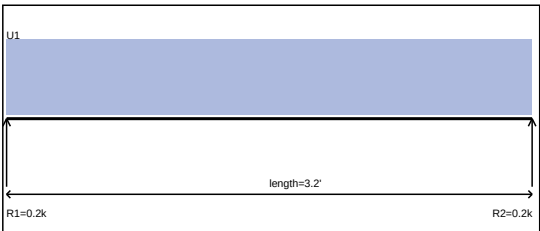
Uniform 1 = 0.08 klf (0.0'-6.3')

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

V = 0.26k	Vall = 4.47k	Ratio = 0.06
M = 0.41k-ft	Mall = 5.17k-ft	Ratio = 0.08
Deflection		
TL = 0.01" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x10 DF #2

Description - Roof Framing - H3-27 - Header



Uniform 1 = 0.08 klf (0.0'-3.2')

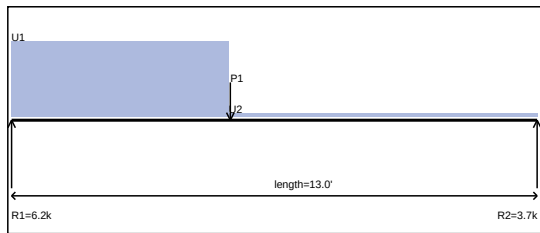
Controlling Load Combination/ Cd
V = (D + S) Cd=1.15
M = (D + S) Cd=1.15
 Δ = (D + S)

V = 0.14k	Vall = 4.47k	Ratio = 0.03
M = 0.11k-ft	Mall = 5.17k-ft	Ratio = 0.02
Deflection		
TL = 0.00" L/999+ > L/240 min		
DL = 0.00"		
L = 0.00" L/999+ > L/360 min		

4x10 DF #2



Description - Roof Framing - B3-1 - Flush Bottom



Uniform 1 = 0.43 klf (0.0'-5.4')

P1 = 7.36 K (5.4')

Uniform 2 = 0.02 klf (5.4'-13.0')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 6.19k Vall = 18.16k Ratio = 0.34

M = 27.21k-ft Mall = 40.99k-ft Ratio = 0.66

Deflection

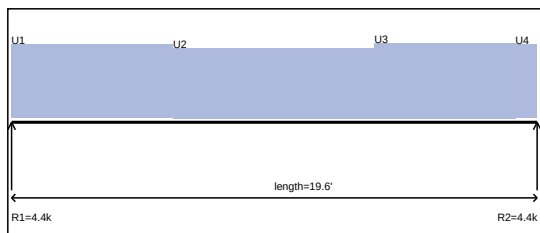
TL = 0.45" L/350 > L/240 min

DL = 0.18"

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

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

Description - Roof Framing - B3-2 - Flush Bottom



Uniform 1 = 0.45 klf (0.0'-6.0')

Uniform 2 = 0.43 klf (6.0'-13.5')

Uniform 3 = 0.46 klf (13.5'-18.8')

Uniform 4 = 0.45 klf (18.8'-19.6')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 4.36k Vall = 20.65k Ratio = 0.21

M = 21.05k-ft Mall = 67.83k-ft Ratio = 0.31

Deflection

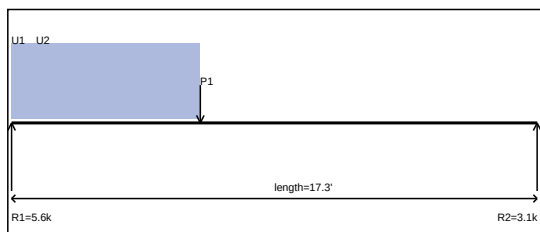
TL = 0.30" L/784 > L/240 min

DL = 0.12"

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

(3)1-3/4x18 LVL

Description - Roof Framing - B3-3 - Flush Bottom



Uniform 1 = 0.04 klf (0.0'-0.8')

P1 = 8.32 K (6.2')

Uniform 2 = 0.04 klf (0.8'-6.2')

Controlling Load Combination/ Cd

V = (D + S) Cd=1.15

M = (D + S) Cd=1.15

Δ = (D + S)

V = 5.54k Vall = 23.47k Ratio = 0.24

M = 33.73k-ft Mall = 88.98k-ft Ratio = 0.38

Deflection

TL = 0.24" L/871 > L/240 min

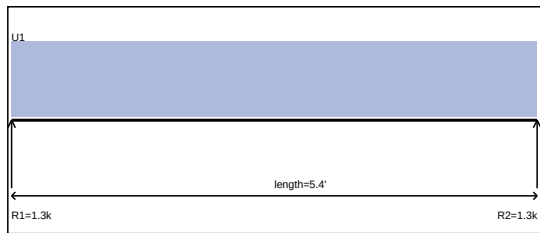
DL = 0.10"

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

5-1/2x21 GLB



Description - Roof Framing - B3-4 - Flush Bottom



Uniform 1 = 0.45 klf (0.0'-5.4')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 1.22k	Vall = 20.65k	Ratio = 0.06
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M = 1.65k-ft	Mall = 67.83k-ft	Ratio = 0.02
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Deflection

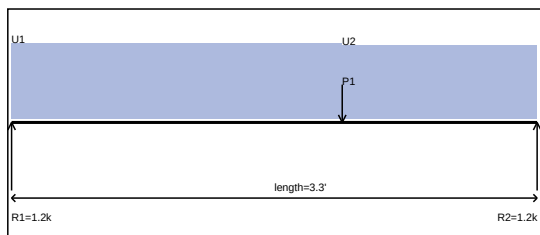
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

(3)1-3/4x18 LVL

Description - Upper Floor Framing - H2-1 - Header



Uniform 1 = 0.69 klf (0.0'-2.0')

P1 = 0.05 K (2.0')

Uniform 2 = 0.67 klf (2.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 1.10k	Vall = 3.88k	Ratio = 0.28
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M = 0.90k-ft	Mall = 4.49k-ft	Ratio = 0.20
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Deflection

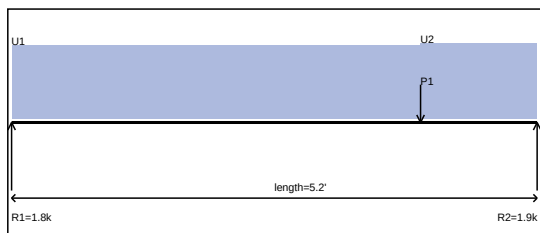
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-2 - Header



Uniform 1 = 0.67 klf (0.0'-4.1')

P1 = 0.05 K (4.1')

Uniform 2 = 0.69 klf (4.1'-5.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 1.78k	Vall = 3.88k	Ratio = 0.46
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M = 2.32k-ft	Mall = 4.49k-ft	Ratio = 0.52
--------------	-----------------	--------------

Deflection

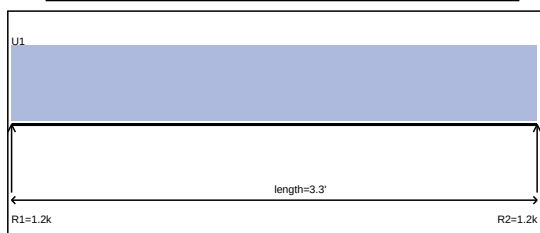
$$TL = 0.03" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.02" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-3 - Header



Uniform 1 = 0.69 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 1.12k	Vall = 3.88k	Ratio = 0.29
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M = 0.94k-ft	Mall = 4.49k-ft	Ratio = 0.21
--------------	-----------------	--------------

Deflection

$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2



Description - Upper Floor Framing - H2-4 - Header



Uniform 1 = 0.73 klf (0.0'-4.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 1.58k	Vall = 3.88k	Ratio = 0.41
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M = 1.71k-ft	Mall = 4.49k-ft	Ratio = 0.38
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Deflection

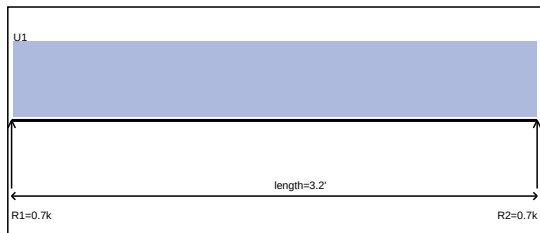
$$TL = 0.02" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.01" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-5 - Header



Uniform 1 = 0.40 klf (0.0'-3.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 0.65k	Vall = 3.88k	Ratio = 0.17
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M = 0.53k-ft	Mall = 4.49k-ft	Ratio = 0.12
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Deflection

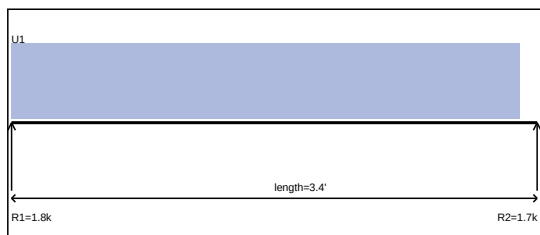
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-6 - Header



Uniform 1 = 1.05 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

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

V = 1.37k	Vall = 5.57k	Ratio = 0.25
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M = 1.17k-ft	Mall = 9.45k-ft	Ratio = 0.12
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Deflection

$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

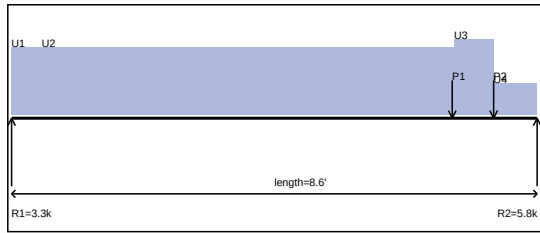
$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

3-1/2x9 GLB



Description - Upper Floor Framing - H2-7 - Header



Uniform 1 = 0.64 klf (0.0'-0.5')

P1 = 3.01 K (7.2')

Uniform 2 = 0.64 klf (0.5'-7.2')

P2 = 0.69 K (7.9')

Uniform 3 = 0.72 klf (7.2'-7.9')

Uniform 4 = 0.30 klf (7.9'-8.6')

Controlling Load Combination/ Cd

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

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

$\Delta = (D + L)$

V = 4.44k Vall = 5.57k Ratio = 0.80

M = 7.44k-ft Mall = 9.45k-ft Ratio = 0.79

Deflection

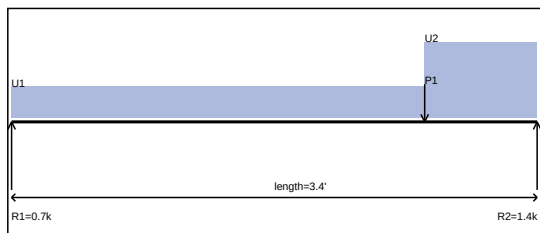
TL = 0.26" L/400 > L/240 min

DL = 0.11"

L = 0.15" L/695 > L/360 min

3-1/2x9 GLB

Description - Upper Floor Framing - H2-8 - Header



Uniform 1 = 0.30 klf (0.0'-2.7')

P1 = 0.69 K (2.7')

Uniform 2 = 0.72 klf (2.7'-3.4')

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 = 1.14k Vall = 6.40k Ratio = 0.18

M = 0.69k-ft Mall = 10.87k-ft Ratio = 0.06

Deflection

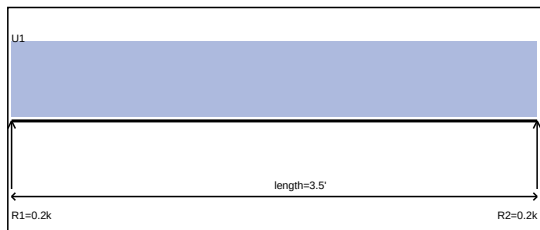
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

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

3-1/2x9 GLB

Description - Upper Floor Framing - H2-9 - Header



Uniform 1 = 0.07 klf (0.0'-3.5')

Controlling Load Combination/ Cd

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

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

$\Delta = (D + L)$

V = 0.13k Vall = 3.88k Ratio = 0.03

M = 0.11k-ft Mall = 4.49k-ft Ratio = 0.02

Deflection

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

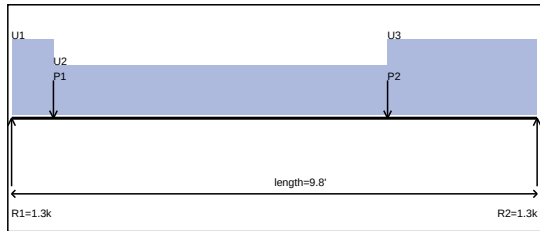
DL = 0.00"

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

4x10 DF #2



Description - Upper Floor Framing - H2-10 - Header



Uniform 1 = 0.26 klf (0.0'-0.8')

P1 = 0.26 K (0.8')

Uniform 2 = 0.17 klf (0.8'-7.0')

P2 = 0.26 K (7.0')

Uniform 3 = 0.26 klf (7.0'-9.8')

Controlling Load Combination/ Cd

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

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

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

V = 1.02k	Vall = 4.72k	Ratio = 0.22
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M = 2.36k-ft	Mall = 6.09k-ft	Ratio = 0.39
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Deflection

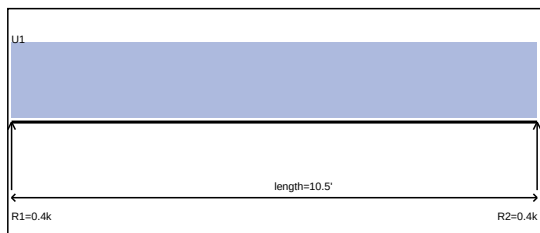
TL = 0.07" L/999+ > L/240 min

DL = 0.04"

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

4x12 DF #2

Description - Upper Floor Framing - H2-11 - Header



Uniform 1 = 0.07 klf (0.0'-10.5')

Controlling Load Combination/ Cd

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

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

$\Delta = (D + L)$

V = 0.38k	Vall = 3.88k	Ratio = 0.10
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M = 1.01k-ft	Mall = 4.49k-ft	Ratio = 0.22
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Deflection

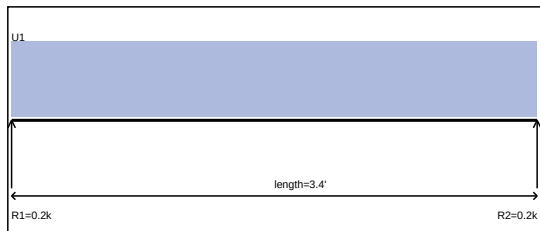
TL = 0.05" L/999+ > L/240 min

DL = 0.01"

L = 0.04" L/999+ > L/360 min

4x10 DF #2

Description - Upper Floor Framing - H2-12 - Header



Uniform 1 = 0.07 klf (0.0'-3.4')

Controlling Load Combination/ Cd

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

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

$\Delta = (D + L)$

V = 0.12k	Vall = 3.88k	Ratio = 0.03
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M = 0.11k-ft	Mall = 4.49k-ft	Ratio = 0.02
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Deflection

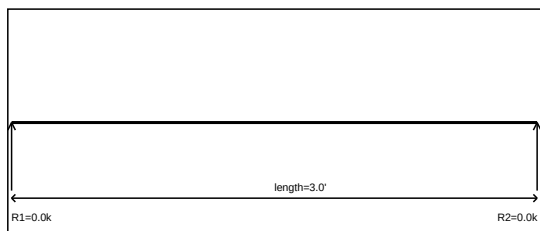
TL = 0.00" L/999+ > L/240 min

DL = 0.00"

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

4x10 DF #2

Description - Upper Floor Framing - H2-13 - Header



Controlling Load Combination/ Cd

$V = NA \quad Cd=1$

$M = NA \quad Cd=1$

$\Delta = NA$

V = 0.00k	Vall = 3.88k	Ratio = 0
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M = 0.00k-ft	Mall = 4.49k-ft	Ratio = 0
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Deflection

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

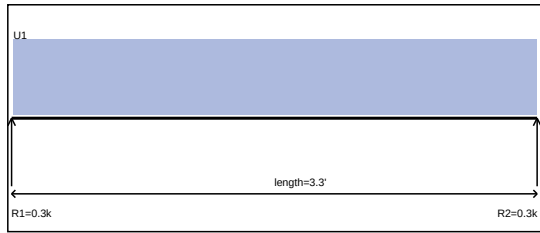
DL = 0 "

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

4x10 DF #2



Description - Upper Floor Framing - H2-14 - Header



Uniform 1 = 0.17 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 0.28k	Vall = 3.88k	Ratio = 0.07
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M = 0.23k-ft	Mall = 4.49k-ft	Ratio = 0.05
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Deflection

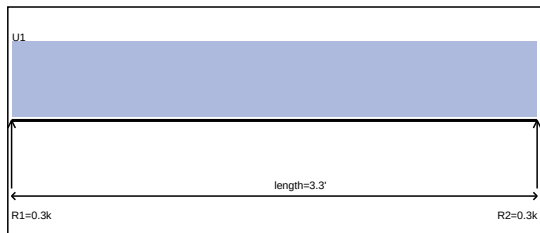
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-15 - Header



Uniform 1 = 0.17 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 0.28k	Vall = 3.88k	Ratio = 0.07
-----------	--------------	--------------

M = 0.23k-ft	Mall = 4.49k-ft	Ratio = 0.05
--------------	-----------------	--------------

Deflection

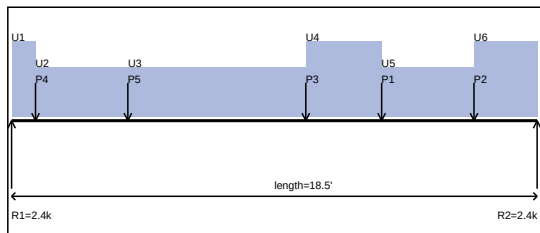
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-16 - Header



Uniform 1 = 0.26 klf (0.0'-0.8')

P1 = 0.14 K (13.0')

Uniform 2 = 0.17 klf (0.8'-4.1')

P2 = 0.14 K (16.3')

Uniform 3 = 0.17 klf (4.1'-10.4')

P3 = 0.26 K (10.4')

Uniform 4 = 0.26 klf (10.4'-13.0')

P4 = 0.14 K (0.8')

Uniform 5 = 0.17 klf (13.0'-16.3')

P5 = 0.40 K (4.1')

Uniform 6 = 0.26 klf (16.3'-18.5')

Controlling Load Combination/ Cd

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

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

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

V = 1.92k	Vall = 13.12k	Ratio = 0.15
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M = 8.77k-ft	Mall = 33.21k-ft	Ratio = 0.26
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Deflection

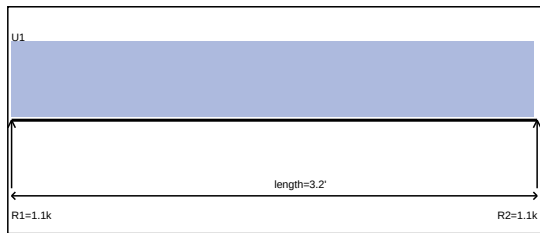
$$TL = 0.30" \quad L/750 > L/240 \text{ min}$$

$$DL = 0.20"$$

$$L = 0.07" \quad L/999+ > L/360 \text{ min}$$

5-1/2x13-1/2 GLB

Description - Upper Floor Framing - H2-17 - Header



Uniform 1 = 0.64 klf (0.0'-3.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$$V = 1.05k \quad Vall = 3.88k \quad Ratio = 0.27$$

$$M = 0.85k-ft \quad Mall = 4.49k-ft \quad Ratio = 0.19$$

Deflection

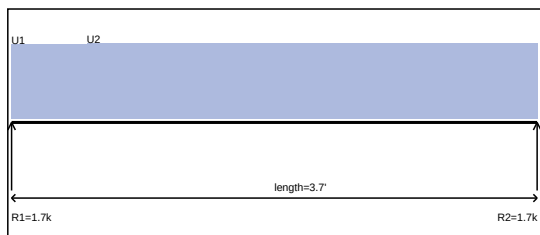
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-18 - Header



Uniform 1 = 0.89 klf (0.0'-0.5')

Uniform 2 = 0.90 klf (0.5'-3.7')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

$$V = 1.54k \quad Vall = 4.47k \quad Ratio = 0.35$$

$$M = 1.41k-ft \quad Mall = 5.17k-ft \quad Ratio = 0.27$$

Deflection

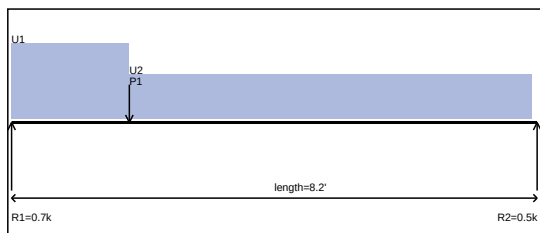
$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-19 - Header



Uniform 1 = 0.17 klf (0.0'-1.8')

P1 = 0.22 K (1.8')

Uniform 2 = 0.10 klf (1.8'-8.1')

Controlling Load Combination/ Cd

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

$$M = D \quad Cd=0.9$$

$$\Delta = (D + S)$$

$$V = 0.69k \quad Vall = 4.47k \quad Ratio = 0.15$$

$$M = 0.91k-ft \quad Mall = 4.04k-ft \quad Ratio = 0.23$$

Deflection

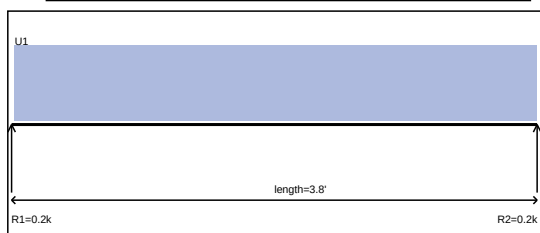
$$TL = 0.04" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.03"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-20 - Header



Uniform 1 = 0.10 klf (0.0'-3.8')

Controlling Load Combination/ Cd

$$V = D \quad Cd=0.9$$

$$M = D \quad Cd=0.9$$

$$\Delta = D$$

$$V = 0.19k \quad Vall = 3.50k \quad Ratio = 0.05$$

$$M = 0.18k-ft \quad Mall = 4.04k-ft \quad Ratio = 0.04$$

Deflection

$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

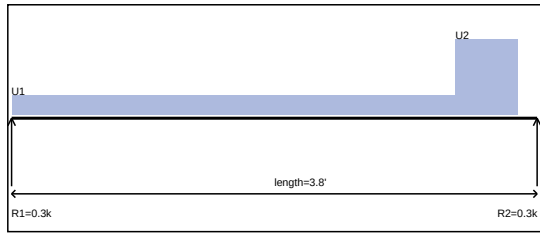
$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2



Description - Upper Floor Framing - H2-21 - Header



Uniform 1 = 0.10 klf (0.0'-3.2')

Uniform 2 = 0.39 klf (3.2'-3.7')

Controlling Load Combination/ Cd

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

$$M = D \quad Cd=0.9$$

$$\Delta = (D + L)$$

V = 0.30k	Vall = 3.88k	Ratio = 0.08
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M = 0.19k-ft	Mall = 4.04k-ft	Ratio = 0.05
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Deflection

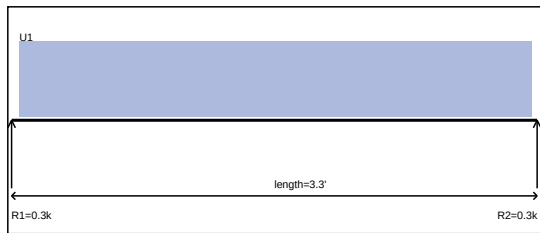
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-22 - Header



Uniform 1 = 0.17 klf (0.1'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 0.28k	Vall = 3.88k	Ratio = 0.07
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M = 0.24k-ft	Mall = 4.49k-ft	Ratio = 0.05
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Deflection

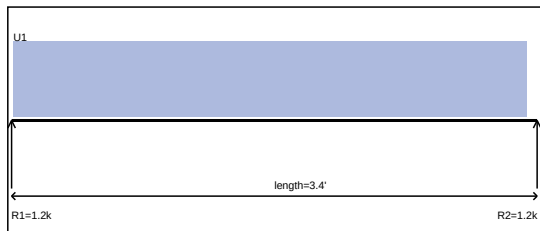
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-23 - Header



Uniform 1 = 0.67 klf (0.0'-3.3')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 1.14k	Vall = 3.88k	Ratio = 0.29
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M = 0.98k-ft	Mall = 4.49k-ft	Ratio = 0.22
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Deflection

$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

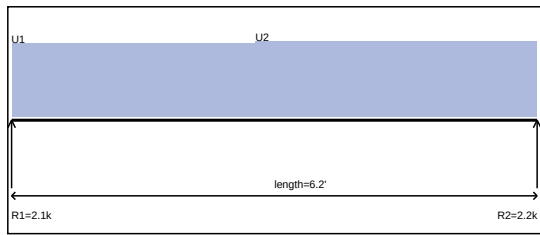
$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2



Description - Upper Floor Framing - H2-24 - Header



Uniform 1 = 0.67 klf (0.0'-2.9')

Uniform 2 = 0.69 klf (2.9'-6.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 2.11k	Vall = 3.88k	Ratio = 0.54
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M = 3.25k-ft	Mall = 4.49k-ft	Ratio = 0.72
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Deflection

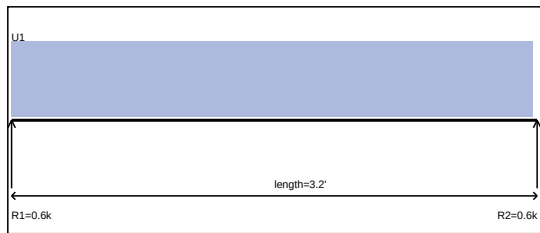
$$TL = 0.06" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.02"$$

$$L = 0.04" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - H2-25 - Header



Uniform 1 = 0.32 klf (0.0'-3.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 0.53k	Vall = 3.88k	Ratio = 0.14
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M = 0.43k-ft	Mall = 4.49k-ft	Ratio = 0.10
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Deflection

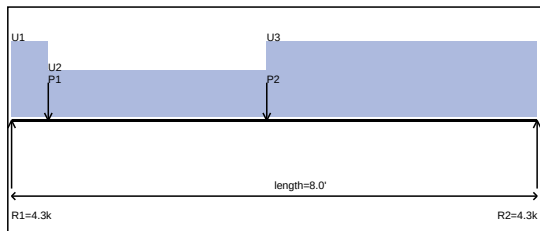
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - B2-1 - Flush



Uniform 1 = 1.05 klf (0.0'-0.6')

P1 = 0.69 K (0.6')

Uniform 2 = 0.64 klf (0.6'-3.9')

P2 = 0.69 K (3.9')

Uniform 3 = 1.05 klf (3.9'-8.0')

Controlling Load Combination/ Cd

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

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

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

V = 3.24k	Vall = 11.13k	Ratio = 0.29
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M = 6.48k-ft	Mall = 37.80k-ft	Ratio = 0.17
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Deflection

$$TL = 0.03" \quad L/999+ > L/240 \text{ min}$$

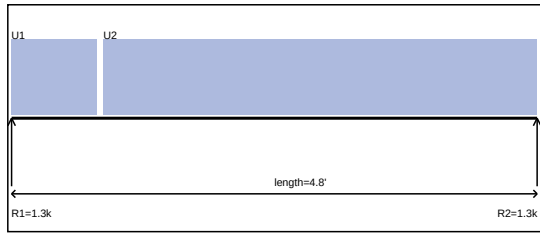
$$DL = 0.01"$$

$$L = 0.01" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB



Description - Upper Floor Framing - B2-2 - Flush



Uniform 1 = 0.54 klf (0.0'-0.8')

Uniform 2 = 0.54 klf (0.8'-4.8')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 1.27k	Vall = 11.13k	Ratio = 0.11
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M = 1.51k-ft	Mall = 37.80k-ft	Ratio = 0.04
--------------	------------------	--------------

Deflection

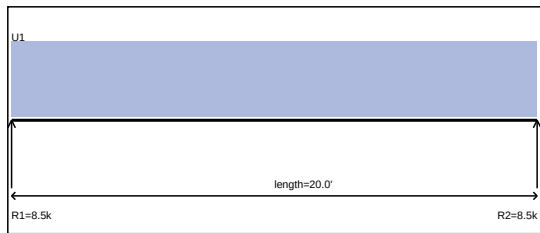
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB

Description - Upper Floor Framing - B2-3 - Flush



Uniform 1 = 0.84 klf (0.0'-20.0')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 8.43k	Vall = 23.94k	Ratio = 0.35
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M = 42.14k-ft	Mall = 78.65k-ft	Ratio = 0.54
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Deflection

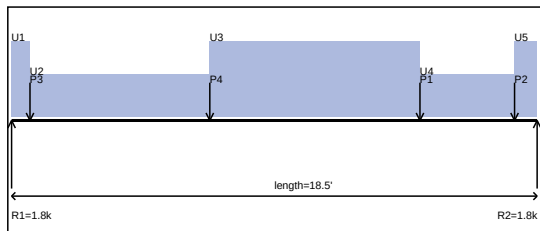
$$TL = 0.47" \quad L/512 > L/240 \text{ min}$$

$$DL = 0.13"$$

$$L = 0.34" \quad L/704 > L/360 \text{ min}$$

(4)1-3/4x18 LVL

Description - Upper Floor Framing - B2-4 - Flush



Uniform 1 = 0.18 klf (0.0'-0.6')

P1 = 0.14 K (14.4')

Uniform 2 = 0.10 klf (0.6'-7.0')

P2 = 0.14 K (17.7')

Uniform 3 = 0.18 klf (7.0'-14.4')

P3 = 0.27 K (0.6')

Uniform 4 = 0.10 klf (14.4'-17.7')

P4 = 0.27 K (7.0')

Uniform 5 = 0.18 klf (17.7'-18.5')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 1.70k	Vall = 12.80k	Ratio = 0.13
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M = 7.87k-ft	Mall = 43.47k-ft	Ratio = 0.18
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Deflection

$$TL = 0.16" \quad L/999+ > L/240 \text{ min}$$

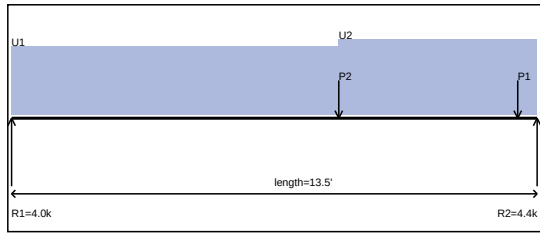
$$DL = 0.12"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB



Description - Upper Floor Framing - B2-5 - Flush



Uniform 1 = 0.57 klf (0.0'-8.4')

P1 = 0.20 K (13.0')

Uniform 2 = 0.63 klf (8.4'-13.5')

P2 = 0.08 K (8.4')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$$V = 4.23k \quad Vall = 11.13k \quad Ratio = 0.38$$

$$M = 13.67k\text{-ft} \quad Mall = 37.80k\text{-ft} \quad Ratio = 0.36$$

Deflection

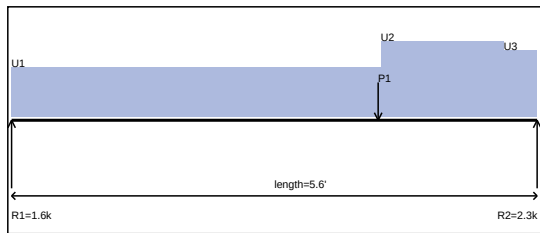
$$TL = 0.15" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.04"$$

$$L = 0.11" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB

Description - Upper Floor Framing - B2-6 - Dropped



Uniform 1 = 0.40 klf (0.0'-3.9')

P1 = 1.20 K (3.9')

Uniform 2 = 0.61 klf (3.9'-5.2')

Uniform 3 = 0.54 klf (5.2'-5.6')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$$V = 2.22k \quad Vall = 3.88k \quad Ratio = 0.57$$

$$M = 2.93k\text{-ft} \quad Mall = 4.49k\text{-ft} \quad Ratio = 0.65$$

Deflection

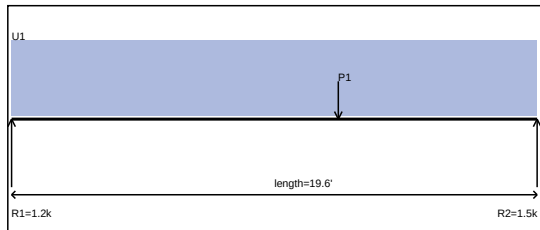
$$TL = 0.04" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.03" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - B2-7 - Flush



Uniform 1 = 0.07 klf (0.0'-19.6')

P1 = 1.25 K (12.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$$V = 1.50k \quad Vall = 11.13k \quad Ratio = 0.13$$

$$M = 9.10k\text{-ft} \quad Mall = 37.80k\text{-ft} \quad Ratio = 0.24$$

Deflection

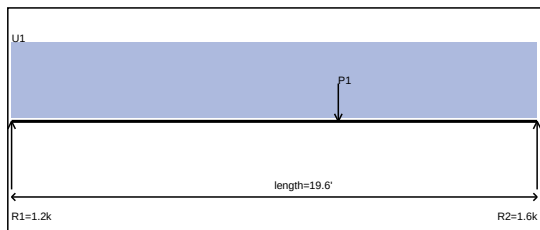
$$TL = 0.21" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.06"$$

$$L = 0.15" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB

Description - Upper Floor Framing - B2-8 - Flush



Uniform 1 = 0.07 klf (0.0'-19.6')

P1 = 1.27 K (12.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$$V = 1.51k \quad Vall = 11.13k \quad Ratio = 0.14$$

$$M = 9.19k\text{-ft} \quad Mall = 37.80k\text{-ft} \quad Ratio = 0.24$$

Deflection

$$TL = 0.21" \quad L/999+ > L/240 \text{ min}$$

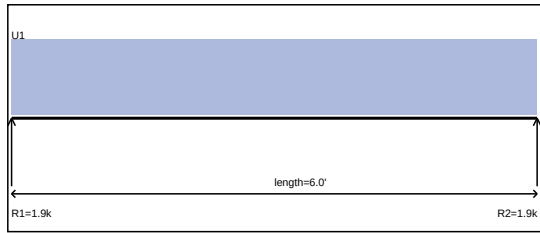
$$DL = 0.06"$$

$$L = 0.15" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB



Description - Upper Floor Framing - B2-9 - Dropped



Uniform 1 = 0.61 klf (0.0'-6.0')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$V = 1.82k$	$Vall = 3.88k$	Ratio = 0.47
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$M = 2.73k\text{-ft}$	$Mall = 4.49k\text{-ft}$	Ratio = 0.61
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Deflection

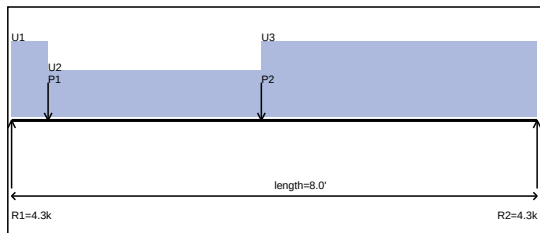
$$TL = 0.05" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.04" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Upper Floor Framing - B2-10 - Flush



Uniform 1 = 1.05 klf (0.0'-0.6')

P1 = 0.67 K (0.6')

Uniform 2 = 0.64 klf (0.6'-3.8')

P2 = 0.67 K (3.8')

Uniform 3 = 1.05 klf (3.8'-8.0')

Controlling Load Combination/ Cd

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

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

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

$V = 3.24k$	$Vall = 11.13k$	Ratio = 0.29
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$M = 6.48k\text{-ft}$	$Mall = 37.80k\text{-ft}$	Ratio = 0.17
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Deflection

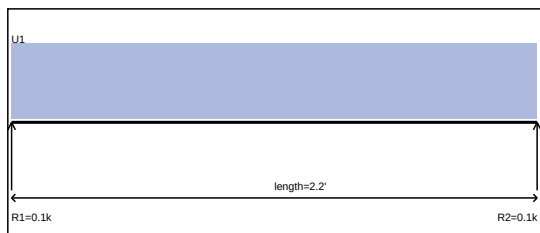
$$TL = 0.03" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.01" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB

Description - Upper Floor Framing - B2-11 - Flush



Uniform 1 = 0.07 klf (0.0'-2.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$V = 0.08k$	$Vall = 11.13k$	Ratio = 0.01
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$M = 0.04k\text{-ft}$	$Mall = 37.80k\text{-ft}$	Ratio = 0.00
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Deflection

$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

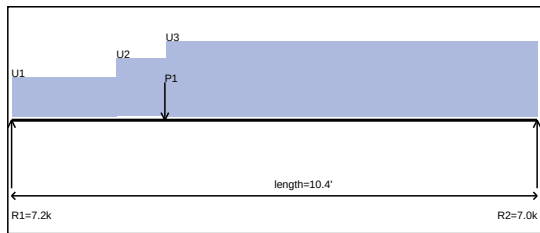
$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB



Description - Upper Floor Framing - B2-12 - Flush



Uniform 1 = 0.63 klf (0.0'-2.1') P1 = 3.03 K (3.0')
Uniform 2 = 0.92 klf (2.1'-3.1')
Uniform 3 = 1.20 klf (3.1'-10.4')

Controlling Load Combination/ Cd

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

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

$$\Delta = NA$$

$$V = 6.40k \quad Vall = 0 \text{ k} \quad \text{Ratio} = 0$$

$$M = 17.20k\text{-ft} \quad Mall = 0 \text{ k-ft} \quad \text{Ratio} = 0$$

Deflection

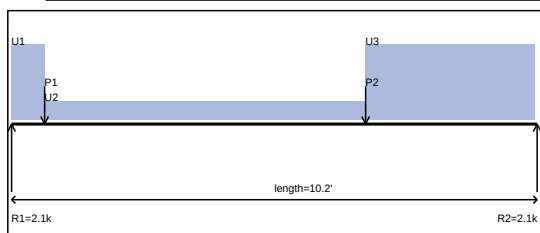
$$TL = NA \quad L/NA > L/240 \text{ min}$$

$$DL = NA$$

$$L = NA \quad L/NA > L/360 \text{ min}$$

Refer to External Design

Description - Upper Floor Framing - B2-13 - Refer to External Design



Uniform 1 = 0.40 klf (0.0'-0.6') P1 = 0.95 K (0.6')
Uniform 2 = 0.10 klf (0.6'-6.9') P2 = 0.95 K (6.9')
Uniform 3 = 0.40 klf (6.9'-10.2')

Controlling Load Combination/ Cd

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

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

$$\Delta = NA$$

$$V = 2.06k \quad Vall = 0 \text{ k} \quad \text{Ratio} = 0$$

$$M = 4.65k\text{-ft} \quad Mall = 0 \text{ k-ft} \quad \text{Ratio} = 0$$

Deflection

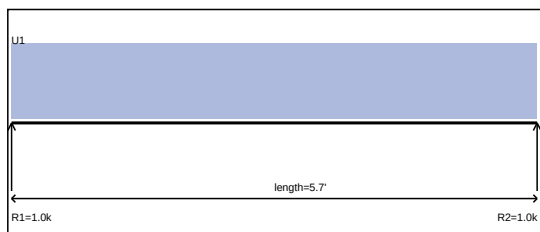
$$TL = NA \quad L/NA > L/240 \text{ min}$$

$$DL = NA$$

$$L = NA \quad L/NA > L/360 \text{ min}$$

Refer to External Design

Description - Upper Floor Framing - B2-14 - Flush



Uniform 1 = 0.33 klf (0.0'-5.7')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$$V = 0.94k \quad Vall = 11.13k \quad \text{Ratio} = 0.08$$

$$M = 1.35k\text{-ft} \quad Mall = 37.80k\text{-ft} \quad \text{Ratio} = 0.04$$

Deflection

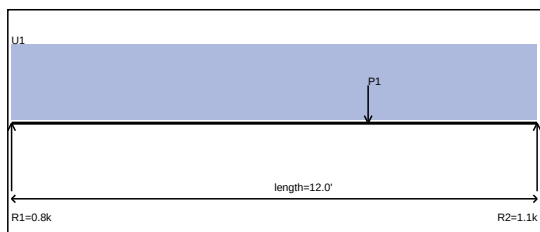
$$TL = 0.00" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB

Description - Upper Floor Framing - B2-15 - Flush



Uniform 1 = 0.07 klf (0.0'-12.0') P1 = 0.94 K (8.1')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

$$V = 1.08k \quad Vall = 11.13k \quad \text{Ratio} = 0.10$$

$$M = 3.63k\text{-ft} \quad Mall = 37.80k\text{-ft} \quad \text{Ratio} = 0.10$$

Deflection

$$TL = 0.03" \quad L/999+ > L/240 \text{ min}$$

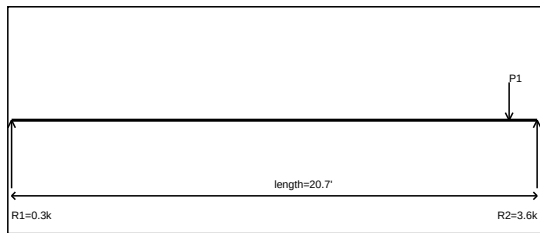
$$DL = 0.01"$$

$$L = 0.02" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB



Description - Upper Floor Framing - B2-16 - Flush



P1 = 3.80 K (19.6')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + S)$$

V = 3.60k	Vall = 12.80k	Ratio = 0.28
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M = 3.97k-ft	Mall = 43.42k-ft	Ratio = 0.09
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Deflection

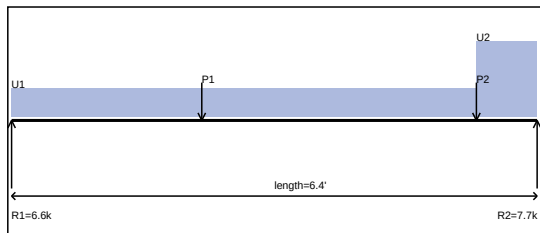
$$TL = 0.10" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.04"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB

Description - Main Floor Framing - H1-1 - Header



Uniform 1 = 0.64 klf (0.0'-5.7')

P1 = 6.41 K (2.3')

Uniform 2 = 1.69 klf (5.7'-6.4')

P2 = 2.84 K (5.7')

Controlling Load Combination/ Cd

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

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

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

V = 6.52k	Vall = 9.23k	Ratio = 0.71
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M = 11.21k-ft	Mall = 16.22k-ft	Ratio = 0.69
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Deflection

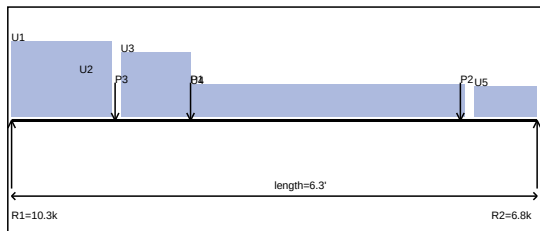
$$TL = 0.13" \quad L/604 > L/240 \text{ min}$$

$$DL = 0.06"$$

$$L = 0.07" \quad L/999+ > L/360 \text{ min}$$

(3)1-3/4x9-1/4 LVL

Description - Main Floor Framing - H1-2 - Header



Uniform 1 = 1.69 klf (0.0'-1.2')

P1 = 1.20 K (2.2')

Uniform 2 = 0.97 klf (0.8'-1.2')

P2 = 3.07 K (5.4')

Uniform 3 = 1.45 klf (1.3'-2.2')

P3 = 6.19 K (1.2')

Uniform 4 = 0.73 klf (2.2'-5.5')

Uniform 5 = 0.69 klf (5.6'-6.3')

Controlling Load Combination/ Cd

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

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

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

V = 8.70k	Vall = 10.61k	Ratio = 0.82
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M = 9.11k-ft	Mall = 16.22k-ft	Ratio = 0.56
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Deflection

$$TL = 0.11" \quad L/662 > L/240 \text{ min}$$

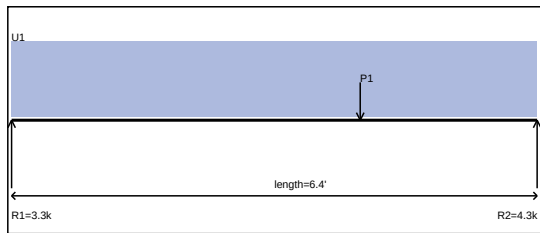
$$DL = 0.05"$$

$$L = 0.05" \quad L/999+ > L/360 \text{ min}$$

(3)1-3/4x9-1/4 LVL



Description - Main Floor Framing - H1-3 - Header



Uniform 1 = 0.69 klf (0.0'-6.4')

P1 = 3.14 K (4.3')

Controlling Load Combination/ Cd

V = (D + L) Cd=1

M = (D + L) Cd=1

Δ = (D + L)

V = 4.24k	Vall = 9.23k	Ratio = 0.46
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M = 7.54k-ft	Mall = 16.22k-ft	Ratio = 0.47
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Deflection

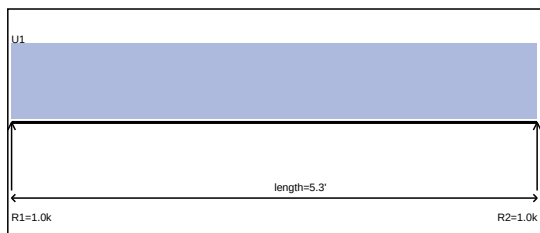
TL = 0.08" L/908 > L/240 min

DL = 0.03"

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

(3)1-3/4x9-1/4 LVL

Description - Main Floor Framing - H1-4 - Header



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

Controlling Load Combination/ Cd

V = (D + L) Cd=1

M = (D + L) Cd=1

Δ = (D + L)

V = 0.96k	Vall = 3.88k	Ratio = 0.25
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M = 1.26k-ft	Mall = 4.49k-ft	Ratio = 0.28
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Deflection

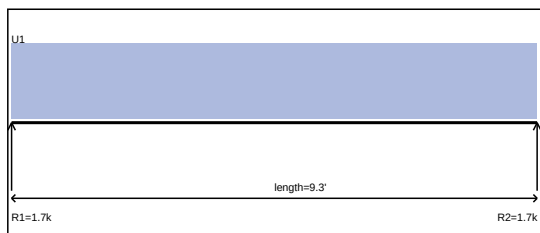
TL = 0.02" L/999+ > L/240 min

DL = 0.00"

L = 0.01" L/999+ > L/360 min

4x10 DF #2

Description - Main Floor Framing - H1-5 - Header



Uniform 1 = 0.37 klf (0.0'-9.3')

Controlling Load Combination/ Cd

V = (D + L) Cd=1

M = (D + L) Cd=1

Δ = (D + L)

V = 1.69k	Vall = 3.88k	Ratio = 0.44
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M = 3.92k-ft	Mall = 4.49k-ft	Ratio = 0.87
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Deflection

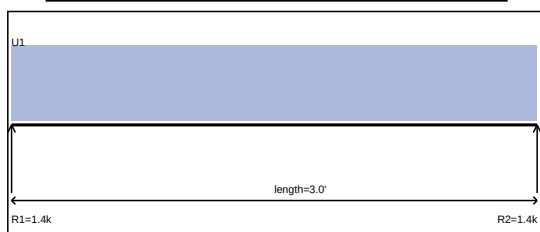
TL = 0.16" L/680 > L/240 min

DL = 0.05"

L = 0.12" L/963 > L/360 min

4x10 DF #2

Description - Main Floor Framing - H1-6 - Header



Uniform 1 = 0.89 klf (0.0'-3.0')

Controlling Load Combination/ Cd

V = (D + L) Cd=1

M = (D + L) Cd=1

Δ = (D + L)

V = 1.33k	Vall = 3.04k	Ratio = 0.44
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M = 1.00k-ft	Mall = 2.99k-ft	Ratio = 0.33
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Deflection

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

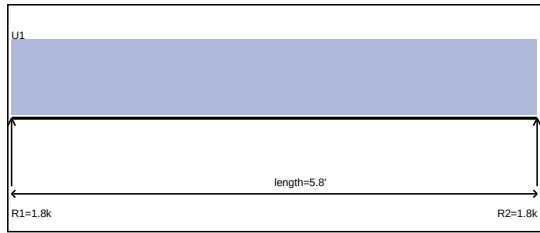
DL = 0.00"

L = 0.01" L/999+ > L/360 min

4x8 DF #2



Description - Main Floor Framing - B1-1 - Dropped



Uniform 1 = 0.60 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 = 1.75k	Vall = 3.88k	Ratio = 0.45
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M = 2.55k-ft	Mall = 4.49k-ft	Ratio = 0.57
--------------	-----------------	--------------

Deflection

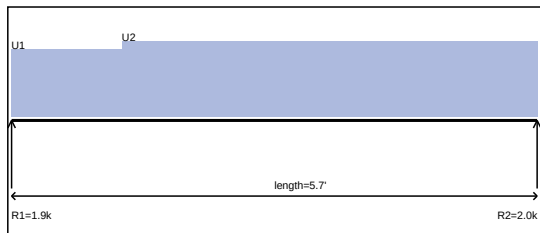
$$TL = 0.04" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.03" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Main Floor Framing - B1-2 - Dropped



Uniform 1 = 0.60 klf (0.0'-1.2')

Uniform 2 = 0.67 klf (1.2'-5.7')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 1.92k	Vall = 3.88k	Ratio = 0.49
-----------	--------------	--------------

M = 2.74k-ft	Mall = 4.49k-ft	Ratio = 0.61
--------------	-----------------	--------------

Deflection

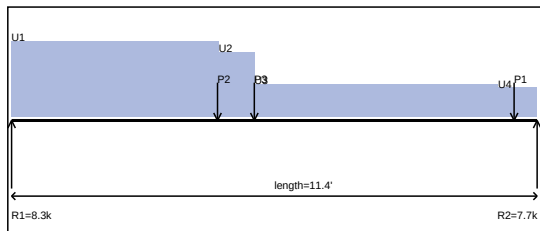
$$TL = 0.04" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.03" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Main Floor Framing - B1-3 - Flush



Uniform 1 = 1.40 klf (0.0'-4.5')

P1 = 2.22 K (10.9')

Uniform 2 = 1.20 klf (4.5'-5.3')

P2 = 1.19 K (4.5')

Uniform 3 = 0.61 klf (5.3'-10.6')

P3 = 1.54 K (5.3')

Uniform 4 = 0.54 klf (10.6'-11.4')

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 8.18k	Vall = 11.13k	Ratio = 0.74
-----------	---------------	--------------

M = 22.99k-ft	Mall = 37.80k-ft	Ratio = 0.61
---------------	------------------	--------------

Deflection

$$TL = 0.18" \quad L/779 > L/240 \text{ min}$$

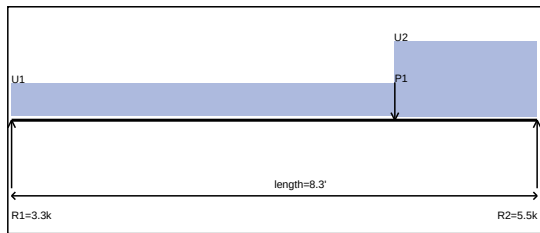
$$DL = 0.06"$$

$$L = 0.12" \quad L/999+ > L/360 \text{ min}$$

3-1/2x18 GLB



Description - Main Floor Framing - B1-4 - Flush



Uniform 1 = 0.61 klf (0.0'-6.0')

P1 = 1.83 K (6.0')

Uniform 2 = 1.40 klf (6.0'-8.3')

Controlling Load Combination/ Cd

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

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

$\Delta = (D + L)$

V = 5.36k	Vall = 11.13k	Ratio = 0.48
-----------	---------------	--------------

M = 8.70k-ft	Mall = 37.80k-ft	Ratio = 0.23
--------------	------------------	--------------

Deflection

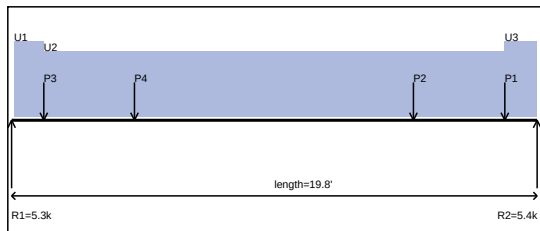
TL = 0.04" L/999+ > L/240 min

DL = 0.01"

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

3-1/2x18 GLB

Description - Main Floor Framing - B1-5 - Flush



Uniform 1 = 0.54 klf (0.1'-1.2')

P1 = 0.13 K (18.6')

Uniform 2 = 0.47 klf (1.2'-18.6')

P2 = 0.51 K (15.1')

Uniform 3 = 0.54 klf (18.6'-19.8')

P3 = 0.12 K (1.2')

P4 = 0.51 K (4.6')

Controlling Load Combination/ Cd

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

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

$\Delta = (D + L)$

V = 5.34k	Vall = 17.49k	Ratio = 0.31
-----------	---------------	--------------

M = 25.36k-ft	Mall = 56.98k-ft	Ratio = 0.45
---------------	------------------	--------------

Deflection

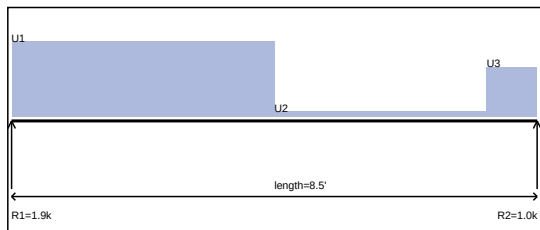
TL = 0.37" L/640 > L/240 min

DL = 0.16"

L = 0.21" L/999+ > L/360 min

5-1/2x18 GLB

Description - Main Floor Framing - B1-6 - Flush



Uniform 1 = 0.56 klf (0.0'-4.2')

Uniform 2 = 0.04 klf (4.2'-7.7')

Uniform 3 = 0.37 klf (7.7'-8.5')

Controlling Load Combination/ Cd

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

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

$\Delta = (D + L)$

V = 1.83k	Vall = 11.13k	Ratio = 0.16
-----------	---------------	--------------

M = 3.01k-ft	Mall = 37.80k-ft	Ratio = 0.08
--------------	------------------	--------------

Deflection

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

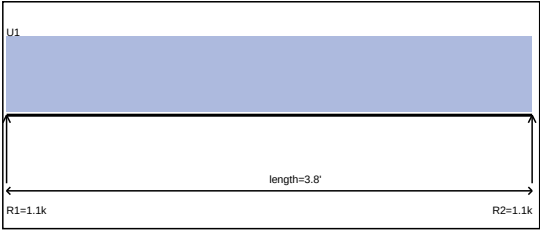
DL = 0.00"

L = 0.01" L/999+ > L/360 min

3-1/2x18 GLB



Description - Main Floor Framing - B1-7 - Dropped



Uniform 1 = 0.53 klf (0.0'-3.8')

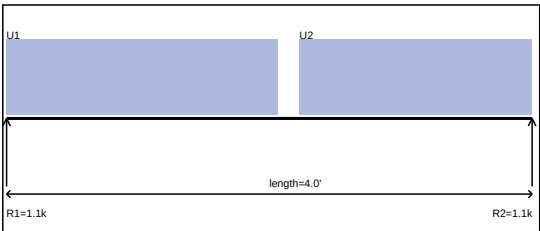
Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.00k	Vall = 3.88k	Ratio = 0.26
M = 0.94k-ft	Mall = 4.49k-ft	Ratio = 0.21

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 - B1-8 - Dropped



Uniform 1 = 0.53 klf (0.0'-2.1')

Uniform 2 = 0.53 klf (2.2'-4.0')

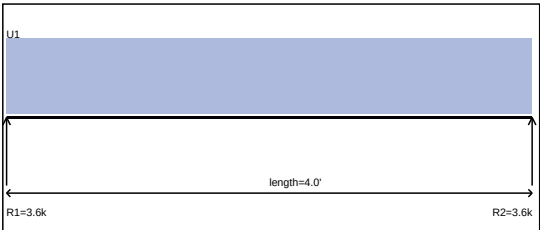
Controlling Load Combination/ Cd
 $V = (D + L) \quad Cd=1$
 $M = (D + L) \quad Cd=1$
 $\Delta = (D + L)$

V = 1.03k	Vall = 3.88k	Ratio = 0.26
M = 0.99k-ft	Mall = 4.49k-ft	Ratio = 0.22

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 - B1-9 - Dropped



Uniform 1 = 1.76 klf (0.0'-4.0')

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

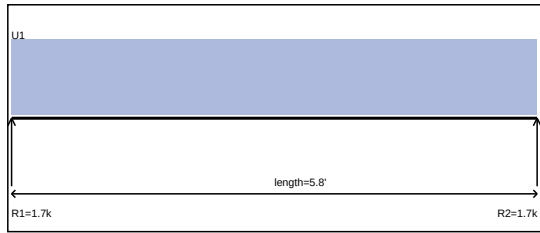
V = 3.51k	Vall = 3.88k	Ratio = 0.90
M = 3.49k-ft	Mall = 4.49k-ft	Ratio = 0.78

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 - B1-10 - Dropped



Uniform 1 = 0.57 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 = 1.67k	Vall = 3.88k	Ratio = 0.43
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M = 2.43k-ft	Mall = 4.49k-ft	Ratio = 0.54
--------------	-----------------	--------------

Deflection

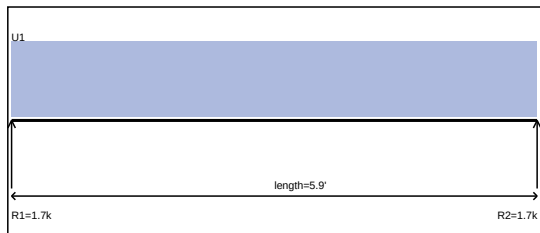
$$TL = 0.04" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.03" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Main Floor Framing - B1-11 - Dropped



Uniform 1 = 0.57 klf (0.0'-5.9')

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
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M = 2.50k-ft	Mall = 4.49k-ft	Ratio = 0.56
--------------	-----------------	--------------

Deflection

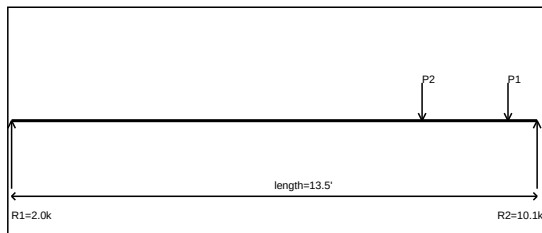
$$TL = 0.04" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.01"$$

$$L = 0.03" \quad L/999+ > L/360 \text{ min}$$

4x10 DF #2

Description - Main Floor Framing - B1-12 - Flush



$$P1 = 4.35 \text{ K (12.7')}$$

$$P2 = 7.64 \text{ K (10.5')}$$

Controlling Load Combination/ Cd

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

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

$$\Delta = (D + L)$$

V = 8.96k	Vall = 17.49k	Ratio = 0.51
-----------	---------------	--------------

M = 17.12k-ft	Mall = 59.20k-ft	Ratio = 0.29
---------------	------------------	--------------

Deflection

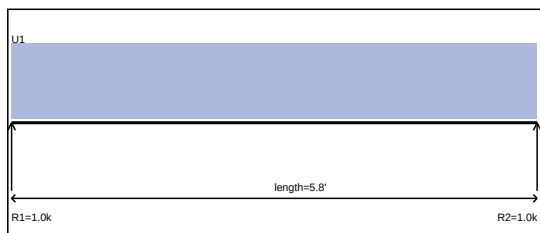
$$TL = 0.12" \quad L/999+ > L/240 \text{ min}$$

$$DL = 0.04"$$

$$L = 0.07" \quad L/999+ > L/360 \text{ min}$$

5-1/2x18 GLB

Description - Main Floor Framing - B1-13 - Flush



Uniform 1 = 0.33 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 = 0.96k	Vall = 5.99k	Ratio = 0.16
-----------	--------------	--------------

M = 1.41k-ft	Mall = 19.66k-ft	Ratio = 0.07
--------------	------------------	--------------

Deflection

$$TL = 0.01" \quad L/999+ > L/240 \text{ min}$$

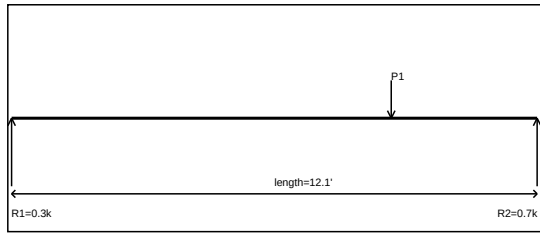
$$DL = 0.00"$$

$$L = 0.00" \quad L/999+ > L/360 \text{ min}$$

1-3/4x18 LVL



Description - Main Floor Framing - B1-14 - Flush



P1 = 0.96 K (8.7)

Controlling Load Combination/ Cd

V = (D + L) Cd=1

M = (D + L) Cd=1

Δ = (D + L)

V = 0.70k	Vall = 11.97k	Ratio = 0.06
-----------	---------------	--------------

M = 2.33k-ft	Mall = 39.32k-ft	Ratio = 0.06
--------------	------------------	--------------

Deflection

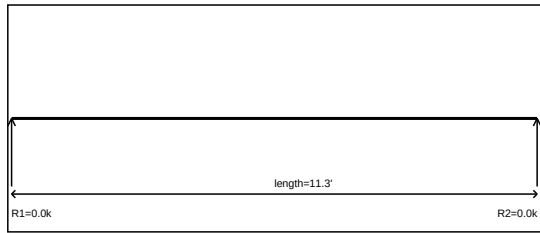
TL = 0.02" L/999+ > L/240 min

DL = 0.01"

L = 0.01" L/999+ > L/360 min

(2)1-3/4x18 LVL

Description - Main Floor Framing - B1-15 - Flush



Controlling Load Combination/ Cd

V = NA Cd=1

M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 5.99k	Ratio = 0
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M = 0.00k-ft	Mall = 19.66k-ft	Ratio = 0
--------------	------------------	-----------

Deflection

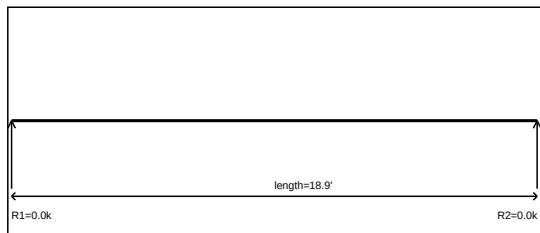
TL = 0 " L/ NA > L/240 min

DL = 0 "

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

1-3/4x18 LVL

Description - Main Floor Framing - B1-16 - Flush



Controlling Load Combination/ Cd

V = NA Cd=1

M = NA Cd=1

Δ = NA

V = 0.00k	Vall = 11.13k	Ratio = 0
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M = 0.00k-ft	Mall = 37.80k-ft	Ratio = 0
--------------	------------------	-----------

Deflection

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

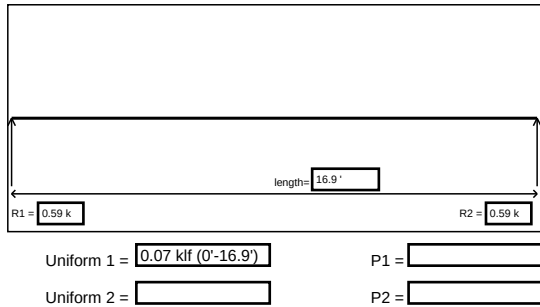
DL = 0 "

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

3-1/2x18 GLB



Description - Roof Framing - B3-4 - Low Roof Rafters



Controlling Load Combination/ Cd

V = (D+S)	Cd = 1.15
M = (D+S)	Cd = 1.15
Δ = (D+S)	

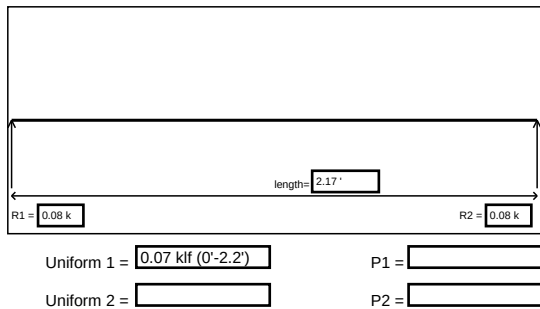
V = 0.59 k	Vall = 1.94 k	Ratio = 0.13
M = 2.50 k-ft	Mall = 2.58 k-ft	Ratio = 0.24

Deflection

TL = 0.28" L/732 > L/240 min
DL = N/A
L = N/A

1-3/4"x11-7/8" LVL

Description - Roof Framing - B3-5 - Roof Rafters



Controlling Load Combination/ Cd

V = (D+S)	Cd = 1.15
M = (D+S)	Cd = 1.15
Δ = (D+S)	

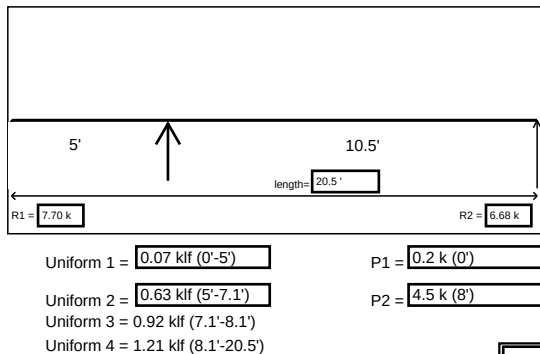
V = 0.08 k	Vall = 1.94 k	Ratio = 0.04
M = 0.04 k-ft	Mall = 2.58 k-ft	Ratio = 0.02

Deflection

TL = 0.01" L/999 > L/240 min
DL = N/A
L = N/A

2x12 HF No. 2

Description - Upper Floor Framing - B2-12 - Flush Cant'd



Controlling Load Combination/ Cd

V = (D+L)	Cd = 1.00
M = (D+L)	Cd = 1.00
Δ = (D+L)	

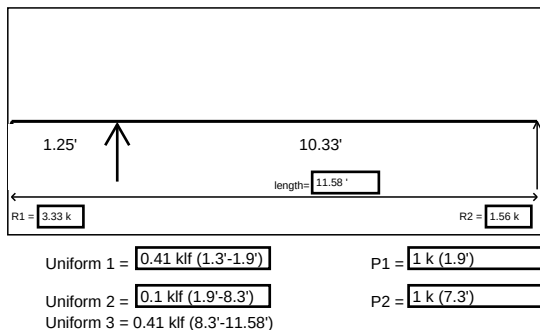
V = 6.62 k	Vall = 11.97 k	Ratio = 0.40
M = 19.4 k-ft	Mall = 38.75 k-ft	Ratio = 0.39

Deflection

TL = 0.11" L/999 > L/240 min
DL = N/A
L = N/A

(2)1-3/4"x18" LVL

Description - Upper Floor Framing - B2-13 - Flush Cant'd



Controlling Load Combination/ Cd

V = (D+S)	Cd = 1.15
M = (D+S)	Cd = 1.15
Δ = (D+S)	

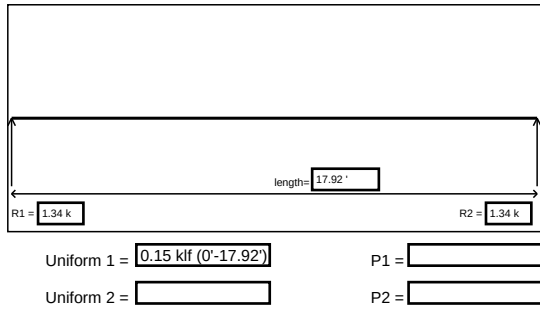
V = 1.49 k	Vall = 17.96 k	Ratio = 0.06
M = 4.35 k-ft	Mall = 58.13 k-ft	Ratio = 0.06

Deflection

TL = 0.02" L/999 > L/240 min
DL = N/A
L = N/A

(3)1-3/4"x18" LVL

Description - Upper Floor Framing - B2-16 - Flush



length= 17.92'

R1 = 1.34 k R2 = 1.34 k

Uniform 1 = 0.15 klf (0'-17.92') P1 =

Uniform 2 = P2 =

Controlling Load Combination/ Cd

V = (D+S) Cd = 1.15

M = (D+S) Cd = 1.15

Δ = (D+S)

V = 1.34 k Vall = 7.9 k Ratio = 0.17

M = 6.02 k-ft Mall = 17.85 k-ft Ratio = 0.34

Deflection

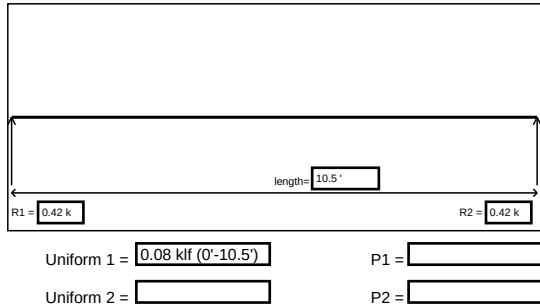
TL = 0.38" L/573 > L/240 min

DL = N/A

L = N/A

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

Description - Upper Floor Framing - B2-17 - Flush



length= 10.5'

R1 = 0.42 k R2 = 0.42 k

Uniform 1 = 0.08 klf (0'-10.5') P1 =

Uniform 2 = P2 =

Controlling Load Combination/ Cd

V = (D+S) Cd = 1.15

M = (D+S) Cd = 1.15

Δ = (D+S)

V = 0.42 k Vall = 7.9 k Ratio = 0.05

M = 1.10 k-ft Mall = 17.85 k-ft Ratio = 0.06

Deflection

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

DL = N/A

L = N/A

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

Description -



length=

R1 = R2 =

Uniform 1 = P1 =

Uniform 2 = P2 =

Controlling Load Combination/ Cd

V = Cd =

M = Cd =

Δ =

V = Vall = Ratio =

M = Mall = Ratio =

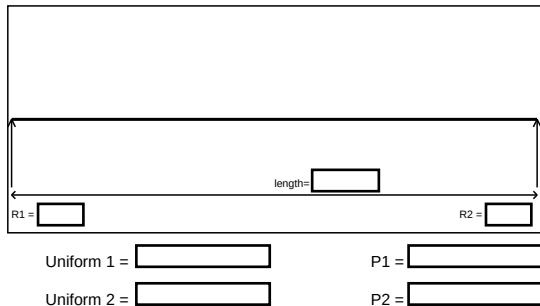
Deflection

TL =

DL =

L =

Description -



length=

R1 = R2 =

Uniform 1 = P1 =

Uniform 2 = P2 =

Controlling Load Combination/ Cd

V = Cd =

M = Cd =

Δ =

V = X k Vall = Ratio =

M = Mall = Ratio =

Deflection

TL =

DL =

L =



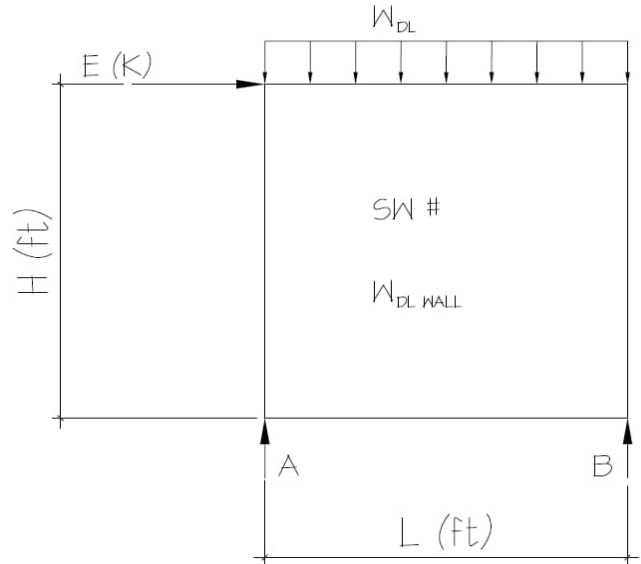
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

201

PARAMETERS:

$L = 9.9$ FT
 $H = 9.1$ FT
 $E = 1.00$ K
 $W_{DLWALL} = 0.10$ KLF
 $W_{DL} = 0.170$ KLF
 $\Omega_0 = 2.5$ (ASCE TABLE 12.2.1 FOOTNOTE)
 $SDS = 1.177$



ANALYSIS:

$E \text{ (UNFACTORED)} = 1.43$
 $E_{MH} = \Omega_0 * E = 3.57$ K
 $E_v = 0.2 * SDS * DL = 0.629$ K
 $E_M = E_{MH} + E_v = 4.201$ K
 $E_M = E_{MH} - E_v = 2.942$ K

$E_M \text{ (MAX)} = \sum M_A = 0 = 4.20(9.1) - R_B(9.9)$ $R_B = 3.9E$
 $R_A = -3.9E$
 $E_M \text{ (MIN)} = \sum M_A = 0 = 2.94(9.1) - R_B(9.9)$ $R_B = 2.7E$
 $R_A = -2.7E$

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



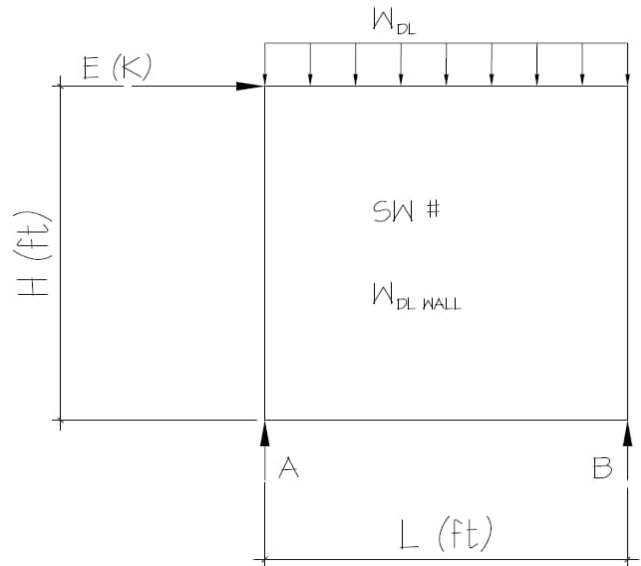
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

207

PARAMETERS:

$L = 7.8$ FT
 $H = 9.1$ FT
 $E = 3.00$ K
 $W_{DLWALL} = 0.10$ KLF
 $W_{DL} = 0.034$ KLF
 $\Omega_0 = 2.5$ (ASCE TABLE 12.2.1 FOOTNOTE)
 $SDS = 1.177$



ANALYSIS:

$E \text{ (UNFACTORED)} = 4.29$
 $E_{MH} = \Omega_0 * E = 10.71$ K
 $E_v = 0.2 * SDS * DL = 0.246$ K
 $E_M = E_{MH} + E_v = 10.960$ K
 $E_M = E_{MH} - E_v = 10.468$ K

$E_M \text{ (MAX)} = \sum M_A = 0 = 10.96(9.1) - R_B(7.8)$ $R_B = 12.8E$
 $R_A = -12.8E$
 $E_M \text{ (MIN)} = \sum M_A = 0 = 10.47(9.1) - R_B(7.8)$ $R_B = 12.2E$
 $R_A = -12.2E$

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



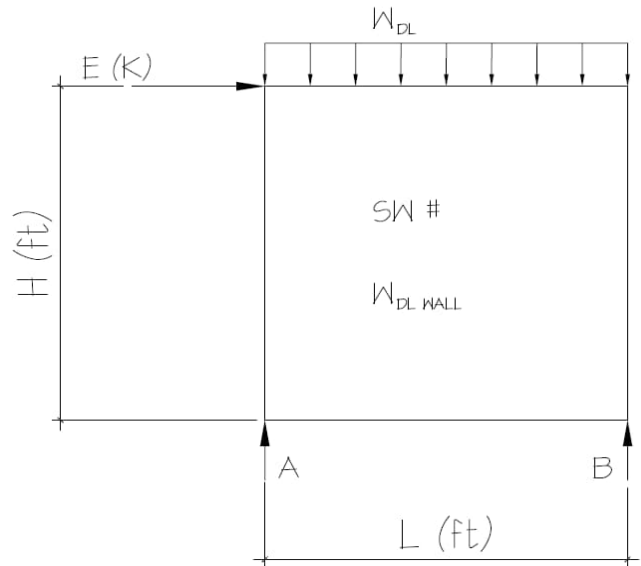
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

210

PARAMETERS:

$L = 8.1$ FT
 $H = 9.1$ FT
 $E = 1.80$ K
 $W_{DLWALL} = 0.10$ KLF
 $W_{DL} = 0.040$ KLF
 $\Omega_0 = 2.5$ (ASCE TABLE 12.2.1 FOOTNOTE)
 $SDS = 1.177$



ANALYSIS:

$E \text{ (UNFACTORED)} = 2.57$
 $E_{MH} = \Omega_0 * E = 6.43$ K
 $E_v = 0.2 * SDS * DL = 0.267$ K
 $E_M = E_{MH} + E_v = 6.696$ K
 $E_M = E_{MH} - E_v = 6.162$ K

$E_M \text{ (MAX)} = \sum M_A = 0 = 6.70(9.1) - R_B(8.1)$ $R_B = 7.5E$
 $R_A = -7.5E$
 $E_M \text{ (MIN)} = \sum M_A = 0 = 6.16(9.1) - R_B(8.1)$ $R_B = 6.9E$
 $R_A = -6.9E$

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



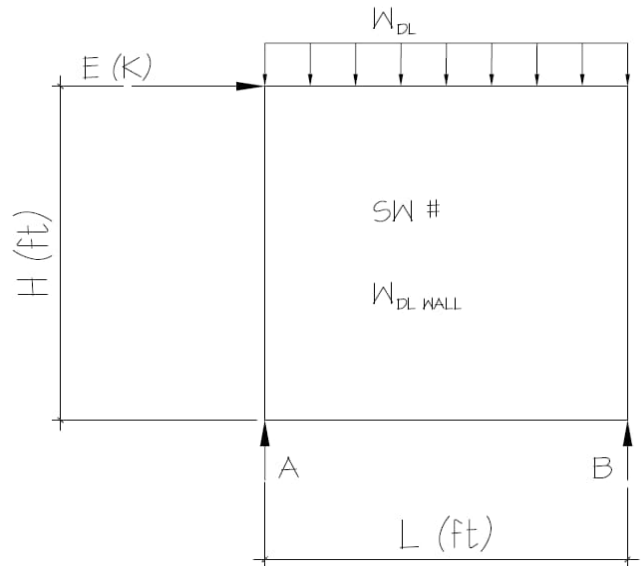
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

101

PARAMETERS:

$L = 16.1$ FT
 $H = 11.0$ FT
 $E = 2.90$ K
 $W_{DLWALL} = 0.10$ KLF
 $W_{DL} = 0.280$ KLF
 $\Omega_0 = 2.5$ (ASCE TABLE 12.2.1 FOOTNOTE)
 $SDS = 1.177$



ANALYSIS:

$E \text{ (UNFACTORED)} = 4.14$
 $E_{MH} = \Omega_0 * E = 10.36$ K
 $E_v = 0.2 * SDS * DL = 1.440$ K
 $E_M = E_{MH} + E_v = 11.797$ K
 $E_M = E_{MH} - E_v = 8.917$ K

$E_M \text{ (MAX)} = \sum M_A = 0 = 11.80(11.0) - R_B(16.1)$

$R_B = 8.1E$

$R_A = -8.1E$

$E_M \text{ (MIN)} = \sum M_A = 0 = 8.92(11.0) - R_B(16.1)$

$R_B = 6.1E$

$R_A = -6.1E$

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



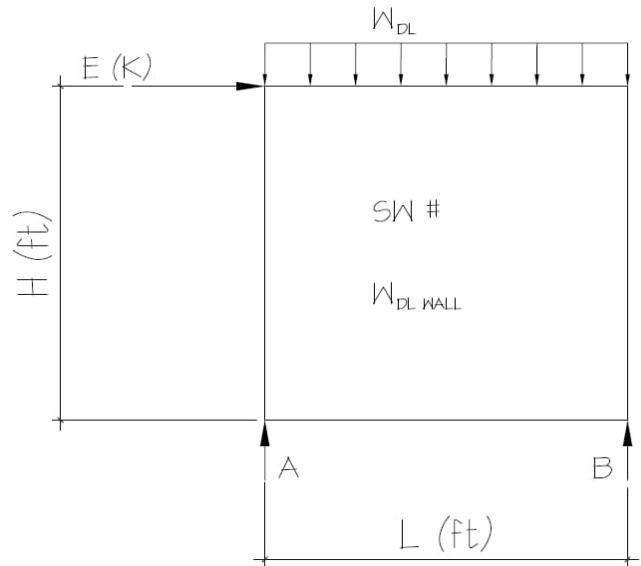
OVERSTRENGTH CALCULATIONS

WALL DESCRIPTION/SW #:

106

PARAMETERS:

$L =$ 3.9 FT
 $H =$ 11.0 FT
 $E =$ 2.20 K
 $W_{DLWALL} =$ 0.10 KLF
 $W_{DL} =$ 0.140 KLF
 $\Omega_0 =$ 2.5 (ASCE TABLE 12.2.1 FOOTNOTE)
 $SDS =$ 1.177



ANALYSIS:

$E \text{ (UNFACTORED)} =$ 3.14
 $E_{MH} = \Omega_0 * E =$ 7.86 K
 $E_v = 0.2 * SDS * DL =$ 0.220 K
 $E_M = E_{MH} + E_v =$ 8.077 K
 $E_M = E_{MH} - E_v =$ 7.637 K

$E_M \text{ (MAX)} = \sum M_A = 0 =$ 8.08(11.0) - $R_B(3.9)$ $R_B =$ 22.8E
 $R_A =$ - 22.8E
 $E_M \text{ (MIN)} = \sum M_A = 0 =$ 7.64(11.0) - $R_B(3.9)$ $R_B =$ 21.5E
 $R_A =$ - 21.5E

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

ALLOWABLE STRESS PERMITTED TO BE INCREASED BY 1.2

SEE FOLLOWING BEAM
CALCS FOR LOAD
APPLICATION

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-1 - OS 201

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-16

Wood Species : 24F-V4 GLB OS

Wood Grade : GLB - Western

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

Fb + 2880 psi

Fb - 2220 psi

Fc - Prll 1980 psi

Fc - Perp 780 psi

Fv 318 psi

Ft 318 psi

E : Modulus of Elasticity

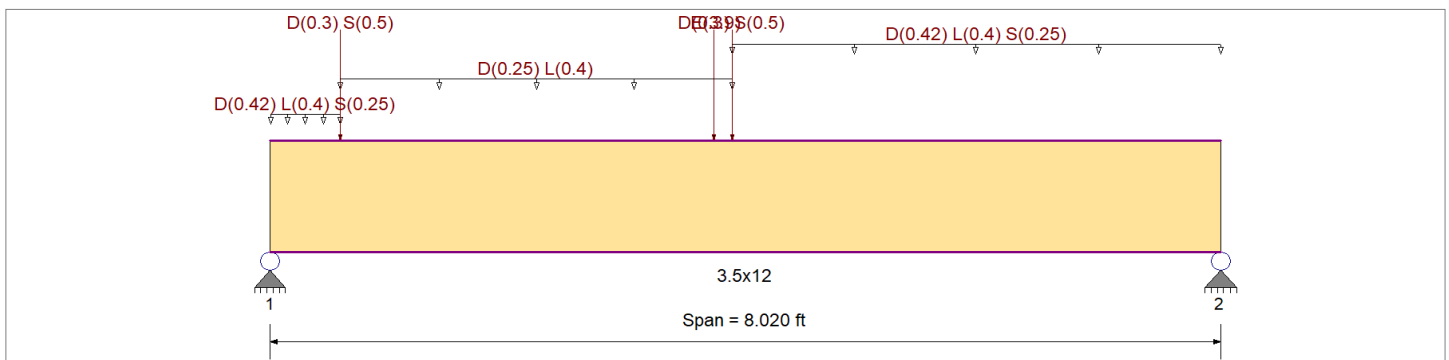
Ebend- xx 1800ksi

Eminbend - xx 950ksi

Ebend- yy ksi

Eminbend - yy ksi

Density 35pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculation

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.420, L = 0.40, S = 0.250 k/ft, Extent = 0.0 --> 0.60 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.250, L = 0.40 k/ft, Extent = 0.60 --> 3.90 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.420, L = 0.40, S = 0.250 k/ft, Extent = 3.90 --> 8.020 ft, Tributary Width = 1.0 ft

Point Load : D = 0.30, S = 0.50 k @ 0.60 ft

Point Load : D = 0.30, S = 0.50 k @ 3.90 ft

Point Load : E = 3.90 k @ 3.750 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.369	1	Maximum Shear Stress Ratio	=	0.282	1
Section used for this span		3.5x12		Section used for this span		3.5x12	
fb: Actual	=	1,700.17psi		fv: Actual	=	89.78 psi	
F'b	=	4,608.00psi		F'v	=	318.00 psi	
Load Combination		+1.105D+0.750L+0.750S+0.5250E		Load Combination		+D+L+H	
Location of maximum on span	=	3.776ft		Location of maximum on span	=	7.025 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.041 in	Ratio = 2331	>=360	Span: 1 : L Only		
Max Upward Transient Deflection		0 in	Ratio = 0	<360	n/a		
Max Downward Total Deflection		0.095 in	Ratio = 1017	>=300	Span: 1 : +D+0.750L+0.750S+H		
Max Upward Total Deflection		0 in	Ratio = 0	<300	n/a		

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _y	Cfu	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+H														0.0	0.00	0.0	0.0
Length = 8.020 ft	1	0.193	0.163	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.50	500.4	2,592.0	1.31	46.7	286.2
+D+L+H														0.0	0.00	0.0	0.0
Length = 8.020 ft	1	0.333	0.282	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	6.72	959.8	2,880.0	2.51	89.8	318.0

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-1 - OS 201

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 _V	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+Lr+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.139	0.118	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.50	500.4	3,600.0	1.31	46.7	397.5
+D+S+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.246	0.206	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.71	816.0	3,312.0	2.11	75.4	365.7
+D+0.750Lr+0.750L+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.235	0.199	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.91	845.0	3,600.0	2.21	79.0	397.5
+D+0.750L+0.750S+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.327	0.275	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	1,081.6	3,312.0	2.81	100.5	365.7
+D+0.60W+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.109	0.092	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.50	500.4	4,608.0	1.31	46.7	508.8
+D+0.750Lr+0.750L+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.183	0.155	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	5.91	845.0	4,608.0	2.21	79.0	508.8
+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 = 8.020 ft	1	0.235	0.198	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.57	1,081.6	4,608.0	2.81	100.5	508.8
+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 = 8.020 ft	1	0.065	0.055	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.10	300.2	4,608.0	0.78	28.0	508.8
+D+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 = 8.020 ft	1	0.276	0.181	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.89	1,270.3	4,608.0	2.58	92.3	508.8
+D-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 = 8.020 ft	1	0.080	0.115	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	2.00	285.6	3,552.0	1.65	58.8	508.8
+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 = 8.020 ft	1	0.358	0.265	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	11.54	1,648.3	4,608.0	3.77	134.7	508.8
+D+0.750L+0.750S-0.5250E+I						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.130	0.130	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.18	597.4	4,608.0	1.86	66.3	508.8
+0.60D+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 = 8.020 ft	1	0.233	0.148	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.51	1,073.4	4,608.0	2.11	75.3	508.8
+0.60D-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 = 8.020 ft	1	0.136	0.105	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.38	482.5	3,552.0	1.50	53.5	508.8
+1.140D+0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.291	0.194	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	9.37	1,339.3	4,608.0	2.77	98.8	508.8
+1.140D-0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.061	0.119	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	1.52	216.6	3,552.0	1.70	60.6	508.8
+1.105D+0.750L+0.750S+0.5250E+I						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.369	0.274	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	11.90	1,700.2	4,608.0	3.91	139.6	508.8
+1.105D+0.750L+0.750S-0.5250E+I						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.140	0.140	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.53	646.7	4,608.0	1.99	71.2	508.8
+0.460D+0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.218	0.137	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.03	1,004.4	4,608.0	1.96	69.9	508.8
+0.460D-0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 8.020 ft	1	0.155	0.102	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	3.86	551.5	3,552.0	1.45	51.6	508.8

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.450W+H	1	0.0946	4.069		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	4.893	4.685
Max Upward from Load Combinations	4.893	4.685

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-1 - OS 201

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from Load Cases	2.076	1.824
Max Downward from all Load Conditio	-2.076	-1.824
Max Downward from Load Combinations	-0.402	-0.235
Max Downward from Load Cases (Resis	-2.076	-1.824
+D+H	1.753	1.736
+D+L+H	3.357	3.340
+D+Lr+H	1.753	1.736
+D+S+H	2.882	2.788
+D+0.750Lr+0.750L+H	2.956	2.939
+D+0.750L+0.750S+H	3.802	3.728
+D+0.60W+H	1.753	1.736
+D+0.750Lr+0.750L+0.450W+H	2.956	2.939
+D+0.750L+0.750S+0.450W+H	3.802	3.728
+0.60D+0.60W+0.60H	1.052	1.042
+D+0.70E+0.60H	3.207	3.013
+D-0.70E+0.60H	0.300	0.460
+D+0.750L+0.750S+0.5250E+H	4.893	4.685
+D+0.750L+0.750S-0.5250E+H	2.712	2.770
+0.60D+0.70E+H	2.505	2.318
+0.60D-0.70E+H	-0.402	-0.235
D Only	1.753	1.736
L Only	1.604	1.604
S Only	1.128	1.052
E Only	2.076	1.824
E Only * -1.0	-2.076	-1.824
H Only		

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-4 - OS 207

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-16

Wood Species : 24F-V4 GLB OS

Wood Grade : GLB - Western

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

Fb + 2,880.0 psi

Fb - 2,220.0 psi

Fc - Prll 1,980.0 psi

Fc - Perp 780.0 psi

Fv 318.0 psi

Ft 318.0 psi

E : Modulus of Elasticity

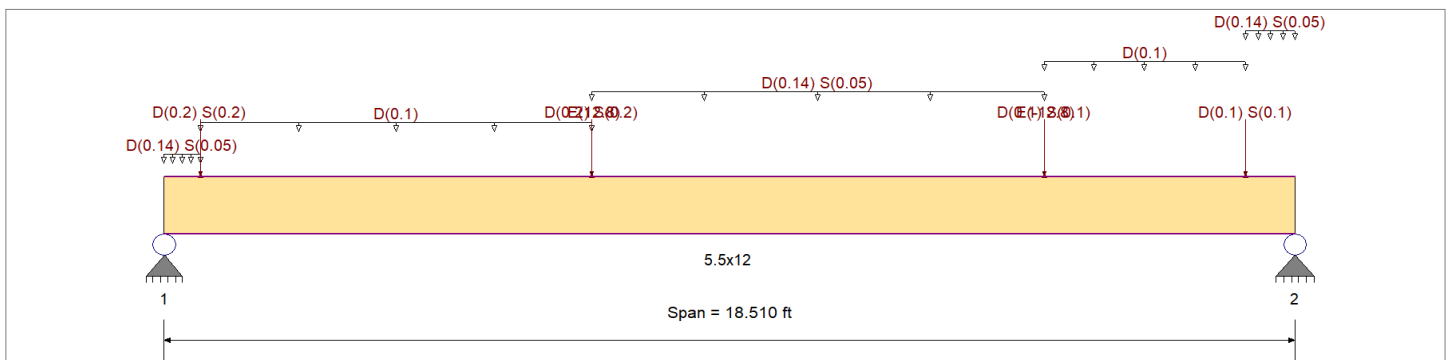
Ebend- xx 1,800.0ksi

Eminbend - xx 950.0ksi

Ebend- yy ksi

Eminbend - yy ksi

Density 35.0pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculation

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.140, S = 0.050 k/ft, Extent = 0.0 --> 0.60 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.10 k/ft, Extent = 0.60 --> 7.0 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.140, S = 0.050 k/ft, Extent = 7.0 --> 14.40 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.10 k/ft, Extent = 14.40 --> 17.70 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.140, S = 0.050 k/ft, Extent = 17.70 --> 18.510 ft, Tributary Width = 1.0 ft

Point Load : D = 0.20, S = 0.20 k @ 0.60 ft

Point Load : D = 0.20, S = 0.20 k @ 7.0 ft

Point Load : D = 0.10, S = 0.10 k @ 14.40 ft

Point Load : D = 0.10, S = 0.10 k @ 17.70 ft

Point Load : E = 12.80 k @ 7.0 ft

Point Load : E = -12.80 k @ 14.40 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.643	1	Maximum Shear Stress Ratio	=	0.282	: 1
Section used for this span		5.5x12		Section used for this span		5.5x12	
fb: Actual	=	2,961.10psi		fv: Actual	=	143.51 psi	
F'b	=	4,608.00psi		F'v	=	508.80 psi	
Load Combination		+1.140D+0.70E		Load Combination		+1.140D+0.70E	
Location of maximum on span	=	7.026ft		Location of maximum on span	=	14.389 ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection		0.099 in	Ratio = 2241 >= 360	Span: 1 : S Only			
Max Upward Transient Deflection		0 in	Ratio = 0 < 360	n/a			
Max Downward Total Deflection		0.404 in	Ratio = 550 >= 300	Span: 1 : +D+S+H			
Max Upward Total Deflection		0 in	Ratio = 0 < 300	n/a			

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-4 - OS 207

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 _v	C _{fu}	C _i	C _r	M	fb	F ^b	V	fv	F ^v
+D+H															0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.247	0.102	0.90	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.04	640.1	2,592.0	1.29	29.3	286.2
+D+L+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.222	0.092	1.00	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.04	640.1	2,880.0	1.29	29.3	318.0
+D+Lr+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.178	0.074	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.04	640.1	3,600.0	1.29	29.3	397.5
+D+S+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.257	0.103	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	9.38	852.6	3,312.0	1.66	37.7	365.7
+D+0.750Lr+0.750L+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.178	0.074	1.25	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.04	640.1	3,600.0	1.29	29.3	397.5
+D+0.750L+0.750S+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.241	0.097	1.15	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.79	799.5	3,312.0	1.57	35.6	365.7
+D+0.60W+H						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.139	0.058	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.04	640.1	4,608.0	1.29	29.3	508.8
+D+0.750Lr+0.750L+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.139	0.058	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	7.04	640.1	4,608.0	1.29	29.3	508.8
+D+0.750L+0.750S+0.450W+						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.174	0.070	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	8.79	799.5	4,608.0	1.57	35.6	508.8
+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 = 18.510 ft	1		0.083	0.035	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	4.22	384.1	4,608.0	0.77	17.6	508.8
+D+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 = 18.510 ft	1		0.624	0.277	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	31.63	2,875.9	4,608.0	6.20	140.9	508.8
+D-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 = 18.510 ft	1		0.386	0.255	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	19.54	1,776.6	4,608.0	5.71	129.7	508.8
+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 = 18.510 ft	1		0.534	0.226	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	27.08	2,461.7	4,608.0	5.06	114.9	508.8
+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 = 18.510 ft	1		0.337	0.198	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	17.09	1,553.5	4,608.0	4.44	100.8	508.8
+0.60D+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 = 18.510 ft	1		0.571	0.262	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	28.96	2,632.3	4,608.0	5.87	133.4	508.8
+0.60D-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 = 18.510 ft	1		0.536	0.249	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	20.92	1,902.2	3,552.0	5.57	126.7	508.8
+1.140D+0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.643	0.282	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	32.57	2,961.1	4,608.0	6.31	143.5	508.8
+1.140D-0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.399	0.257	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	20.23	1,838.6	4,608.0	5.75	130.7	508.8
+1.105D+0.750L+0.750S+0.52						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.548	0.230	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	27.78	2,525.7	4,608.0	5.14	116.9	508.8
+1.105D+0.750L+0.750S-0.52						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.347	0.200	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	17.60	1,600.1	4,608.0	4.47	101.6	508.8
+0.460D+0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.553	0.257	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	28.02	2,547.0	4,608.0	5.76	130.8	508.8
+0.460D-0.70E						1.00	1.00	1.00	1.000	1.00	1.00	1.00			0.0	0.00	0.0	0.0
Length = 18.510 ft	1		0.559	0.247	1.60	1.00	1.00	1.00	1.000	1.00	1.00	1.00	21.86	1,987.0	3,552.0	5.53	125.6	508.8

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+S+H	1	0.4036	9.323		0.0000	0.000

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B2-4 - OS 207

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	5.150	5.117
Max Upward from Load Combinations	5.150	5.115
Max Upward from Load Cases	5.117	5.117
Max Downward from all Load Conditions	-5.117	-5.117
Max Downward from Load Combinations	-2.641	-2.662
Max Downward from Load Cases (Resis)	-5.117	-5.117
+D+H	1.568	1.533
+D+L+H	1.568	1.533
+D+Lr+H	1.568	1.533
+D+S+H	2.099	2.042
+D+0.750Lr+0.750L+H	1.568	1.533
+D+0.750L+0.750S+H	1.966	1.915
+D+0.60W+H	1.568	1.533
+D+0.750Lr+0.750L+0.450W+H	1.568	1.533
+D+0.750L+0.750S+0.450W+H	1.966	1.915
+0.60D+0.60W+0.60H	0.941	0.920
+D+0.70E+0.60H	5.150	-2.049
+D-0.70E+0.60H	-2.014	5.115
+D+0.750L+0.750S+0.5250E+H	4.652	-0.772
+D+0.750L+0.750S-0.5250E+H	-0.721	4.601
+0.60D+0.70E+H	4.523	-2.662
+0.60D-0.70E+H	-2.641	4.502
D Only	1.568	1.533
S Only	0.531	0.510
E Only	5.117	-5.117
E Only * -1.0	-5.117	5.117
H Only		

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: H2-16 - OS 210

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design

Load Combination : ASCE 7-16

Wood Species : 24F-V4 GLB OS

Wood Grade : GLB - Western

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

Fb + 2,880.0 psi

Fb - 2,220.0 psi

Fc - Prll 1,980.0 psi

Fc - Perp 780.0 psi

Fv 318.0 psi

Ft 318.0 psi

E : Modulus of Elasticity

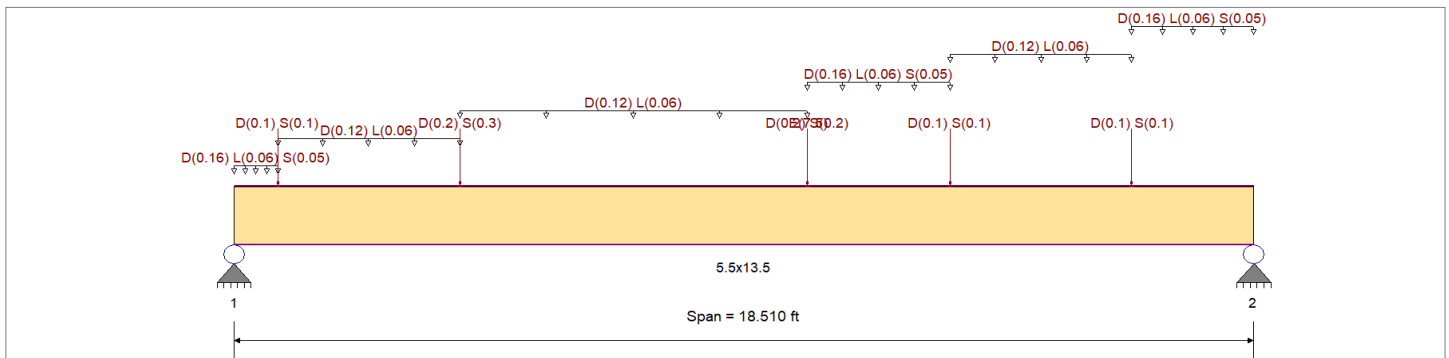
Ebend- xx 1,800.0ksi

Eminbend - xx 950.0ksi

Ebend- yy ksi

Eminbend - yy ksi

Density 35.0pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculation

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.160, L = 0.060, S = 0.050 k/ft, Extent = 0.0 --> 0.80 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.120, L = 0.060 k/ft, Extent = 0.80 --> 4.10 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.120, L = 0.060 k/ft, Extent = 4.10 --> 10.40 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.160, L = 0.060, S = 0.050 k/ft, Extent = 10.40 --> 13.0 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.120, L = 0.060 k/ft, Extent = 13.0 --> 16.30 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.160, L = 0.060, S = 0.050 k/ft, Extent = 16.30 --> 18.510 ft, Tributary Width = 1.0 ft

Point Load : D = 0.10, S = 0.10 k @ 0.80 ft

Point Load : D = 0.20, S = 0.30 k @ 4.10 ft

Point Load : D = 0.10, S = 0.10 k @ 13.0 ft

Point Load : D = 0.20, S = 0.20 k @ 10.40 ft

Point Load : D = 0.10, S = 0.10 k @ 16.30 ft

Point Load : E = 7.50 k @ 10.40 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.518 1	Maximum Shear Stress Ratio	=	0.187 : 1
Section used for this span		5.5x13.5	Section used for this span		5.5x13.5
fb: Actual	=	2,374.23psi	fv: Actual	=	95.38 psi
F'b	=	4,579.43psi	F'v	=	508.80 psi
Load Combination	=	+1.140D+0.70E	Load Combination	=	+1.140D+0.70E
Location of maximum on span	=	10.403ft	Location of maximum on span	=	17.429ft
Span # where maximum occurs	=	Span # 1	Span # where maximum occurs	=	Span # 1
Maximum Deflection					
Max Downward Transient Deflection	0.079 in	Ratio =	2828	>=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.358 in	Ratio =	621	>=300	Span: 1 : +D+0.750L+0.750S+H
Max Upward Total Deflection	0 in	Ratio =	0	<300	n/a

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: H2-16 - OS 210

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 _v	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	Fv	
																0.0	0.00	0.0	0.0
+D+H	Length = 18.510 ft	1	0.224	0.110	0.90	1.00	1.00	1.00	0.994	1.00	1.00	1.00	8.02	576.3	2,575.9	1.55	31.4	286.2	
+D+L+H	Length = 18.510 ft	1	0.265	0.130	1.00	1.00	1.00	1.00	0.994	1.00	1.00	1.00	10.58	759.7	2,862.1	2.04	41.3	318.0	
+D+Lr+H	Length = 18.510 ft	1	0.161	0.079	1.25	1.00	1.00	1.00	0.994	1.00	1.00	1.00	8.02	576.3	3,577.7	1.55	31.4	397.5	
+D+S+H	Length = 18.510 ft	1	0.229	0.112	1.15	1.00	1.00	1.00	0.994	1.00	1.00	1.00	10.51	755.0	3,291.5	2.03	41.0	365.7	
+D+0.750Lr+0.750L+H	Length = 18.510 ft	1	0.200	0.098	1.25	1.00	1.00	1.00	0.994	1.00	1.00	1.00	9.94	713.8	3,577.7	1.92	38.8	397.5	
+D+0.750L+0.750S+H	Length = 18.510 ft	1	0.257	0.126	1.15	1.00	1.00	1.00	0.994	1.00	1.00	1.00	11.79	846.6	3,291.5	2.28	46.0	365.7	
+D+0.60W+H	Length = 18.510 ft	1	0.126	0.062	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	8.02	576.3	4,579.4	1.55	31.4	508.8	
+D+0.750Lr+0.750L+0.450W+	Length = 18.510 ft	1	0.156	0.076	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	9.94	713.8	4,579.4	1.92	38.8	508.8	
+D+0.750L+0.750S+0.450W+H	Length = 18.510 ft	1	0.185	0.090	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	11.79	846.6	4,579.4	2.28	46.0	508.8	
+0.60D+0.60W+0.60H	Length = 18.510 ft	1	0.076	0.037	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	4.81	345.8	4,579.4	0.93	18.8	508.8	
+D+0.70E+0.60H	Length = 18.510 ft	1	0.501	0.179	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	31.93	2,293.6	4,579.4	4.50	91.0	508.8	
+D-0.70E+0.60H	Length = 18.510 ft	1	0.323	0.108	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	15.89	1,141.6	3,530.0	2.71	54.8	508.8	
+D+0.750L+0.750S+0.5250E+	Length = 18.510 ft	1	0.466	0.178	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	29.72	2,134.7	4,579.4	4.49	90.7	508.8	
+D+0.750L+0.750S-0.5250E+H	Length = 18.510 ft	1	0.125	0.074	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	6.15	441.7	3,530.0	1.86	37.6	508.8	
+0.60D+0.70E+H	Length = 18.510 ft	1	0.451	0.154	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	28.72	2,063.2	4,579.4	3.88	78.4	508.8	
+0.60D-0.70E+H	Length = 18.510 ft	1	0.389	0.112	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	19.10	1,372.0	3,530.0	2.81	56.7	508.8	
+1.140D+0.70E	Length = 18.510 ft	1	0.518	0.187	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	33.05	2,374.2	4,579.4	4.72	95.4	508.8	
+1.140D-0.70E	Length = 18.510 ft	1	0.301	0.106	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	14.77	1,061.0	3,530.0	2.68	54.2	508.8	
+1.105D+0.750L+0.750S+0.5250E+H	Length = 18.510 ft	1	0.479	0.185	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	30.56	2,195.2	4,579.4	4.65	94.0	508.8	
+1.105D+0.750L+0.750S-0.5250E+H	Length = 18.510 ft	1	0.108	0.073	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	5.31	381.2	3,530.0	1.83	37.1	508.8	
+0.460D+0.70E	Length = 18.510 ft	1	0.433	0.146	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	27.60	1,982.6	4,579.4	3.66	74.0	508.8	
+0.460D-0.70E	Length = 18.510 ft	1	0.412	0.113	1.60	1.00	1.00	1.00	0.994	1.00	1.00	1.00	20.22	1,452.7	3,530.0	2.84	57.4	508.8	

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+0.750L+0.750S+0.450W+H	1	0.3576	9.323		0.0000	0.000

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: H2-16 - OS 210

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	4.289	4.772
Max Upward from Load Combinations	4.289	4.772
Max Upward from Load Cases	3.286	4.214
Max Downward from all Load Conditions	-3.286	-4.214
Max Downward from Load Combinations	-1.260	-1.902
Max Downward from Load Cases (Resis)	-3.286	-4.214
+D+H	1.733	1.746
+D+L+H	2.288	2.302
+D+Lr+H	1.733	1.746
+D+S+H	2.285	2.275
+D+0.750Lr+0.750L+H	2.150	2.163
+D+0.750L+0.750S+H	2.564	2.559
+D+0.60W+H	1.733	1.746
+D+0.750Lr+0.750L+0.450W+H	2.150	2.163
+D+0.750L+0.750S+0.450W+H	2.564	2.559
+0.60D+0.60W+0.60H	1.040	1.048
+D+0.70E+0.60H	4.033	4.696
+D-0.70E+0.60H	-0.567	-1.203
+D+0.750L+0.750S+0.5250E+H	4.289	4.772
+D+0.750L+0.750S-0.5250E+H	0.839	0.347
+0.60D+0.70E+H	3.340	3.998
+0.60D-0.70E+H	-1.260	-1.902
D Only	1.733	1.746
L Only	0.555	0.555
S Only	0.552	0.528
E Only	3.286	4.214
E Only * -1.0	-3.286	-4.214
H Only		

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B1-5 - OS 106

CODE REFERENCES

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

Load Combination Set : ASCE 7-16

Material Properties

Analysis Method : Allowable Stress Design

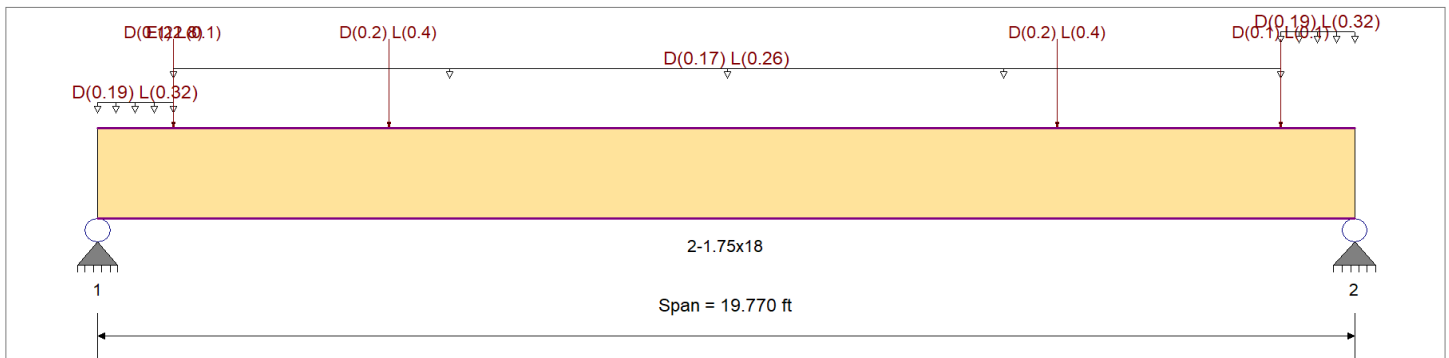
Load Combination : ASCE 7-16

Wood Species : 1.9E LVL OS

Wood Grade : Manufactured

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

Fb +	3120 psi	E : Modulus of Elasticity	
Fb -	3120 psi	Ebend- xx	1900ksi
Fc - Prll	3012 psi	Eminbend - xx	101654ksi
Fc - Perp	900 psi		
Fv	342 psi		
Ft	1866 psi	Density	35 pcf



Applied Loads

Service loads entered. Load Factors will be applied for calculation

Beam self weight calculated and added to loading

Load for Span Number 1

Uniform Load : D = 0.190, L = 0.320 k/ft, Extent = 0.0 --> 1.20 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.170, L = 0.260 k/ft, Extent = 1.20 --> 18.60 ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.190, L = 0.320 k/ft, Extent = 18.60 --> 19.770 ft, Tributary Width = 1.0 ft

Point Load : D = 0.10, L = 0.10 k @ 1.20 ft

Point Load : D = 0.20, L = 0.40 k @ 4.60 ft

Point Load : D = 0.20, L = 0.40 k @ 15.10 ft

Point Load : D = 0.10, L = 0.10 k @ 18.60 ft

Point Load : E = 22.80 k @ 1.20 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio = 0.534 : 1				Maximum Shear Stress Ratio = 0.304 : 1			
Section used for this span 2-1.75x18				Section used for this span 2-1.75x18			
fb: Actual	=	1,576.55psi		fv: Actual	=	103.83 psi	
F'b	=	2,952.61psi		F'v	=	342.00 psi	
Load Combination	=	+D+L+H		Load Combination	=	+D+L+H	
Location of maximum on span	=	9.885ft		Location of maximum on span	=	0.000ft	
Span # where maximum occurs	=	Span # 1		Span # where maximum occurs	=	Span # 1	
Maximum Deflection							
Max Downward Transient Deflection	0.327 in	Ratio = 724	>=360	Span: 1 : L Only			
Max Upward Transient Deflection	0 in	Ratio = 0	<360	n/a			
Max Downward Total Deflection	0.552 in	Ratio = 429	>=300	Span: 1 : +D+L+H			
Max Upward Total Deflection	0 in	Ratio = 0	<300	n/a			

Maximum Forces & Stresses for Load Combinations

Load Combination		Max Stress Ratios										Moment Values			Shear Values		
Segment Length	Span #	M	V	CD	CM	C _t	CLx	C _F	C _{fu}	C _i	C _r	M	fb	F'b	V	fv	F'v
+D+H														0.0	0.00	0.0	0.0
Length = 19.770 ft	1	0.242	0.137	0.90	1.00	1.00	1.00	0.946	1.00	1.00	1.00	10.11	642.1	2,657.3	1.76	42.0	307.8
+D+L+H					1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

DESCRIPTION: B1-5 - OS 106**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
+D+Lr+H	Length = 19.770 ft	1	0.534	0.304	1.00	1.00	1.00	1.00	0.946	1.00	1.00	1.00	24.83	1,576.5	2,952.6	4.36	103.8	342.0
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+S+H	Length = 19.770 ft	1	0.174	0.098	1.25	1.00	1.00	1.00	0.946	1.00	1.00	1.00	10.11	642.1	3,690.8	1.76	42.0	427.5
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.750Lr+0.750L+H	Length = 19.770 ft	1	0.189	0.107	1.15	1.00	1.00	1.00	0.946	1.00	1.00	1.00	10.11	642.1	3,395.5	1.76	42.0	393.3
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.750L+0.750S+H	Length = 19.770 ft	1	0.364	0.207	1.25	1.00	1.00	1.00	0.946	1.00	1.00	1.00	21.15	1,342.9	3,690.8	3.71	88.4	427.5
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.60W+H	Length = 19.770 ft	1	0.396	0.225	1.15	1.00	1.00	1.00	0.946	1.00	1.00	1.00	21.15	1,342.9	3,395.5	3.71	88.4	393.3
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.750Lr+0.750L+0.450W+	Length = 19.770 ft	1	0.136	0.077	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	10.11	642.1	4,724.2	1.76	42.0	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.750L+0.750S+0.450W+H	Length = 19.770 ft	1	0.284	0.162	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	21.15	1,342.9	4,724.2	3.71	88.4	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+0.60D+0.60W+0.60H	Length = 19.770 ft	1	0.284	0.162	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	21.15	1,342.9	4,724.2	3.71	88.4	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.70E+0.60H	Length = 19.770 ft	1	0.082	0.046	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	6.07	385.3	4,724.2	1.06	25.2	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D-0.70E+0.60H	Length = 19.770 ft	1	0.299	0.119	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	22.22	1,410.7	4,724.2	2.73	65.1	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.750L+0.750S+0.5250E+	Length = 19.770 ft	1	0.208	0.119	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	15.48	982.6	4,724.2	2.73	65.1	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+D+0.750L+0.750S-0.5250E+H	Length = 19.770 ft	1	0.390	0.193	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	29.02	1,842.8	4,724.2	4.44	105.6	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+0.60D+0.70E+H	Length = 19.770 ft	1	0.197	0.193	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	14.67	931.2	4,724.2	4.44	105.7	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+0.60D-0.70E+H	Length = 19.770 ft	1	0.262	0.088	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	19.52	1,239.1	4,724.2	2.03	48.3	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+1.140D+0.70E	Length = 19.770 ft	1	0.221	0.088	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	16.47	1,045.8	4,724.2	2.03	48.3	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+1.140D-0.70E	Length = 19.770 ft	1	0.313	0.130	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	23.32	1,480.9	4,724.2	2.98	70.9	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+1.105D+0.750L+0.750S+0.5250E+	Length = 19.770 ft	1	0.203	0.130	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	15.13	960.5	4,724.2	2.98	71.0	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+1.105D+0.750L+0.750S-0.5250E+H	Length = 19.770 ft	1	0.404	0.201	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	30.05	1,908.1	4,724.2	4.62	110.0	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+0.460D+0.70E	Length = 19.770 ft	1	0.211	0.201	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	15.69	996.4	4,724.2	4.62	110.1	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
+0.460D-0.70E	Length = 19.770 ft	1	0.257	0.077	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	19.11	1,213.2	4,724.2	1.78	42.4	547.2
						1.00	1.00	1.00	0.946	1.00	1.00	1.00			0.0	0.00	0.0	0.0
	Length = 19.770 ft	1	0.226	0.077	1.60	1.00	1.00	1.00	0.946	1.00	1.00	1.00	16.82	1,067.9	4,724.2	1.78	42.4	547.2

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L+H	1	0.5518	9.957		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	21.416	5.294

Wood Beam

Project File: beam calcs with overstrength.eci

LIC# : KW-06017913, Build:20.24.08.01

MULHERN & KULP STRUCTURAL ENGINEERING INC

(c) ENERCALC INC 1983-2023

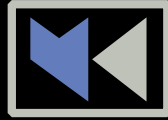
DESCRIPTION: B1-5 - OS 106

Vertical Reactions

Support notation : Far left is #1

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from Load Combinations	17.148	5.294
Max Upward from Load Cases	21.416	3.139
Max Downward from all Load Conditi	-21.416	-1.384
Max Downward from Load Combinations	-13.697	
Max Downward from Load Cases (Resis	-21.416	-1.384
+D+H	2.156	2.155
+D+L+H	5.300	5.294
+D+Lr+H	2.156	2.155
+D+S+H	2.156	2.155
+D+0.750Lr+0.750L+H	4.514	4.509
+D+0.750L+0.750S+H	4.514	4.509
+D+0.60W+H	2.156	2.155
+D+0.750Lr+0.750L+0.450W+H	4.514	4.509
+D+0.750L+0.750S+0.450W+H	4.514	4.509
+0.60D+0.60W+0.60H	1.294	1.293
+D+0.70E+0.60H	17.148	3.123
+D-0.70E+0.60H	-12.835	1.186
+D+0.750L+0.750S+0.5250E+H	15.757	5.236
+D+0.750L+0.750S-0.5250E+H	-6.730	3.782
+0.60D+0.70E+H	16.285	2.262
+0.60D-0.70E+H	-13.697	0.324
D Only	2.156	2.155
L Only	3.143	3.139
E Only	21.416	1.384
E Only * -1.0	-21.416	-1.384
H Only		



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEAR WALL CALCULATIONS WIND

HIGHLANDS BUILDERS GROUP

SEAR PLAT - LOT 2

MERCER ISLAND, WA

PARAMETERS:

SINGLE FAMILY HOME

DESIGN WIND SPEED: 100 MPH

WIND EXPOSURE CATEGORY: B

SEISMIC DESIGN CATEGORY: D

CODE & DESIGN STANDARD: 2021 IBC CH. 1609, ASCE 7-16 CH. 26-30

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

NICHOLAS MARTIGNETTI, P.E., PROJECT MANAGER

RYAN CHAN, E.I.T., STAFF ENGINEER II



WIND DESIGN SUMMARY PER ASCE 7-16

M+K PROJECT #: 244-25011
ENGINEER: RSC

PARAMETERS:

WIND SPEED	100
EXPOSURE CATEGORY	B
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	5.0	:12
LONG. ROOF PITCH	5.0	:12
MEAN ROOF HEIGHT, H	25.06	FT

BUILDING GEOMETRY:

LENGTH	80	FT
WIDTH	45	FT
NUMBER OF STORIES	2	

TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)

DIAPHRAGM
LEVEL

FLOOR-TO-
FLOOR
HEIGHT

TRIBUTARY DESIGN AREAS:

SECTION

A O B

2

9.08

FT

ROOF SURFACE

0 343 0 SQ FT

WALL SURFACE

0 548 0 SQ FT

1

12.56

FT

ROOF SURFACE

0 0 0 SQ FT

WALL SURFACE

0 866 0 SQ FT

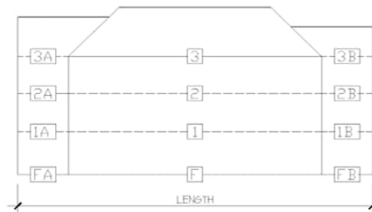
FND

ROOF SURFACE

0 0 0 SQ FT

WALL SURFACE

0 0 0 SQ FT



**TRIBUTARY DESIGN LOADS:
(0.6W)**

SECTION

A O B

STORY SHEAR

0.00 6.92 0.00 KIPS

TOTAL SHEAR

0.00 6.92 0.00 KIPS

6.92 KIPS

STORY SHEAR

0.00 8.31 0.00 KIPS

TOTAL SHEAR

0.00 15.22 0.00 KIPS

15.22 KIPS

STORY SHEAR

0.00 0.00 0.00 KIPS

TOTAL SHEAR

0.00 15.22 0.00 KIPS

15.22 KIPS

LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

DIAPHRAGM
LEVEL

FLOOR-TO-
FLOOR
HEIGHT

TRIBUTARY DESIGN AREAS:

SECTION

A O B

2

9.08

FT

ROOF SURFACE

0 161 0 SQ FT

WALL SURFACE

0 322 0 SQ FT

1

12.56

FT

ROOF SURFACE

0 0 0 SQ FT

WALL SURFACE

0 489 0 SQ FT

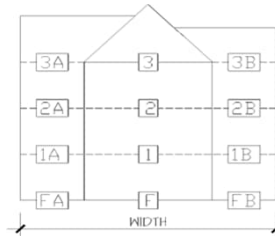
FND

ROOF SURFACE

0 0 0 SQ FT

WALL SURFACE

0 0 0 SQ FT



**TRIBUTARY DESIGN LOADS:
(0.6W)**

SECTION

A O B

STORY SHEAR

0.00 3.86 0.00 KIPS

TOTAL SHEAR

0.00 3.86 0.00 KIPS

3.86 KIPS

STORY SHEAR

0.00 4.69 0.00 KIPS

TOTAL SHEAR

0.00 8.56 0.00 KIPS

8.56 KIPS

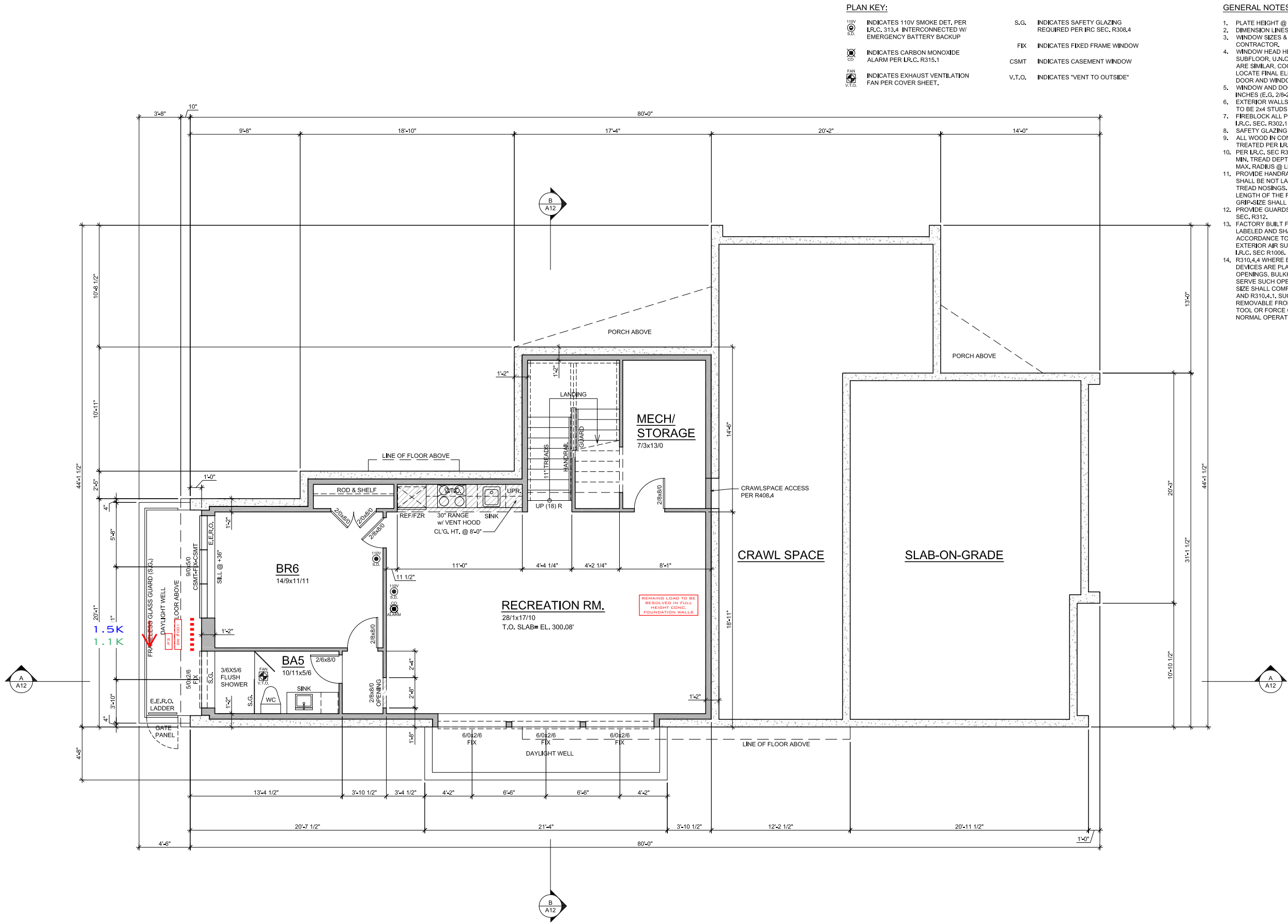
STORY SHEAR

0.00 0.00 0.00 KIPS

TOTAL SHEAR

0.00 8.56 0.00 KIPS

8.56 KIPS



BASEMENT FLOOR PLAN

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

Comment

Revisions

2025.04.11
24-008

Date:

Job No:

Project No:

Drawn:

Approved:

Owner



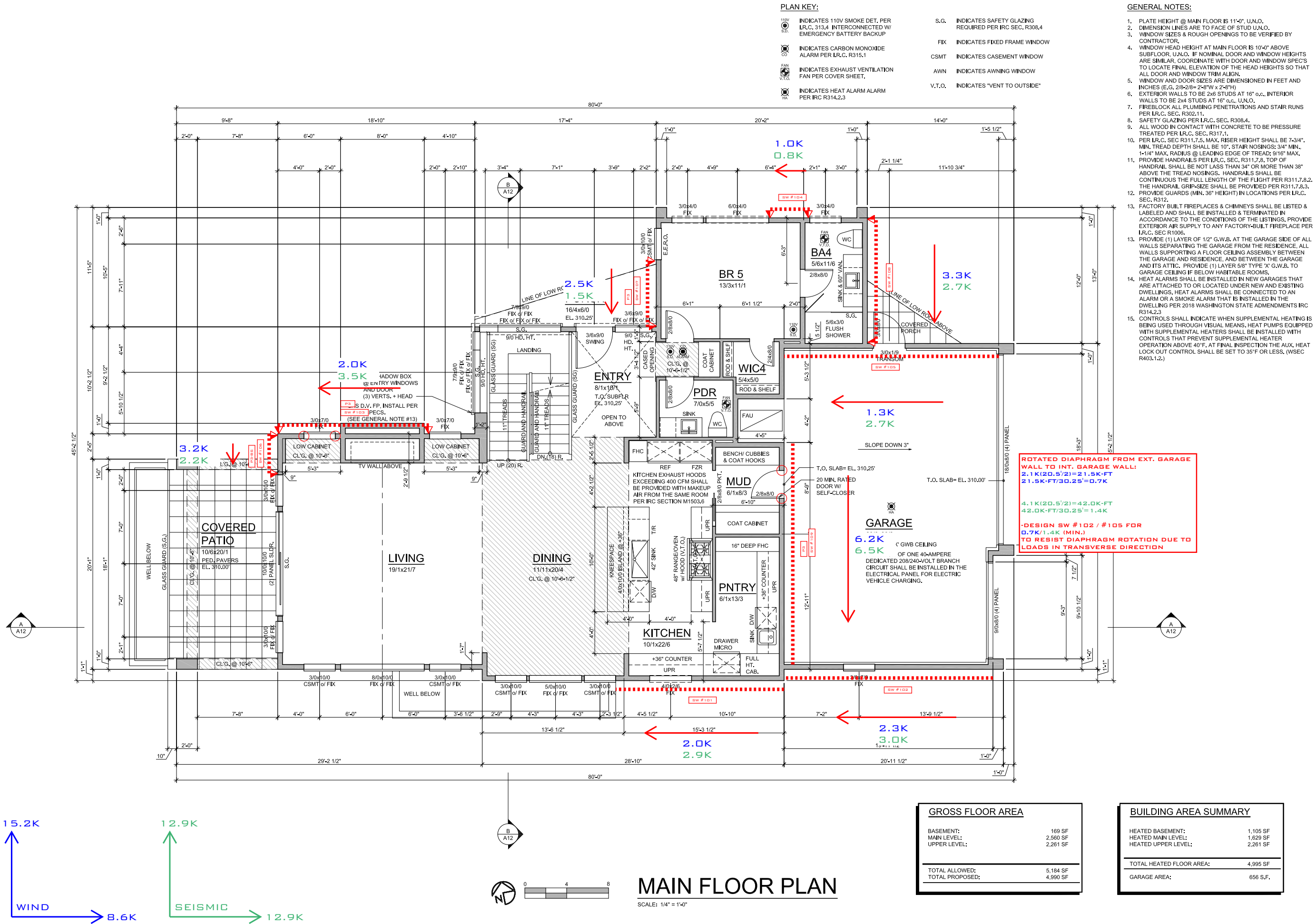
SEARS PLAT - LOT 2

Mercer Island
Washington
98040

PRELIMINARY

Lower Floor
Plan

A4



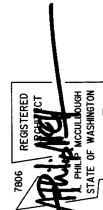
Comment

Revisions

2025.04.11
24-008

Date:
Job No:
Project No:
Drawn:
Approved:

Owner



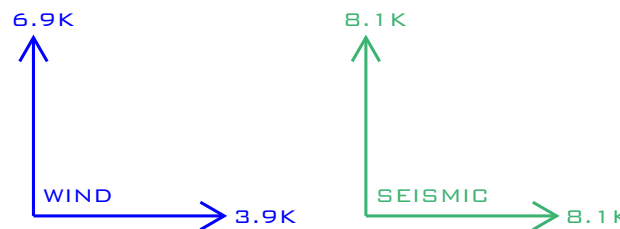
SEARS PLAT - LOT 2

Mercer Island
Washington
98040

PRELIMINARY

Main Floor
Plan

A6



PLAN KEY:

- | | | | |
|---------------|---|--------|---|
| 15V
S.D. | INDICATES 110V SMOKE DET. PER I.R.C. 313.4 INTERCONNECTED W/ EMERGENCY BATTERY BACKUP | S.G. | INDICATES SAFETY GLAZING REQUIRED PER IRC SEC. R308.4 |
| CO | INDICATES CARBON MONOXIDE ALARM PER I.R.C. R315.1 | FIX | INDICATES FIXED FRAME WINDOW |
| FAN
V.T.O. | INDICATES EXHAUST VENTILATION FAN PER COVER SHEET | CSMT | INDICATES CASEMENT WINDOW |
| HA | INDICATES HEAT ALARM ALARM PER IRC R314.2.3 | AWN | INDICATES AWNING WINDOW |
| | | V.T.O. | INDICATES "VENT TO OUTSIDE" |

GENERAL NOTES:

2. PLATE HEIGHT AT UPPER FLOOR IS 9'-1". U.N.O.
3. DIMENSION LINES ARE TO FACE OF STUD U.N.O.
4. WINDOW SIZES & ROUGH OPENINGS TO BE VERIFIED BY CONTRACTOR.
5. WINDOW HEIGHT AT UPPER FLOOR IS 8'-0" ABOVE SUBFLOOR. IF, IF NORMAL DOOR AND WINDOW HEIGHTS ARE SIMILAR, COORDINATE WITH DOOR AND WINDOW SPECS TO LOCATE FINAL ELEVATION OF THE HEAD HEIGHTS SO THAT ALL DOOR AND WINDOW TRIM ALIGN.
6. WINDOW AND DOOR SIZES ARE DIMENSIONED IN FEET AND INCHES (E.G. 2'-8" X 5'-0").
7. EXTERIOR WALLS TO BE 2x6 STUDS AT 16" o.c., INTERIOR WALLS TO BE 2x4 STUDS AT 16" o.c., U.N.O.
8. FIREBLOCK ALL PLUMBING PENETRATIONS AND STAIR RUNS PER I.R.C. SEC. R302.11.
9. PROVIDE SAFETY GLAZING AT HAZARDOUS LOCATIONS PER I.R.C. SEC. R303.4.
10. PER I.R.C. SEC R311.7.5, MAX. RISER HEIGHT SHALL BE 7'-4 1/4". MIN. TREAD DEPTH SHALL BE 10". STAIR NOSINGS: 3/4" MIN. 1/4" MAX. RADIUS @ LEADING EDGE OF TREAD: 9/16" MIN. 1/4" MAX. PROVIDE HANDRAILS AT R311.7.3, TOP OF HANDRAIL SHALL BE NOT LESS THAN 34" OR MORE THAN 38" ABOVE THE TREAD NOSINGS. HANDRAILS SHALL BE CONTINUOUS THE FULL LENGTH OF THE FLIGHT PER R311.7.8.2. THE HANDRAIL GRIP-SIZE SHALL BE PROVIDED PER R311.7.8.3.
11. PROVIDE GUARDS (MIN. 36" HEIGHT) IN LOCATIONS PER I.R.C. SEC. R312.
12. FACTORY BUILT FIREPLACES & CHIMNEYS SHALL BE LISTED & LABELED AND SHALL BE INSTALLED & TERMINATED IN ACCORDANCE TO THE CONDITIONS OF THE LISTINGS.
13. PROVIDE EXTERIOR AIR SUPPLY TO ANY FACTORY-BUILT FIREPLACE PER I.R.C. SEC. R1006.

McCULLOUGH
ARCHITECTS

5601 - 6th Ave South, #317
Seattle, WA. 98108
206.443.1181
mccullougharchitects.com

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Comment

Revisions

2025.04.11
24-008

Date: _____
Job No: _____
Project No: _____
Drawn: _____
Approved: _____
Owner _____

Owner



SEARS PLAT - LOT 2

Mercer Island
Washington
98040

PRELIMINARY

Upper Floor Plan

A8



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011

ENGINEER: RSC

SHEARWALL 201: 2ND - REAR EXT. WALL @ BR1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	9.9	FT.	QUALIFYING WALL LENGTH, L	9.9	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
500	LBS	<	3314	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	270	PLF	OVERTURNING MOMENT	4.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	15.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - REAR EXT. WALL @ WIC1 - BONUS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	8.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	28.8	FT.	QUALIFYING WALL LENGTH, L	14.3	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
1000	LBS	<	4763	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	110	PLF	OVERTURNING MOMENT	9.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	51.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 203: 2ND - REAR EXT. WALL @ WIC4 - BR4

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	8.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	15.9	FT.	QUALIFYING WALL LENGTH, L	12.9	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
500	LBS	<	4339	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	250	PLF	OVERTURNING MOMENT	4.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	34.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - FRONT EXT. WALL @ VESTIBULE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	8.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	14.5	FT.	QUALIFYING WALL LENGTH, L	11.5	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
900	LBS	<	3736	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	120	PLF	OVERTURNING MOMENT	8.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	16.6	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 205: 2ND - FRONT EXT. WALL @ BR2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	3.9	FT.	QUALIFYING WALL LENGTH, L	3.9	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500	LBS	< 1264
		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	140	PLF	OVERTURNING MOMENT	4.5	K-FT	HOLD DOWN DESIGN LOAD	731	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	1.7	K-FT	HOLDOWN CAPACITY	2325	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC40 STRAP TIE (10" END LENGTH)

SHEARWALL 206: 2ND - FRONT EXT. WALL @ BR3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	2.9	FT.	QUALIFYING WALL LENGTH, L	2.9	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
500	LBS	< 1561
		LBS

SHEARWALL ASSEMBLY SPECIFICATION

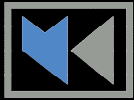
P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	360	PLF	OVERTURNING MOMENT	4.5	K-FT	HOLD DOWN DESIGN LOAD	743	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	2.4	K-FT	HOLDOWN CAPACITY	5505	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 207: 2ND - SIDE EXT. WALL @ BR1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	7.8	FT.	QUALIFYING WALL LENGTH, L	7.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
2500	LBS	<	4884	LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	134	PLF	OVERTURNING MOMENT	22.7	K-FT	HOLD DOWN DESIGN LOAD	2282	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	5.0	K-FT	HOLDOWN CAPACITY	5505	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

SHEARWALL 208: 2ND - SIDE EXT. WALL @ BR2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	6.4	FT.	QUALIFYING WALL LENGTH, L	6.4	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
700	LBS	<	4046	LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	270	PLF	OVERTURNING MOMENT	6.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	7.3	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 209: 2ND - SIDE EXT. WALL @ BA2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	12.0	FT.	QUALIFYING WALL LENGTH, L	12.0	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1000	LBS	<	ALLOWABLE SHEARWALL CAPACITY	4030	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	270	PLF	OVERTURNING MOMENT	9.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	21.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 210: 2ND - SIDE EXT. WALL @ BA3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	3.0	FT.	SHEARWALL ASSEMBLY	P3
WALL LENGTH, L	8.1	FT.	QUALIFYING WALL LENGTH, L	5.1	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1000	LBS	<	ALLOWABLE SHEARWALL CAPACITY	3239	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	140	PLF	OVERTURNING MOMENT	9.1	K-FT	HOLD DOWN DESIGN LOAD	425	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	5.6	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 211: 2ND - SIDE INT. WALL @ BONUS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	15.2	FT.	QUALIFYING WALL LENGTH, L	15.2	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1700	LBS	<	ALLOWABLE SHEARWALL CAPACITY	5094	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	100	PLF	OVERTURNING MOMENT	15.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	15.8	K-FT	HOLD DOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL : BASEMENT - NOT USED

SHEARWALL PROPERTIES:

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

CAPACITY EVALUATION:

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

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

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 101: 1ST - REAR EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	2.5	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	16.1	FT.	QUALIFYING WALL LENGTH, L	12.1	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
2000	LBS	<	4060	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	380	PLF	OVERTURNING MOMENT	27.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	55.9	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102: 1ST - REAR EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	7.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	20.0	FT.	QUALIFYING WALL LENGTH, L	17.0	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
2300	LBS	<	5695	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	320	PLF	OVERTURNING MOMENT	31.0	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	71.7	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 103: 1ST - FRONT EXT. WALL @ LIVING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	7.0	FT.	SHEARWALL ASSEMBLY	P3
WALL LENGTH, L	14.5	FT.	QUALIFYING WALL LENGTH, L	11.5	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	2000	LBS	<	ALLOWABLE SHEARWALL CAPACITY	7090	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	230	PLF	OVERTURNING MOMENT	30.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	32.2	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 104: 1ST - FRONT EXT. WALL @ BR5

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	3.9	FT.	QUALIFYING WALL LENGTH, L	3.9	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1000	LBS	<	ALLOWABLE SHEARWALL CAPACITY	1184	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	400	PLF	OVERTURNING MOMENT	15.5	K-FT	HOLD DOWN DESIGN LOAD	2719	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	4.9	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 105: 1ST - FRONT INT./EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	8.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	20.5	FT.	QUALIFYING WALL LENGTH, L	17.5	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1300	LBS	<	ALLOWABLE SHEARWALL CAPACITY	5877	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	322	PLF	OVERTURNING MOMENT	14.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	68.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 106: 1ST - SIDE EXT. WALL @ LIVING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P3-BS
WALL LENGTH, L	3.9	FT.	QUALIFYING WALL LENGTH, L	3.9	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	3200	LBS	<	ALLOWABLE SHEARWALL CAPACITY	4443	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

P3-BS - 2-SIDES 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	240	PLF	OVERTURNING MOMENT	35.2	K-FT	HOLD DOWN DESIGN LOAD	7836	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	4.5	K-FT	HOLDOWN CAPACITY	7870	LBS

HOLD-DOWN SPECIFICATION

SIMPSON HDU8-SDS2.5



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 107: 1ST - SIDE EXT. WALL @ BR5

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P3
WALL LENGTH, L	6.4	FT.	QUALIFYING WALL LENGTH, L	6.4	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	2500	LBS	<	ALLOWABLE SHEARWALL CAPACITY	4046	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	390	PLF	OVERTURNING MOMENT	33.9	K-FT	HOLD DOWN DESIGN LOAD	3427	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	11.9	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 108: 1ST - SIDE EXT. WALL @ BA4

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	12.0	FT.	QUALIFYING WALL LENGTH, L	12.0	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	3300	LBS	<	ALLOWABLE SHEARWALL CAPACITY	4030	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	390	PLF	OVERTURNING MOMENT	45.4	K-FT	HOLD DOWN DESIGN LOAD	956	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	33.9	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 109: 1ST - SIDE INT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	8.0	FT.		
WALL LENGTH, L	21.2	FT.	QUALIFYING WALL LENGTH, L	18.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
6200	LBS	<	11474	LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	113	PLF	OVERTURNING MOMENT	68.2	K-FT	HOLD DOWN DESIGN LOAD	1417	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	38.1	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STD14RJ HOLDOWN

SHEARWALL 1: BASEMENT - SIDE EXT. WALL @ BR6

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	2.9	FT.	QUALIFYING WALL LENGTH, L	2.9	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
1500	LBS	<	1577	LBS

SHEARWALL ASSEMBLY SPECIFICATION

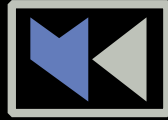
P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	170	PLF	OVERTURNING MOMENT	13.6	K-FT	HOLD DOWN DESIGN LOAD	4098	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	1.7	K-FT	HOLDOWN CAPACITY	4935	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STD14RJ HOLDOWN



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEAR WALL CALCULATIONS SEISMIC

HIGHLANDS BUILDERS GROUP

SEAR PLAT - LOT 2

MERCER ISLAND, WA

PARAMETERS:

SINGLE FAMILY HOME

DESIGN WIND SPEED: 100 MPH

WIND EXPOSURE CATEGORY: B

SEISMIC DESIGN CATEGORY: D

CODE & DESIGN STANDARD: 2021 IBC CH. 1609, ASCE 7-16 CH. 26-30

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

NICHOLAS MARTIGNETTI, P.E., PROJECT MANAGER

RYAN CHAN, E.I.T., STAFF ENGINEER II



SEISMIC CALCULATION - ASCE 7-16

M+K PROJECT #: 244-25011

ENGINEER: RSC

SEISMIC DESIGN CATEGORY:

USER INPUTS:

SITE CLASS	D
SPECTRAL RESPONSE ACCELERATION 0.2 SEC, $S_{0.2}$	1.471
SPECTRAL RESPONSE ACCELERATION 1.0 SEC, S_1	0.508
OCCUPANCY CATEGORY	II

VARIABLES:

SITE COEFFICIENT, F_A	1.20
SITE COEFFICIENT, F_V	1.79

CALCULATED VALUES:

MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{MS}	1.765
MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{M1}	0.910
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{DS}	1.177
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{D1}	0.607
SEISMIC DESIGN CATEGORY (SHORT TERM)	D
SEISMIC DESIGN CATEGORY (1.0 SECOND TERM)	D

BUILDING PERIOD DETERMINATION:

USER INPUTS:

BUILDING PERIOD COEFFICIENT, C_T	0.020
LONG-PERIOD TRANS PERIOD, T_L (SEC)	6
HT. ABV BASE TO HIGHEST LEVEL, h_N	22

CALCULATED VALUES:

APPROXIMATE FUNDAMENTAL PERIOD, T_A	0.201
T_D	0.103
T_B	0.516
SPECTRAL RESPONSE ACC., S_A (G)	1.177

SITE CLASS ASSUMPTION

Yes	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	12.6	2345	15	16.1	51 K
2	9.1	2557	17	7.3	51 K
3	0.0	0	0	0.0	0 K
4	0.0	0	0	0.0	0 K
5	0.0	0	0	0.0	0 K
6	0.0	0	0	0.0	0 K
7	0.0	0	0	0.0	0 K
8	0.0	0	0	0.0	0 K
9	0.0	0	0	0.0	0 K
10	0.0	0	0	0.0	0 K
11	0.0	0	0	0.0	0 K
12	0.0	0	0	0.0	0 K
13	0.0	0	0	0.0	0 K
14	0.0	0	0	0.0	0 K
15	0.0	0	0	0.0	0 K

TOTAL DEAD LOAD OF STRUCTURE 102 KIPS

SEISMIC RESPONSE COEFFICIENT:

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

BASE SHEARS:

ULTIMATE LOADS

x 0.7 =

ALLOWABLE LOADS

TRANSVERSE	LONGITUDINAL	TRANSVERSE	LONGITUDINAL
18 K	18 K	12.9 K	12.9 K

STORY SHEAR CALCULATION:

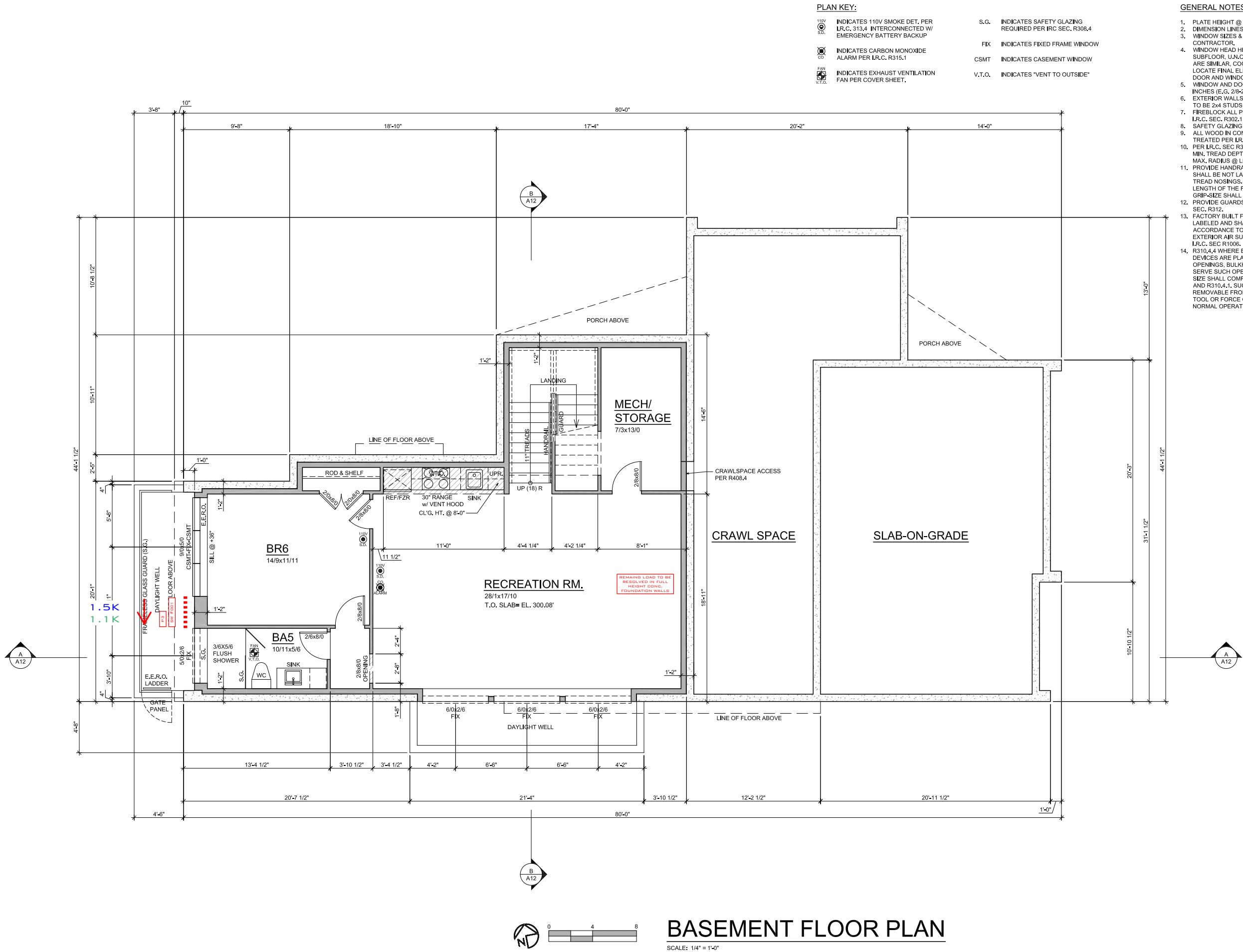
DISTRIBUTION EXPONENT, N 1.00

ULTIMATE LOADS

x 0.7 =

ALLOWABLE LOADS

LEVEL	VERT. DIST. FACTOR, D_{VM}	TRANSVERSE STORY SHEAR, F_x	LONGITUDINAL STORY SHEAR, F_x	TRANSVERSE STORY SHEAR, F_x	LONGITUDINAL STORY SHEAR, F_x	TRANSVERSE STORY SHEAR, F_x	LONGITUDINAL STORY SHEAR, F_x
1	0.368	6.8 K	6.8 K	4.7 K	12.9 K	4.7 K	12.9 K
2	0.632	11.6 K	11.6 K	8.1 K	8.1 K	8.1 K	8.1 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



BASEMENT FLOOR PLAN

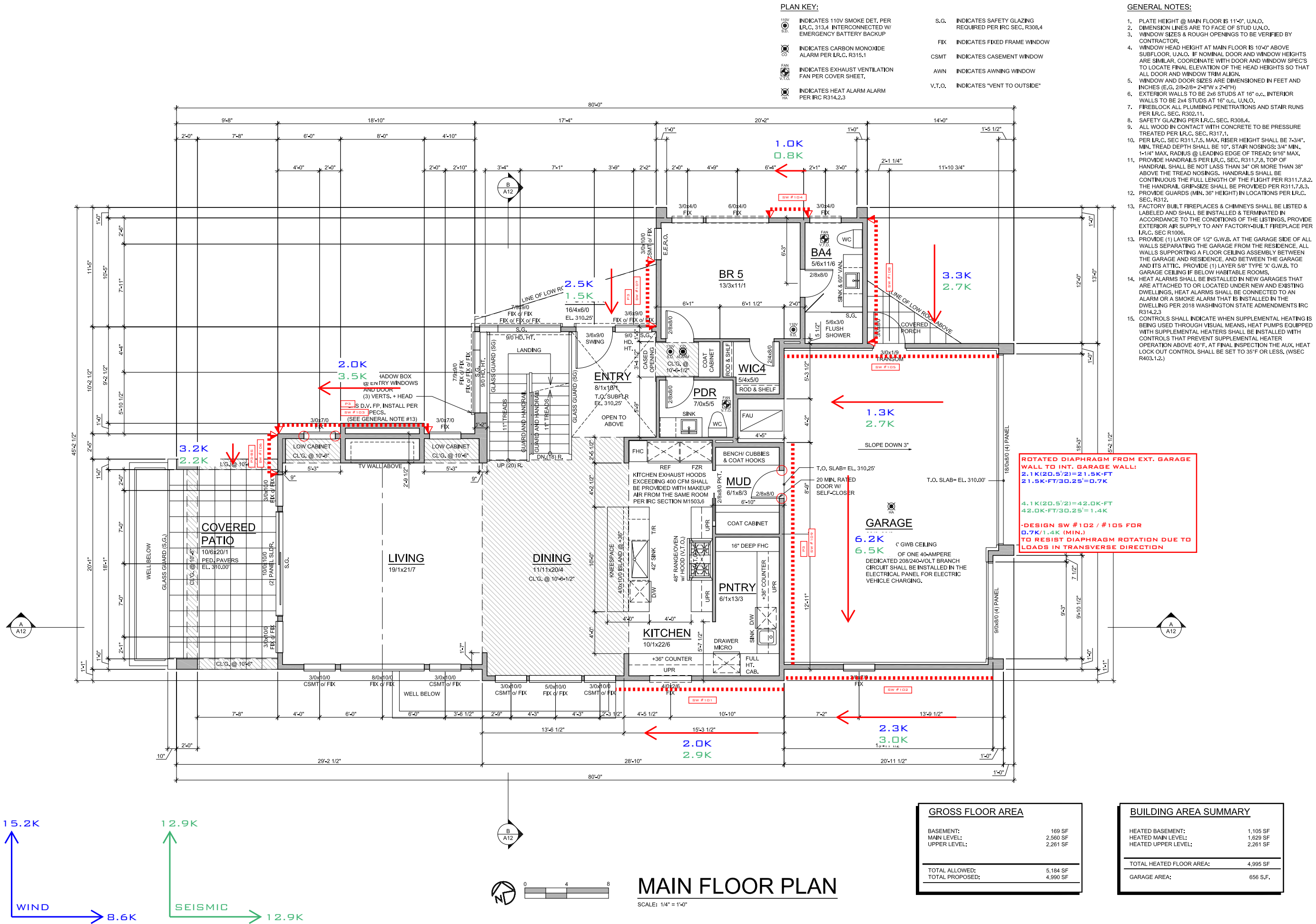
SCALE: 1/4" = 1'-0"

Revisions	Comment
2025.04.11 24-008	
Date:	Job No:
Project No:	Drawn:
Approved:	Owner



SEARS PLAT - LOT 2

Mercer Island
Washington
98040



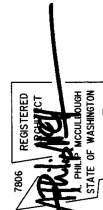
Comment

Revisions

2025.04.11
24-008

Date:
Job No:
Project No:
Drawn:
Approved:

Owner



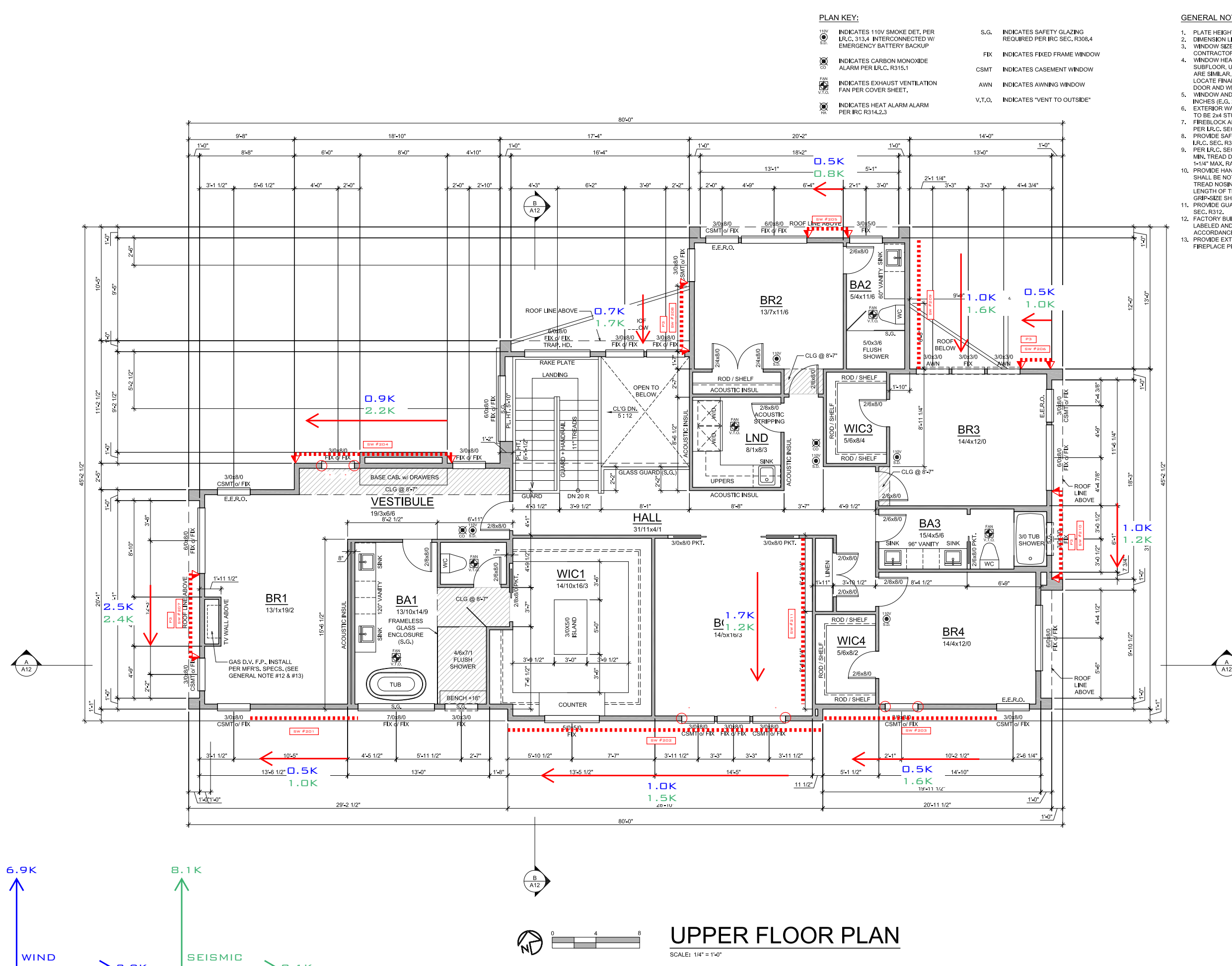
SEARS PLAT - LOT 2

Mercer Island
Washington
98040

PRELIMINARY

Main Floor
Plan

A6



PLAN KEY:

	INDICATES 110V SMOKE DET. PER I.R.C. 313.4 INTERCONNECTED W/ EMERGENCY BATTERY BACKUP		INDICATES SAFETY GLAZING REQUIRED PER IRC SEC. R308.4
	INDICATES CARBON MONOXIDE ALARM PER I.R.C. R315.1		INDICATES FIXED FRAME WINDOW
	INDICATES EXHAUST VENTILATION FAN PER COVER SHEET.		INDICATES CASEMENT WINDOW
	INDICATES HEAT ALARM ALARM PER IRC R314.2.3		INDICATES AWNING WINDOW
			INDICATES "VENT TO OUTSIDE"

GENERAL NOTES:

1. PLATE HEIGHT @ UPPER FLOOR IS 9'-1". U.N.O.
2. DIMENSION LINES ARE TO FACE OF STUD U.N.O.
3. WINDOW SIZES & ROUGH OPENINGS TO BE VERIFIED BY CONTRACTOR.
4. WINDOW HEAD HEIGHT AT UPPER FLOOR IS 8'-0" ABOVE SUBFLOOR. U.N.O. IF NOMINAL DOOR AND WINDOW HEIGHTS ARE SIMILAR, COORDINATE WITH DOOR AND WINDOW SPECS TO LOCATE FINAL ELEVATION OF THE HEAD HEIGHTS SO THAT ALL DOOR AND WINDOW TRIM ALIGN.
5. WINDOW AND DOOR SIZES ARE DIMENSIONED IN FEET AND INCHES (E.G. 2'-8-2/8" = 2'-8" W x 2'-0" H)
6. EXTERIOR WALLS TO BE 2x6 STUDS AT 16" o.c., INTERIOR WALLS TO BE 2x4 STUDS AT 16" o.c., U.N.O.
7. FIREBLOCK ALL PLUMBING PENETRATIONS AND STAIR RUNS PER I.R.C. SEC. R302.11.
8. PROVIDE SAFETY GLAZING AT HAZARDOUS LOCATIONS PER I.R.C. SEC. R308.4.
9. PER I.R.C. SEC R311.7.5. MAX. RISER HEIGHT SHALL BE 7-3/4". MIN. TREAD DEPTH SHALL BE 10". STAIR NOSINGS: 3/4" MIN. 1-1/4" MAX. RADIUS @ LEADING EDGE OF TREAD: 9/16" MAX.
10. PROVIDE HANDRAILS PER I.R.C. SEC. R311.7.8. TOP OF HANDRAIL SHALL BE NOT LESS THAN 34" OR MORE THAN 38" ABOVE THE TREAD NOSING. HANDRAILS SHALL BE CONTINUOUS THE FULL LENGTH OF THE FLIGHT PER R311.7.8.2. THE HANDRAIL GRIP-SIZE SHALL BE PROVIDED PER R311.7.8.3.
11. PROVIDE GUARDS (MIN. 36" HEIGHT) IN LOCATIONS PER I.R.C. SEC. R312.
12. FACTORY BUILT FIREPLACES & CHIMNEYS SHALL BE LISTED & LABELED AND SHALL BE INSTALLED & TERMINATED IN ACCORDANCE TO THE CONDITIONS OF THE LISTINGS.
13. PROVIDE EXTERIOR AIR SUPPLY TO ANY FACTORY-BUILT FIREPLACE PER I.R.C. SEC R1006.

PRELIMINARY

SEARS PLAT - LOT 2

Mercer Island
Washington
98040

Upper Floor
Plan

A8

McCULLOUGH
ARCHITECTS

5601 - 6th Ave South, #317
Seattle, WA. 98108
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UNPUBLISHED WORK 2025 © McCullough Architects

Comment

Revisions

2025.04.11
24-008

Date:
Job No:
Project No:
Drawn:
Approved:
Owner



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011

ENGINEER: RSC

SHEARWALL 201: 2ND - REAR EXT. WALL @ BR1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	9.9	FT.	QUALIFYING WALL LENGTH, L	9.9	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
1000	LBS	<	2367	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	270	PLF	OVERTURNING MOMENT	9.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	11.2	K-FT	HOLD DOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 202: 2ND - REAR EXT. WALL @ WIC1 - BONUS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	8.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	28.8	FT.	QUALIFYING WALL LENGTH, L	14.3	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
1500	LBS	<	3402	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	110	PLF	OVERTURNING MOMENT	13.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	37.4	K-FT	HOLD DOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 203: 2ND - REAR EXT. WALL @ WIC4 - BR4

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	8.0	FT.
WALL LENGTH, L	15.9	FT.	QUALIFYING WALL LENGTH, L	12.9	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1600	LBS	<	ALLOWABLE SHEARWALL CAPACITY	3099	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	250	PLF	OVERTURNING MOMENT	14.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	24.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 204: 2ND - FRONT EXT. WALL @ VESTIBULE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	8.0	FT.
WALL LENGTH, L	14.5	FT.	QUALIFYING WALL LENGTH, L	11.5	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	2200	LBS	<	ALLOWABLE SHEARWALL CAPACITY	2668	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	120	PLF	OVERTURNING MOMENT	20.0	K-FT	HOLD DOWN DESIGN LOAD	549	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	12.0	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 205: 2ND - FRONT EXT. WALL @ BR2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.
WALL LENGTH, L	3.9	FT.	QUALIFYING WALL LENGTH, L	3.9	FT.

SHEARWALL ASSEMBLY **P1**

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	800	LBS	<	ALLOWABLE SHEARWALL CAPACITY	903	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	140	PLF	OVERTURNING MOMENT	7.3	K-FT	HOLD DOWN DESIGN LOAD	1543	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	1.2	K-FT	HOLDOWN CAPACITY	2325	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC40 STRAP TIE (10" END LENGTH)

SHEARWALL 206: 2ND - FRONT EXT. WALL @ BR3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.
WALL LENGTH, L	2.9	FT.	QUALIFYING WALL LENGTH, L	2.9	FT.

SHEARWALL ASSEMBLY **P3**

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1000	LBS	<	ALLOWABLE SHEARWALL CAPACITY	1115	LBS
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SHEARWALL ASSEMBLY SPECIFICATION

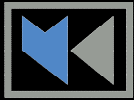
P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	360	PLF	OVERTURNING MOMENT	9.1	K-FT	HOLD DOWN DESIGN LOAD	2541	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	1.7	K-FT	HOLDOWN CAPACITY	5505	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 207: 2ND - SIDE EXT. WALL @ BR1

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	7.8	FT.	QUALIFYING WALL LENGTH, L	7.8	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
2400	LBS	<	3489	LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	134	PLF	OVERTURNING MOMENT	21.8	K-FT	HOLD DOWN DESIGN LOAD	2342	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	3.6	K-FT	HOLDOWN CAPACITY	5505	LBS

HOLD-DOWN SPECIFICATION

SIMPSON MSTC66 STRAP TIE (24" END LENGTH)

SHEARWALL 208: 2ND - SIDE EXT. WALL @ BR2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	6.4	FT.	QUALIFYING WALL LENGTH, L	6.4	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
1700	LBS	<	2890	LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	270	PLF	OVERTURNING MOMENT	15.4	K-FT	HOLD DOWN DESIGN LOAD	1577	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	5.3	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 209: 2ND - SIDE EXT. WALL @ BA2

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.
WALL LENGTH, L	12.0	FT.	QUALIFYING WALL LENGTH, L	12.0	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1600	LBS	<	ALLOWABLE SHEARWALL CAPACITY	2878	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	270	PLF	OVERTURNING MOMENT	14.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	15.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 210: 2ND - SIDE EXT. WALL @ BA3

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	3.0	FT.
WALL LENGTH, L	8.1	FT.	QUALIFYING WALL LENGTH, L	5.1	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1200	LBS	<	ALLOWABLE SHEARWALL CAPACITY	2314	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	140	PLF	OVERTURNING MOMENT	10.9	K-FT	HOLD DOWN DESIGN LOAD	838	LBS
DL AT ENDS OF WALL	200	LBS	RESISTIVE MOMENT	4.1	K-FT	HOLDOWN CAPACITY	1705	LBS

HOLD-DOWN SPECIFICATION

SIMPSON CS16 STRAP TIE (14" END LENGTH)



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 211: 2ND - SIDE INT. WALL @ BONUS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.
WALL LENGTH, L	15.2	FT.	QUALIFYING WALL LENGTH, L	15.2	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
1200	LBS	<	3639	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	100	PLF	OVERTURNING MOMENT	10.9	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	11.5	K-FT	HOLD DOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL : BASEMENT - NOT USED

SHEARWALL PROPERTIES:

WALL HEIGHT, H	0.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.
WALL LENGTH, L	0.0	FT.	QUALIFYING WALL LENGTH, L	0.0	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

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

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

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

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 101: 1ST - REAR EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	2.5	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	16.1	FT.	QUALIFYING WALL LENGTH, L	12.1	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY	
2900	LBS	= 2900	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	380	PLF	OVERTURNING MOMENT	39.5	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	40.5	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102: 1ST - REAR EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	7.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	20.0	FT.	QUALIFYING WALL LENGTH, L	17.0	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY	
3000	LBS	< 4068	LBS

SHEARWALL ASSEMBLY SPECIFICATION

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

OVERTURNING EVALUATION:

RESISTIVE DL	320	PLF	OVERTURNING MOMENT	51.2	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	52.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 103: 1ST - FRONT EXT. WALL @ LIVING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	7.0	FT.		
WALL LENGTH, L	14.5	FT.	QUALIFYING WALL LENGTH, L	11.5	FT.	SHEARWALL ASSEMBLY	P3

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
3500	LBS	<	5064	LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 3"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	230	PLF	OVERTURNING MOMENT	58.5	K-FT	HOLD DOWN DESIGN LOAD	2422	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	23.4	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 104: 1ST - FRONT EXT. WALL @ BR5

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.		
WALL LENGTH, L	3.9	FT.	QUALIFYING WALL LENGTH, L	3.9	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY		
800	LBS	<	845	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	400	PLF	OVERTURNING MOMENT	16.1	K-FT	HOLD DOWN DESIGN LOAD	3194	LBS
DL AT ENDS OF WALL	600	LBS	RESISTIVE MOMENT	3.5	K-FT	HOLDOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 105: 1ST - FRONT INT./EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	8.0	FT.	SHEARWALL ASSEMBLY	P1
WALL LENGTH, L	20.5	FT.	QUALIFYING WALL LENGTH, L	17.5	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2700	LBS	< 4198
		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	322	PLF	OVERTURNING MOMENT	29.7	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	49.5	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 106: 1ST - SIDE EXT. WALL @ LIVING

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P3-BS
WALL LENGTH, L	3.9	FT.	QUALIFYING WALL LENGTH, L	3.9	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2200	LBS	< 3174
		LBS

SHEARWALL ASSEMBLY SPECIFICATION

P3-BS - 2-SIDES 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	240	PLF	OVERTURNING MOMENT	24.2	K-FT	HOLD DOWN DESIGN LOAD	5344	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	3.3	K-FT	HOLDOWN CAPACITY	6580	LBS

HOLD-DOWN SPECIFICATION

SIMPSON HDU8-SDS2.5



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 107: 1ST - SIDE EXT. WALL @ BR5

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.
WALL LENGTH, L	6.4	FT.	QUALIFYING WALL LENGTH, L	6.4	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1500	LBS	<	ALLOWABLE SHEARWALL CAPACITY	2890	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	390	PLF	OVERTURNING MOMENT	31.9	K-FT	HOLD DOWN DESIGN LOAD	3635	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	8.6	K-FT	HOLD DOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN

SHEARWALL 108: 1ST - SIDE EXT. WALL @ BA4

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	0.0	FT.
WALL LENGTH, L	12.0	FT.	QUALIFYING WALL LENGTH, L	12.0	FT.

SHEARWALL ASSEMBLY

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	2700	LBS	<	ALLOWABLE SHEARWALL CAPACITY	2878	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	390	PLF	OVERTURNING MOMENT	44.2	K-FT	HOLD DOWN DESIGN LOAD	1636	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	24.6	K-FT	HOLD DOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STHD14RJ HOLDOWN



SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 244-25011
ENGINEER: RSC

SHEARWALL 109: 1ST - SIDE INT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	11.0	FT.	MAX WALL OPENING HT, H _c	8.0	FT.	SHEARWALL ASSEMBLY	P3
WALL LENGTH, L	21.2	FT.	QUALIFYING WALL LENGTH, L	18.5	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	6500	LBS	<	ALLOWABLE SHEARWALL CAPACITY	8196	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	113	PLF	OVERTURNING MOMENT	71.5	K-FT	HOLD DOWN DESIGN LOAD	2066	LBS
DL AT ENDS OF WALL	800	LBS	RESISTIVE MOMENT	27.7	K-FT	HOLD DOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STD14RJ HOLDOWN

SHEARWALL 1: BASEMENT - SIDE EXT. WALL @ BR6

SHEARWALL PROPERTIES:

WALL HEIGHT, H	9.1	FT.	MAX WALL OPENING HT, H _c	0.0	FT.	SHEARWALL ASSEMBLY	P3
WALL LENGTH, L	2.9	FT.	QUALIFYING WALL LENGTH, L	2.9	FT.		

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL	1100	LBS	<	ALLOWABLE SHEARWALL CAPACITY	1126	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	170	PLF	OVERTURNING MOMENT	10.0	K-FT	HOLD DOWN DESIGN LOAD	3010	LBS
DL AT ENDS OF WALL	400	LBS	RESISTIVE MOMENT	1.2	K-FT	HOLD DOWN CAPACITY	3695	LBS

HOLD-DOWN SPECIFICATION

SIMPSON STD14RJ HOLDOWN