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STRUCTURAL, DESIGN, FORENSICS & INSPECTIONS
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Structural Engineering Report
WildStar Farm
16 Nason Hill Lane, Sherborn, MA 01770

Background:

Victor A. Popp, PE, of VPOPP Inc. performed structural calculations and designs required for the new WildStar Farm, 16 Nason Hill Lane, Sherborn MA 01770. The calculations include revisions to validate changes made after the initial design was completed through Sept. 30 2018.

Summary of Results:

X Results of calculations and sketche(s) are attached (128 Pages)

Shts. 1-2: General Design Criteria

Shts. 3-30: Wind load/seismic calculations & sketches (Includes Diaphragm checks)

Shts. 31-33: Snow load Calculations

Shts. 34-80: Gravity load structural member calculations

Shts. 81-128: Individual shear wall designs

GENERAL DESIGN REQUIREMENTS WILDSTAR FARM PROJECT

Location:

16 Nason Hill Lane Sherborn MA, 01770

Ground Snow Load: $P_g = 40$, $P_f = 35$ min

$V = 105$ mph

$S_s = .26$

$S_1 = .066$

Wind Design Method:

- 1) Simple diaphragm building yes
 - 2) Low Rise: < 60 ft yes, $h = 32'-6''$ max, $l_{min} = 38'$, yes
 - 3) Enclosed, yes
 - 4) Regular shape, yes
 - 5) $F_n > 1$ hz, Yes per Judgement (Low rise wood frame)
 - 6) No special conditions
 - 7) No expansion joints or separation
 - 8) Not subject to topographic feature (Exp. B)
 - 9) Relatively symmetrical cross section, roof slopes < 45 Deg? YES
- Therefore, use Method 1

MWFRS Loads:

Building parameters:

Roof angle = 7/12: 30°

$6/12 = 26^\circ$

$4/12 = 18^\circ$

$a =$ lesser of $.1L$ or $.4h$

$= .1 \times 38' = 3.8'$

$= .4 \times 24' = 9.6'$

$a = 3.8'$

MWFRS Wind Pressure (Use worst case for all roof angles)

$$P_a = (22.0 + 26.6)/2 = 24.3 \text{ psf}$$

$$P_b = (12.2 + 14.8)/2 = 13.5 \text{ psf}$$

$$P_c = (14.6 + 17.7)/2 = 16.2 \text{ psf}$$

$$P_d = (9.8 + 11.8)/2 = 10.8 \text{ psf}$$

$$P_e = (-19.1 + -23.1) = -21.1 \text{ psf}$$

$$P_f = (-12.0 + -13.3) = -14.7 \text{ psf}$$

$$P_g = (-12.0 + -13.3) = -14.7 \text{ psf}$$

$$P_h = (-10.1 + -12.2) = -11.2 \text{ psf}$$

$$P_{eoh} = (-26.7 + -32.3) = -29.5 \text{ psf}$$

$$P_{goh} = (-20.9 + -25.3) = -23.1 \text{ psf}$$

COMPONENT AND CLADDING WIND PRESSURES

$$Z3 \text{ (18 deg. Roof)} = (39.6 + 47.9)/2 = 43.8 \text{ psf}$$

$$O_h \text{ (18 deg. Roof)} = (50.9 + 61.6)/2 = 56.3 \text{ psf}$$

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Seismic Design Method

Site Class: D

Occupancy Category: II

Seismic Use Group: I (table 9.1.3)

$I = 1.0$

Seismic Design Category:

$$S_{ds} = (2/3)S_{ms}$$

$$S_{ms} = F_a S_s$$

$$F_a = 1.4$$

$$S_{ds} = (2/3) 1.4 \times 0.26 = 0.24$$

$$S_{d1} = (2/3)S_{m1}$$

$$S_{m1} = F_v S_1$$

$$F_v = 2.4$$

$$S_{d1} = (2/3) 2.4 \times 0.066 = 0.11$$

Therefore, structure is Seismic Design Category B

Simplest permitted analytical procedure Simplified Analysis per Section 9.5.4

Base Shear:

$$V = 1.2 S_{ds} W / R$$

$$R = 2-1/2 \text{ (for Post/Beam), } R = 6 \text{ (for platform frame)}$$

SNOW LOADS

$$P_g = 35 \text{ psf}$$

$$P_f = 0.7 C_e C_t I P_g$$

$$C_e = 1.0$$

$$C_t = 1.2 \text{ (unheated structure)}$$

$$I = 1.0 \text{ (Use category II)}$$

$$P_f = 0.7 \times 1.0 \times 1.2 \times 1.0 \times 40 \text{ psf} = 33.6 \text{ psf, use 35 psf per MA ammendments}$$

$$P_s = P_f \text{ (Max. slope roof is } 30^\circ \text{) \& per figure 7-2c, no reduction is allowed with slopes } < 45^\circ \text{.}$$

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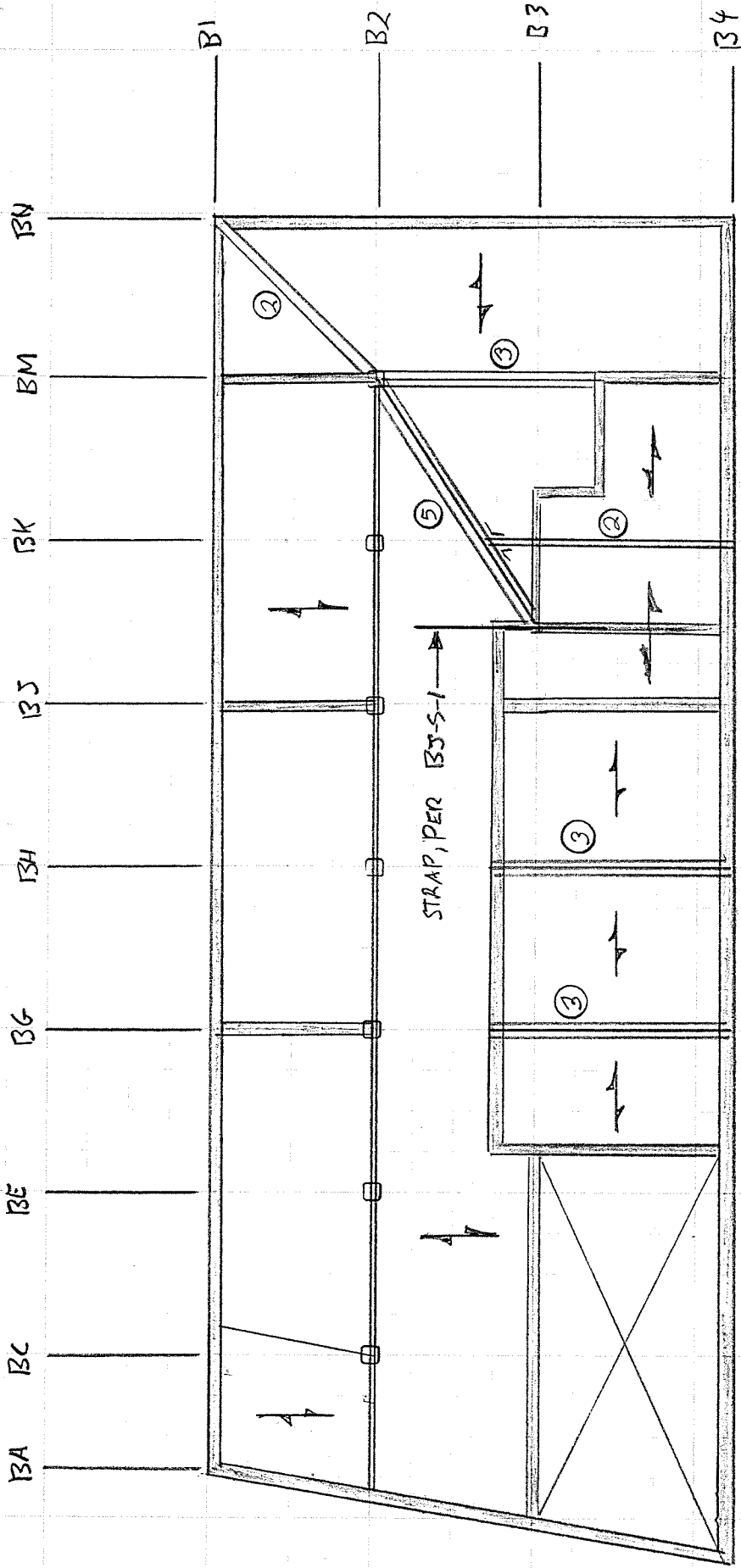
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ALL RAFTERS 2x10 SFF NO. 2 UNLESS NOTED
 SEE 2ND FLOOR DIAPHRAM SKETCH FOR
 MEMBER SIZES

SHEATHING: 1/2" STRUCTURAL 2 RATED
 w/ 104 NAILS @ 6" O.C. EDGE
 12" O.C. FIELD STAGGER
 JOINTS & RUN " STRENGTH
 AXIS OF PANELS PERP.
 TO RAFTERS

BJS-2
 BJS-1

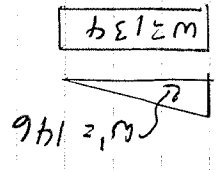
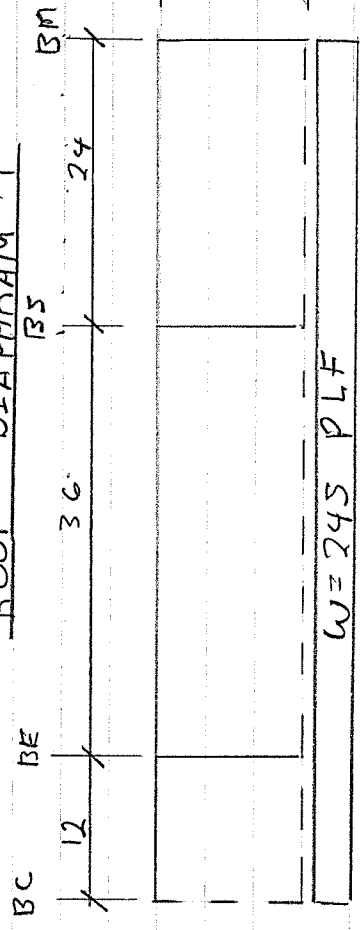
STRAP, PER BJS-1

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ROOF DIAPHR

ROOF DIAPHRAGM #1

* TORSIONAL IRREGULAR
IN EAST WEST DIR.



$$F_x = 1.2 \times 24 \times 22 \times 12 \times 72'$$

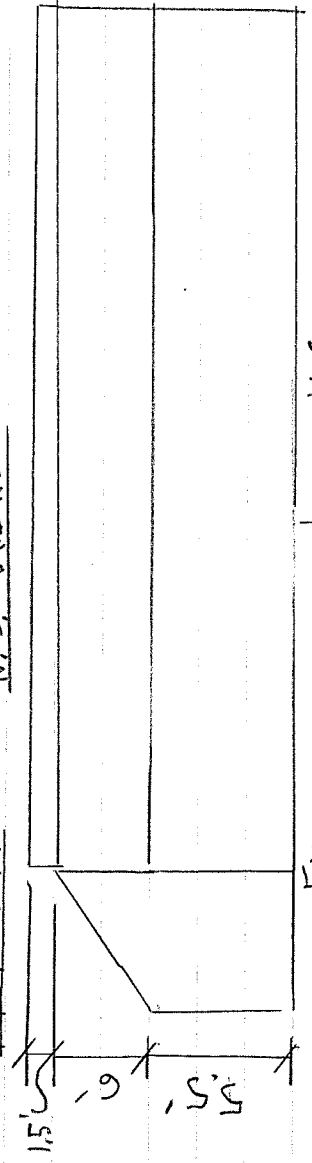
$$= 912 \neq < \text{WIND } 134 \times 2 = 1608$$

DESIGN FOR WIND

N. S. WIND

W = 245 PLF

E. W. WIND



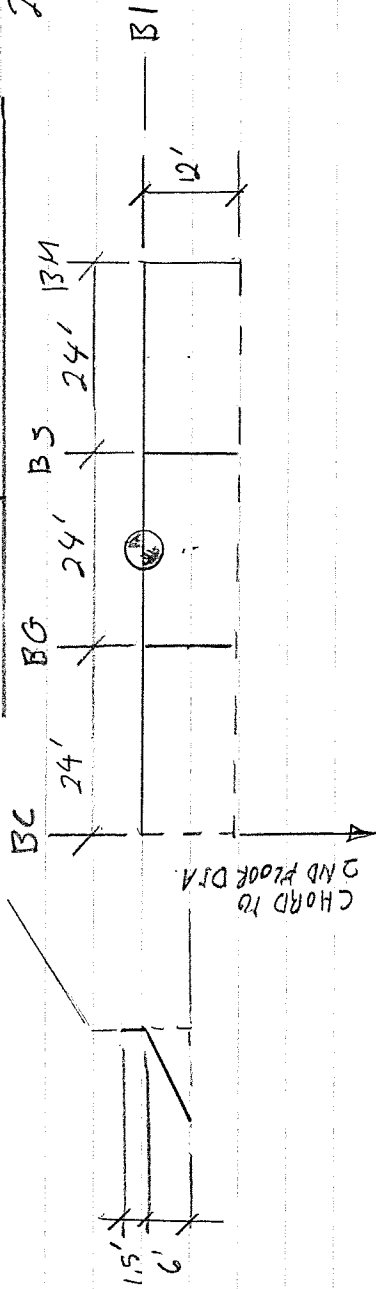
N. S.

$$W = (5.5' + 1.5') \times 23.4 \text{ PSF} = 164 \text{ PLF}$$

$$+ (6') \times 13.5 \text{ PSF} = 81 \text{ PLF}$$

$$= 245 \text{ PLF}$$

ROOF DIAPHRAM #1 REV. 1 → REDUCED C.A. DUE TO EXTENDED 2ND FLOOR DIAPHRAM



WIND - NS

$2a = 7.6'$

- $w_a = 1.5' \times 24.3 \text{ PSF} = 37 \text{ PLF}$
- $w_b = 1.5' \times 16.2 \text{ PSF} = 24 \text{ PLF}$
- $w_c = 6' \times 13.5 \text{ PSF} = 81 \text{ PLF}$
- $w_d = 6' \times 10.8 \text{ PSF} = 65 \text{ PLF}$

$w_{\text{balanced}} = 24 \text{ PLF} + 65 \text{ PLF} \times 72' = 6.4 \text{ KIP}$

$w_{\text{unbal}} = (37 \text{ PLF} + 81 \text{ PLF} - 24 \text{ PLF} - 65 \text{ PLF}) \times 7.6' = 220 \text{ \#}$
ACTING AT 3.6' FROM BC/BM

$V_D = 6.4 \text{ KIP} / 4 = 1.6 \text{ KIP/WALL}$

$M_{\text{un}} = 222 \text{ KIP} \times (36' - 3.6') = 7.2 \text{ KIP-FT}$

$36 V_{BC} + 12 V_{BE} + 12 V_{BS} + 36 V_{BM} = 7.2 \text{ KIP-FT}$

$V_{BC} = V_{BM} = 3 V_{BE} = 3 V_{BS}$

WIND - EW

$6' \times 12' \times 23.4 = 842 \text{ \#}$

VERY LOW, USE SEISMIC FOR E-W

$\Rightarrow 2(36 V_{BC} + \frac{12}{3} V_{BE}) = 7.2 \text{ KIP-FT}$

$V_{BC} = 90 \text{ \#}$

$V_{BCF} = 1.7 \text{ KIP}$ CHORD

$V_{BEF} = 1.6 \text{ KIP}$

$V_{BSF} = 1.6 \text{ KIP}$

$V_{BMF} = 1.7 \text{ KIP}$

$V_D = \frac{1.7 \text{ KIP}}{12 \text{ FT}} = 141 \text{ PLF}$

SEISMIC

$F_x = 1 \text{ KIP} = \text{CONT. DESIGN FOR 2 KIP}$

$V_D = 2 \text{ KIP} - \text{WALL BI}$

$M = 2 \text{ KIP} \times 6' = 12 \text{ KIP-FT}$

$V_T = 90 \text{ \#} \times \frac{12}{76} = 142 \text{ \#}$

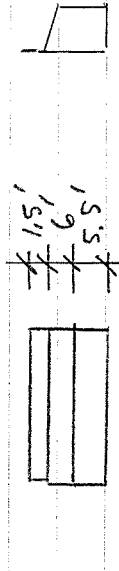
$V_d = \frac{2.1 \text{ KIP}}{72} = 29 \text{ PLF}$

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ROOF DEAPHRAM #2

NS

E-W



E-W

$$W = 7' \times 16.2 \text{ PSF} = 113.4 \text{ PLF}$$

$$+ 6' \times 10.8 \text{ PSF} = 64.8 \text{ PLF}$$

$$= 178.4 \text{ PLF}$$

$$W' = 7' \times 24.3 \text{ PSF} = 170 \text{ PLF}$$

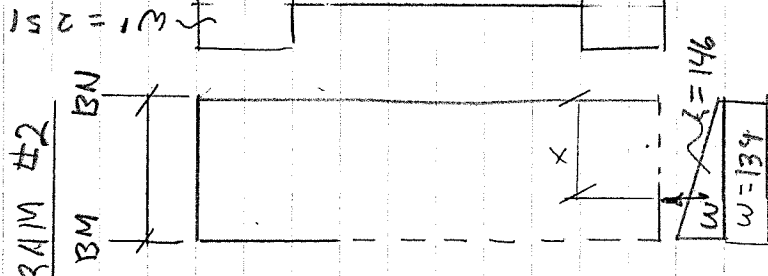
$$+ 6' \times 13.5 \text{ PSF} = 81 \text{ PLF}$$

$$= 251 \text{ PLF}$$

NS

$$W = 5.5' \times 24.3 \text{ PSF} = 134 \text{ PLF}$$

$$W' = 6' \times 24.3 \text{ PSF} = 145.8 \text{ PLF}$$



$$S = \frac{1.2 \times 24 \times 22}{6} \times 38 \times 12$$

$$= 481 \#,$$

$$W_{\text{PAV}} = 146 \times 12 = 1752$$

USE WIND FOR DESIGN

$$W_{NS} = 134 \times 12 + 146 \times \frac{12}{2} = 2,5 \text{ KEP}$$

$$x = \frac{9/4 \times 82}{2} + (46 \times \frac{12}{2}) \times 12 \times \frac{2}{3}$$

$$= 6.7'$$

$$V_{B_m} = 2.5 \text{ KEP} \times \frac{6.7}{12} = 1.4 \text{ KEP}$$

$$V_{BN} = 2.5 - 1.4 = 1.1 \text{ KEP}$$

$$v_D = \frac{1.4 \text{ KEP}}{12} = 116 \text{ PLF}$$

$$V_{B1} = V_{B2} = \frac{2.5 \text{ KEP} \times 6.7}{38} = 44$$

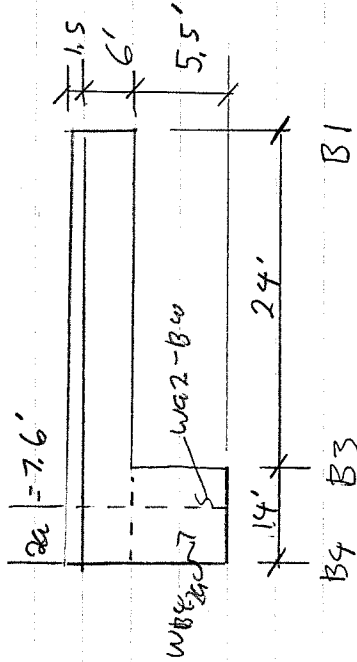
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ROOF DEACREAM #2 CONT'D

WIND E/W REVISED

BASED ON NEW
2ND FLOOR DIAP.

PROFILE E/W



$$W_{\text{top}} = 1.5 \times 16.2 \text{ PSF} = 24.3$$

$$W_{\text{bot}} = 6 \times 10.8 \text{ PSF} = 64.8$$

$$= 89.1 \text{ PLF}$$

$$W_{29-B3} = 5.5' \times 16.2 \text{ PSF} = 81 \text{ PLF}$$

$$W_{B4-29} = 1.5 \times (24.3 - 16.2 \text{ PSF}) = 12 \text{ PLF}$$

$$+ 6' \times (13.5 - 10.8 \text{ PSF}) = 16 \text{ PLF}$$

$$+ 5.5' \times (24.3) = 134 \text{ PLF}$$

w/ V₄ + B₃

$$V_{B4} = 819 \#$$

$$V_{B3} = 3.2 \text{ KIP}$$

$$V_{B1} = 1.7 \text{ KIP}$$

$$V = \frac{3.2}{12} = 266 \text{ PLF}$$

w/o B₃

$$V_{B4} = 3.7 \text{ KIP}$$

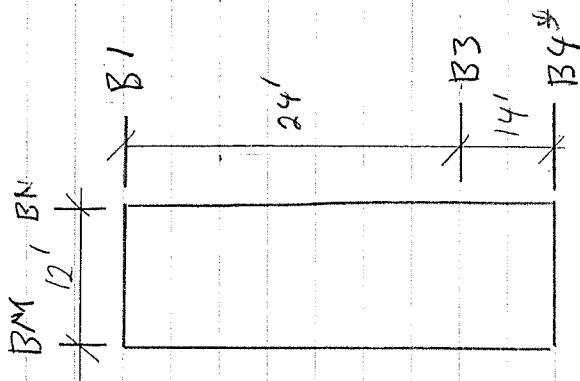
$$V_{B1} = 2.015 \text{ KIP}^*$$

ADD 2₉

$$(12 \text{ PLF} + 16 \text{ PLF}) \times 7.6' = 212 \#$$

$$V_{B1} = 2.2 \text{ KIP}$$

$$V = 3.7 \text{ KIP} / 12 = 309 \text{ PLF}$$

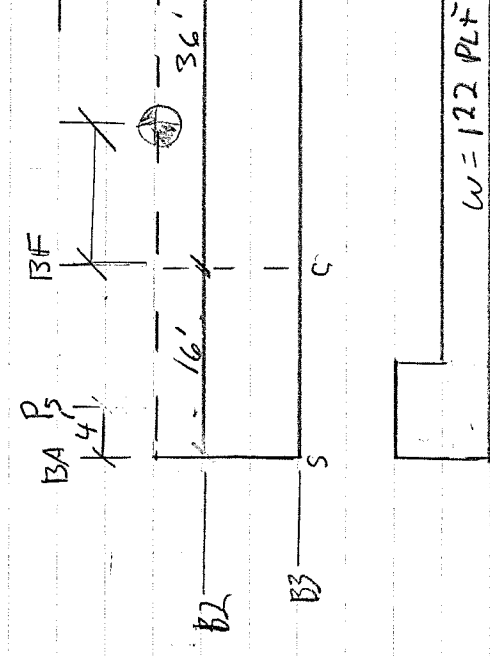


$$V_{B2} = \frac{3.7 \text{ KIP}}{12 \text{ ft}} = 308 \text{ PLF}$$

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RELEASE TO ROOF D. #4

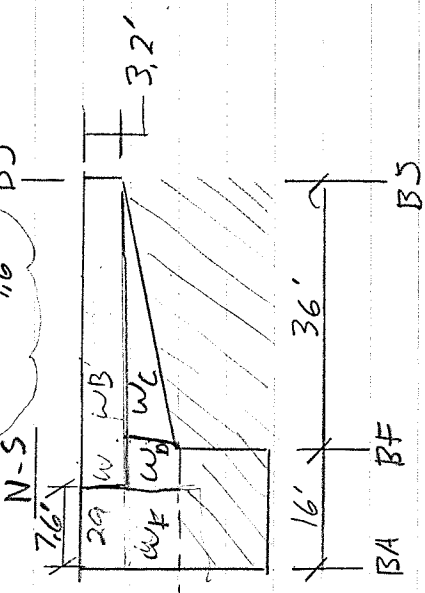
ROOF DIAGRAM #3



$W = 76 \times 12 \times 22 \text{ PSF} = 20 \text{ KIP}$

$F_x = \frac{1,2 \times 24 \times 20 \text{ KEP}}{6} = 960 \#$

170x12 = 2 KIP, USE WIND



$E = W$

$W = 5 \times 24.3 = 121.5 \text{ PLF}$

$W' = 7' \times 24.3 = 170 \text{ PLF}$

$X = 6.7' \text{ (CONS. EST.)}$

$W = 121.5 \times 12' + 170 \times (2' \div 2)$

$= 2.5 \text{ KEP}$

$B3 = 2.5 \text{ KEP}$

$M = 2.5 \text{ KEP} \times 6.7 = 16.8 \text{ KEP-FT}$

$BA = B3 = 16.8 \text{ KEP-FT} = 323 \text{ KEP}$

$W_B = 3.2 \times 16.2 \text{ PSF} = 52 \text{ PLF}$

$W_C = (9.5 - 3.2) \times 16.2 \text{ PSF} = 102 \text{ PLF}$

$W_D = 102 \text{ PLF}$

$W_F = (9.5) \times 2.4.3 \text{ PSF} = 221 \text{ PLF}$

USE BE CALC ANALOGY

$B_F = 323 \text{ KEP} \times \left(\frac{26-16}{26} \right) = 125 \text{ KEP}$

*ADD X FEE FROM #6

$B3 = 2.5 \text{ KEP} + 11 \text{ KEP} = 3.6 \text{ KEP}$

$M_{X6} = 11 \text{ KEP} \times 12' = 132 \text{ KEP-FT}$

FW - CONFID

$BA = B_J = 323 \text{ KEP} + \frac{3.2 \times 13.2}{16.8}$

$= 577$

$B_F = 125 \left(1 + \frac{13.2}{16.8} \right) = 223 \text{ KEP}$

$W = (2.5 \text{ KEP} + 323 \text{ KEP})^{1/2}$

$= 2.52, \text{ USE } Z = 2.8$

$= V = 2.8 / 52 = 53 \text{ PLF}$

N-S CONT'D

DIAPHRAM #3 CONT'D

CONVERT W LOADS TO J POINT LOAD:

$$P_B = 52 \text{ PLF} \times (52' - 7.6') = 2,309 \text{ \#} \quad \frac{(52' - 7.6')}{2} = 22.2'$$

$$P_C = 102 \text{ PLF} \times 36' \div 2 = 3,672 \text{ \#} \quad 36 \times \frac{3}{2} = 24'$$

$$P_D = 102 \text{ PLF} \times (16' - 7.6') = 857 \text{ \#} \quad 36' + (16' - 7.6') = 40.2'$$

$$P_F = 231 \text{ PLF} \times 7.6' = 1,756 \text{ \#} \quad 52' - \frac{7.6'}{2} = 48.2'$$

$$P_T = 2,309 + 3,672 + 857 + 1,756 = 8,594 \text{ \#}$$

$$X = (2,309 \times 22.2) + (3,672 \times 24) + (857 \times 40.2) + (1,756 \times 48.2) = 8,594 \text{ \#}$$

$$= 30.1 \text{ Ft (FROM RIGHT) } 52 - 30.1 = 21.9'$$

$$CS = \frac{0 + 16 + 52}{3} = 22.6 \text{ Ft}$$

$$M = (22.6 - 21.9) \times 8.6 \text{ KIP} =$$

$$+ 528 \text{ KIP} \times (22.6 - 6) = 14.8 \text{ KIP-FT}$$

$$M = 22.6 V_{BA} + (22.6 - 16') V_{BF} + (52 - 22.6) V_{BS}$$

$$= 22.6 V_{BA} + 6.6 V_{BF} + 29.4 V_{BS}$$

$$V_{BS} \frac{29.4}{22.6} V_{BA}$$

* FROM

DIAG #6

$$V_{BF} = \frac{6.6}{22.6} V_{BA}$$

$$M = 22.6 V_{BA} + \frac{6.6}{22.6} V_{BA} + \frac{29.4}{22.6} V_{BA}$$

$$14.8 \text{ K-FT} = 62.7 V_{BA}$$

$$V_{BA} = 236 \text{ KIP}$$

$$V_{BS} = \frac{29.4}{22.6} \times 236 \text{ KIP} = 31 \text{ KIP}$$

$$V_{BF} = \frac{6.6}{22.6} \times 236 = 6.8 \text{ KIP}$$

DIAPHRAM #3 CONT'D

x FER FROM DEAR #6

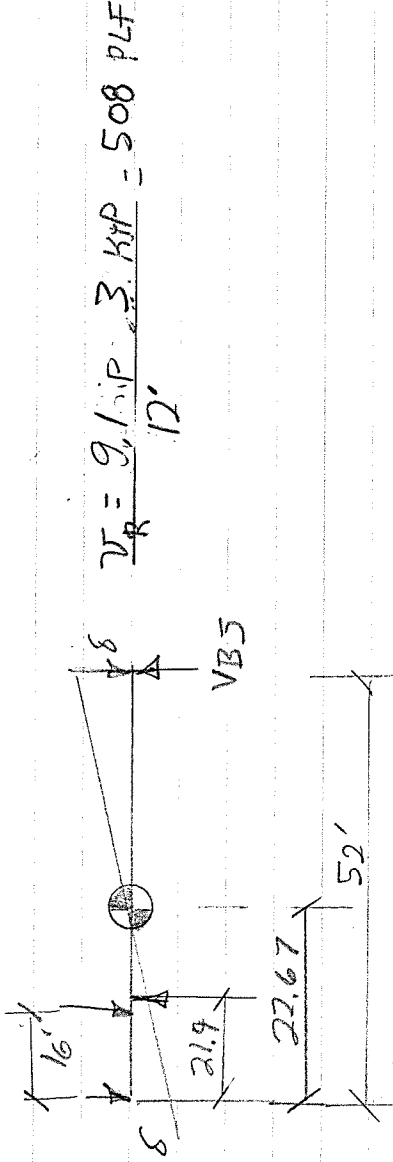
$$V_D = (8.6 \text{ KIP} + 5 \text{ KIP}) / 3 = 3 \text{ KIP}$$

$$V_{BA} = \frac{2.9 \text{ KIP} + 2.4 \text{ KIP}}{3} = 3.3 \text{ KIP}$$

$$V_{BF} = \frac{2.9 \text{ KIP} + 1.1 \text{ KIP}}{3} = 3.1 \text{ KIP}$$

$$V_{BS} = 2.9 \text{ KIP} - \text{NOT ADDITIVE}$$

RIGID DEACHRAM



$$V_R = \frac{9.1 \text{ KIP} \cdot 3 \text{ KIP}}{12'} = 508 \text{ PLF}$$

-USE BC CALC FOR FLEXIBLE DIAPHRAM ANALOGY

$$V_{BA} = .89 \text{ KIP} \approx 1.2 \text{ KIP} \quad V_{DEA} = 2.7 \text{ KIP}$$

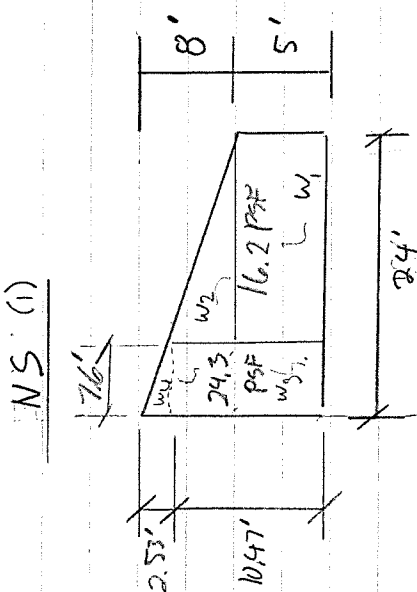
$$V_{BF} = 4.7 \text{ KIP} \approx 4.9 \text{ KIP} \quad V_D = \frac{2.7 \text{ KIP}}{12'} = 225 \# / \text{FE}$$

$$V_{BS} = 1.2 \text{ KIP} \quad \text{w/24 BF}$$

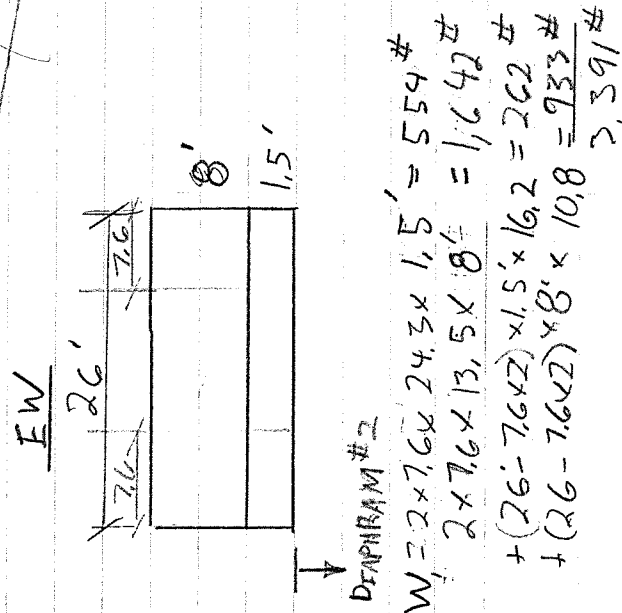
- DOES NOT MEET 4:1 ASPECT RATIO w/o BS

*1 ADDED TO ACCOUNT FOR X-FER FROM DEAR #6

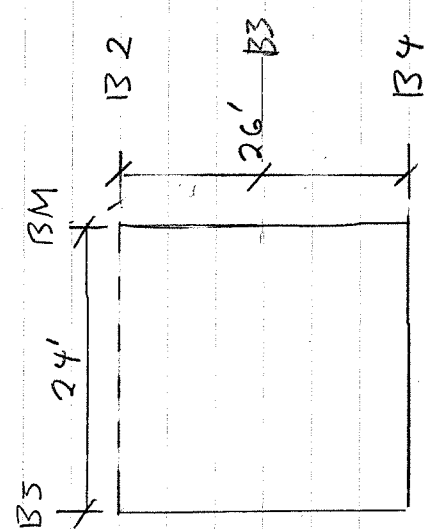
ROOF DEBRISAM NO. 4



$w = 5' \times 24.3 \text{ PSF} = 122 \text{ PSF}$
 $w' = 8' \times 24.3 \text{ PSF} = 194 \text{ PSF}$



$w_1 = 2 \times 7.6 \times 24.3 \times 1.5' = 554 \#$
 $2 \times 7.6 \times 13.5 \times 18' = 1,642 \#$
 $+ (26 - 7.6 \times 2) \times 1.5' \times 16.2 = 262 \#$
 $+ (26 - 7.6 \times 2) \times 8' \times 10.8 = 933 \#$
 $\underline{\hspace{1cm}}$
 $2,391 \#$



NS
 $w_1 = 81 \text{ PLF}$
 $w_2 = 87 \text{ PLF}$
 $w_3 = 254 \text{ PLF}$
 $w_4 = 61 \text{ PLF}$

USE BC CALL ANALOGY
 $V_{B3} = 2,619 \#$
 $V_{B4} = 1,583 \# + 4,000 \approx 2,000 \#$

$\sqrt{DIA} \frac{2619}{26} = 101 \text{ PLF}$
 $4,000 \#$ ADDED FOR NS (2) - HIGHER WIND ON OPPOSITE CORNER

$S = \frac{1.2 \times 24 \times 22 \times 2.4 \times 36}{6}$
 $= 658 \#$
 $L_{min} = 122 \times 24 = 2.9 \text{ KIP}$
 DESIGN FOR WIND

$w = 145 \text{ PLF}$

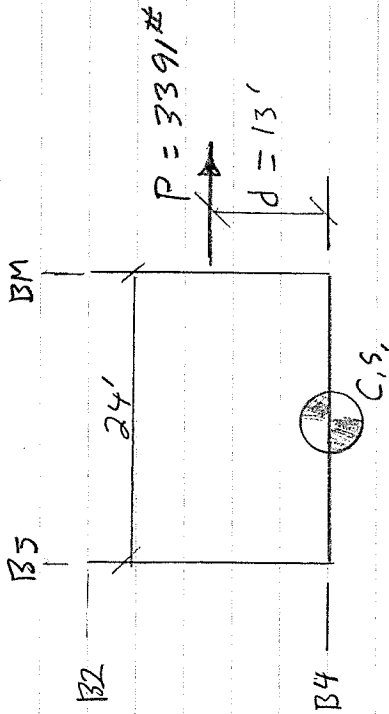
EW - CONT'D

$V_{B2} = 3,391 \# / 2 = 1696 \#$
 $V_{B4} = 1696 \#$
 $\sqrt{DIA} = 1696 \# / 24 = 71 \# / \text{FE}$

- NA, NO DRAG B2
 - RE DO AS PICTD

ROOF DIAGRAM #4 CONT'D

E-W REGGD DIAGRAM



$$V_{B4} = P = 3391\#$$

$$V_{B3} = V_{BM} = \frac{13' \times 3391\#}{24'}$$

$$= 184 \text{ kIP}$$

$$U_{DFA} = \frac{1.84 \text{ kIP} \times 24'}{26'} = 77 \text{ PLF}$$

$$= \frac{3.4 \text{ kIP} \times 26'}{26'} = 131 \text{ PLF}$$

ROOF DEBRHAM #5

$AR = \frac{33.67}{12} = 2.8 < 3.0$

UNBLOCKED O.K.

SEES MEC

$F_x = 1.2 D_s W_x$

$R = 6$

$D_s = 24$

$W_x = (15 \text{ psf} + 3.5 \text{ psf} \times 1.2) = 22$

$W_x = w_x A$

$= 22 \text{ psf} \times 14' \times 33.7'$

$= 10.4 \text{ kip}$

$F_x = \frac{1.2 \times 24 \times 10.4 \text{ kip}}{6}$

$= 500\# \pm$

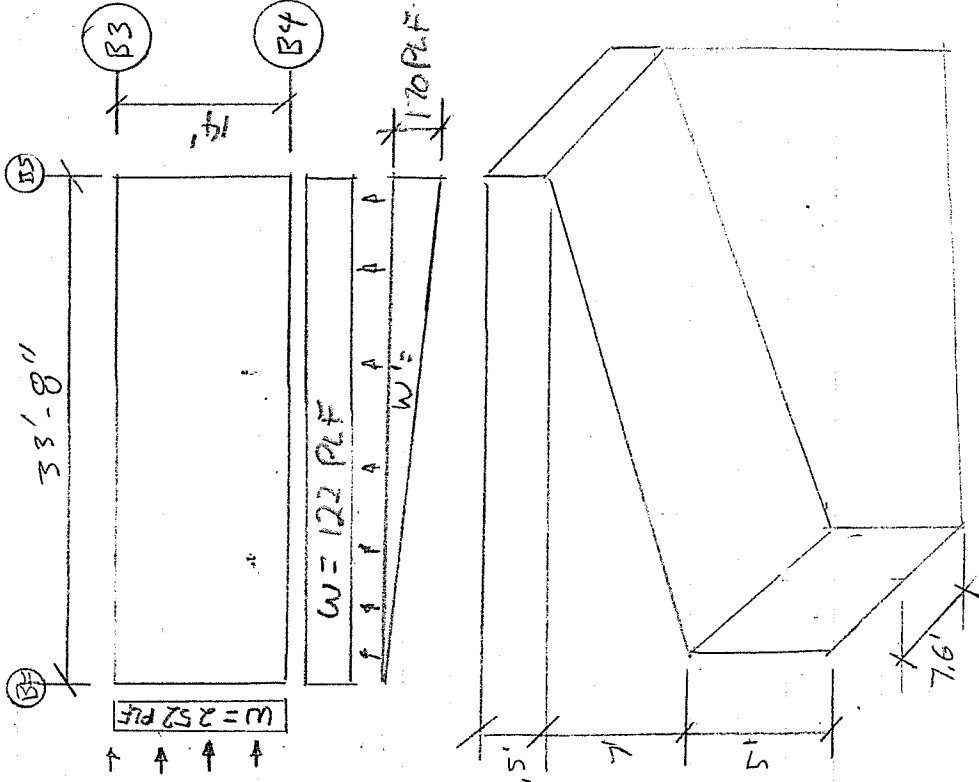
\ll WIND, O.K.

UNBLOCKED DEBRHAM

L.C. 384,

$CAP = 350 > 122 + 170 = 292$

OK.



E-W WIND
 $A_e = 5.5' \times 1.8' = 6.5'$

$A_b = 7'$

$P_a = 24.3 \text{ psf}$

$P_b = 13.5 \text{ psf}$

$W = \frac{24.3 \times 6.5'}{13.5 \times 7'}$

252 PLF

N-S WIND
 $A_a = 5' / F_z$
 $A_d = 0' - 7' / F_z$

$W = 24.3 \text{ psf} \times 5' = 122 \text{ PLF}$

$W' = 24.3 \text{ psf} \times 7' = 170 \text{ PLF}$

$W_{DRAP} =$

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E-W WIND ROOF DIAGRAM # 5 CONT'D

$$V_{B3}^x = V_{B4} = 252 \text{ PLF} \times \frac{14'}{33.67'} = 105 \text{ PLF} \quad v_{DPA} = \frac{3.53 \text{ KIP}}{33.67} = 119 \text{ PLF}$$

$$105 \text{ PLF} \times 33.67' = 3.53 \text{ KIP/WALL}$$

NS WIND

$$V_{BF} = \frac{2.05 \text{ PLF} \times 33.67'}{2} + 170 \text{ PLF} \times \frac{33.67'}{2} \times \frac{1}{3}$$

$$= 3.01 \text{ KIP}$$

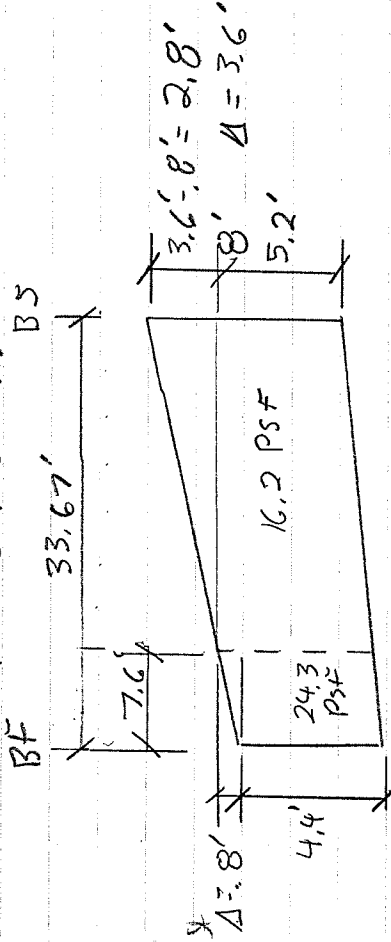
$$V_{B5} = \frac{2.05 \text{ PLF} \times 33.67'}{2} + 170 \text{ PLF} \times \frac{33.67'}{2} \times \frac{2}{3}$$

$$= 3.95 \text{ KIP}$$

$$v_D = 3.95 \text{ KIP} / 14' = 282 \text{ PLF}$$

ROOF DIAGRAMS CONT'D

REFINE N-S LOAD:

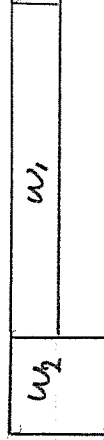


$$w_1 = 16.2 \text{ PSF} \times 5.2' = 84 \text{ PLF}$$

$$w_3 = 2.8' \times 16.2 \text{ PSF} = 45 \text{ PLF}$$

$$w_2 = 7.6' \times 24.3 \text{ PSF} = 185 \text{ PLF}$$

$$w_4 = .8' \times 24.3 \text{ PSF} = 19 \text{ PLF}$$



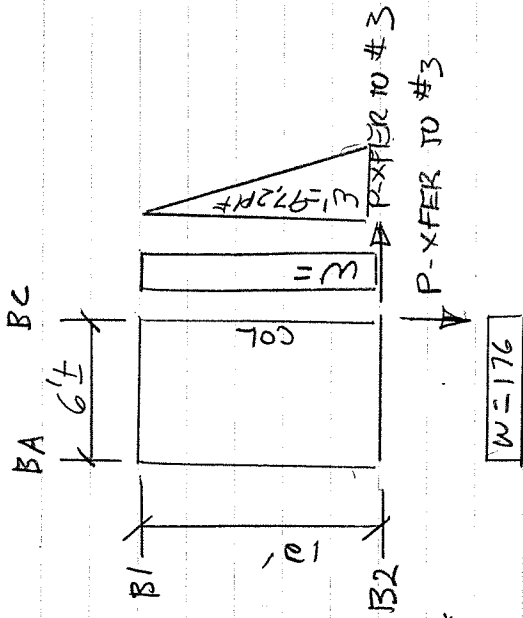
USE BCCALL ANALOGY

$$V_{BF} = 2.3 \text{ KIP}$$

$$V_{BS} = 1.9 \text{ KIP}$$

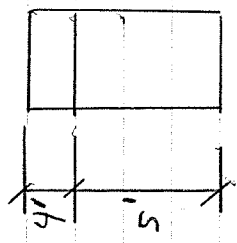
$V = 2.3 \text{ KIP} / 2 \text{ RE} = 1.2 \text{ PLF}$
 - PER SPREAD SHIP, O.K.

ROOF DIAGRAM # 6

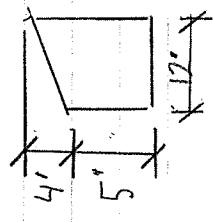


$W = 5' \times 24.3 \text{ PSF} = 121.5 \text{ PLF}$
 $+ 4' \times 13.5 \text{ PSF} = 54 \text{ PLF}$
 $\underline{\hspace{1.5cm}} 176 \text{ PLF}$

NS



F-W

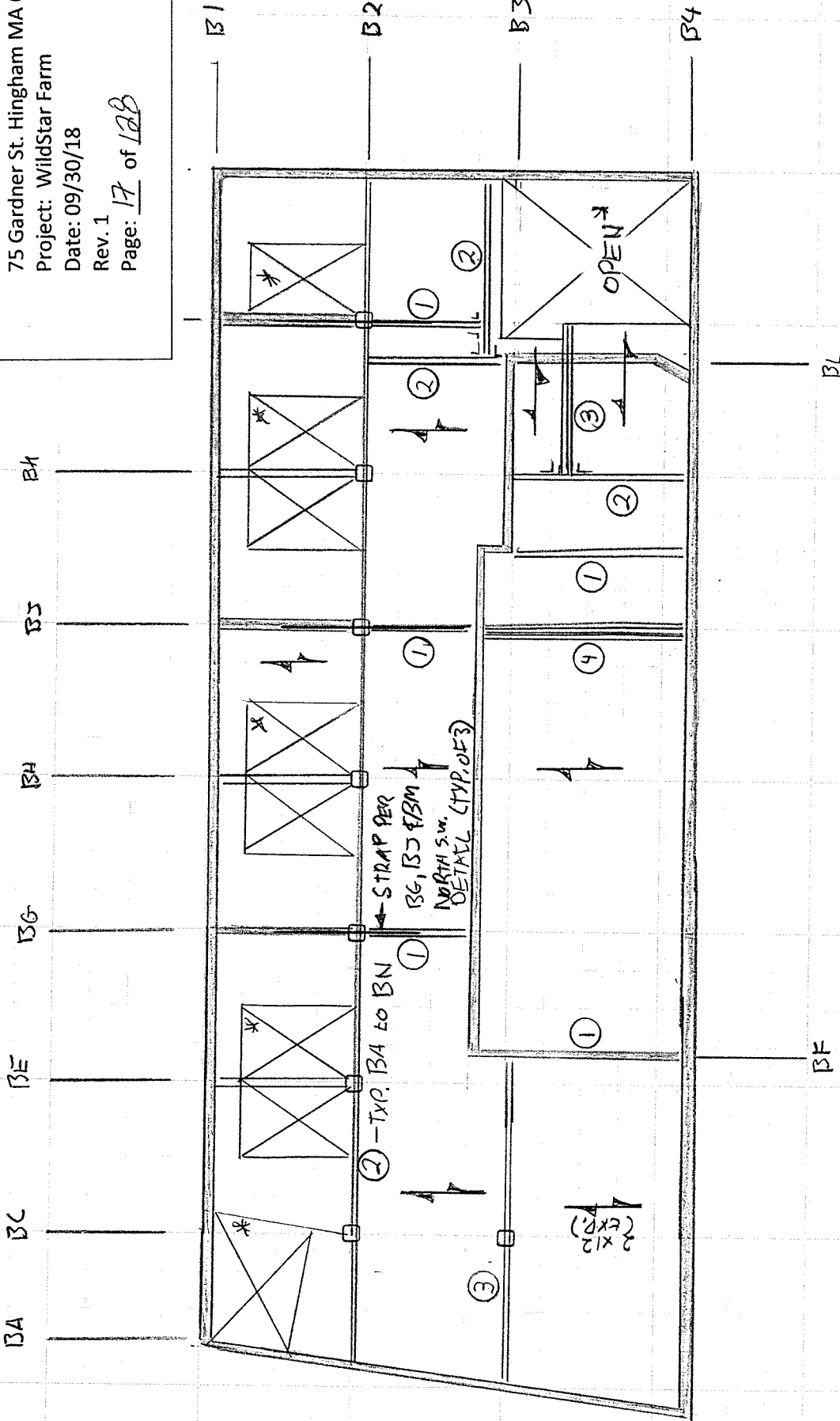


$W = 5 \times 24.3 \text{ PSF} = 121.5 \text{ PLF}$
 $W' = 4 \times 24.3 \text{ PSF} = 97.2 \text{ PLF}$

NS XFER TO \#3
 $V_{BA} = V_{BC} = 528 \# \text{ (SEE BELOW)}$
 $= 176 \text{ PLF} \times 6' / 2 = 528 \#$
 $V = 528 \# / 12' = 44 \# / \text{FL}$
 EW XFER TO \#3

$121.5 \text{ PLF} \times 12' / 2 = 729 \#$
 $+ 97.2 \text{ PLF} \times 12' / 2 \times \frac{2}{3} = 376 \#$
 $\underline{\hspace{1.5cm}} 1016 \#$

$B_1 = 729 \# + 376 \# = 917 \#$
 $V = 1016 \# / 12' = 85 \# / \text{FL}$



- ① = (2) 2x12, SPF NO. 2
- ② = (2) 3/4" x 1 1/4" LVL
- ③ = (3) 3/4" x 1 1/4" LVL
- ④ = (4) 3/4" x 1 1/4" LVL
- ⑤ = (3) 3/4" x 1 1/4" LVL

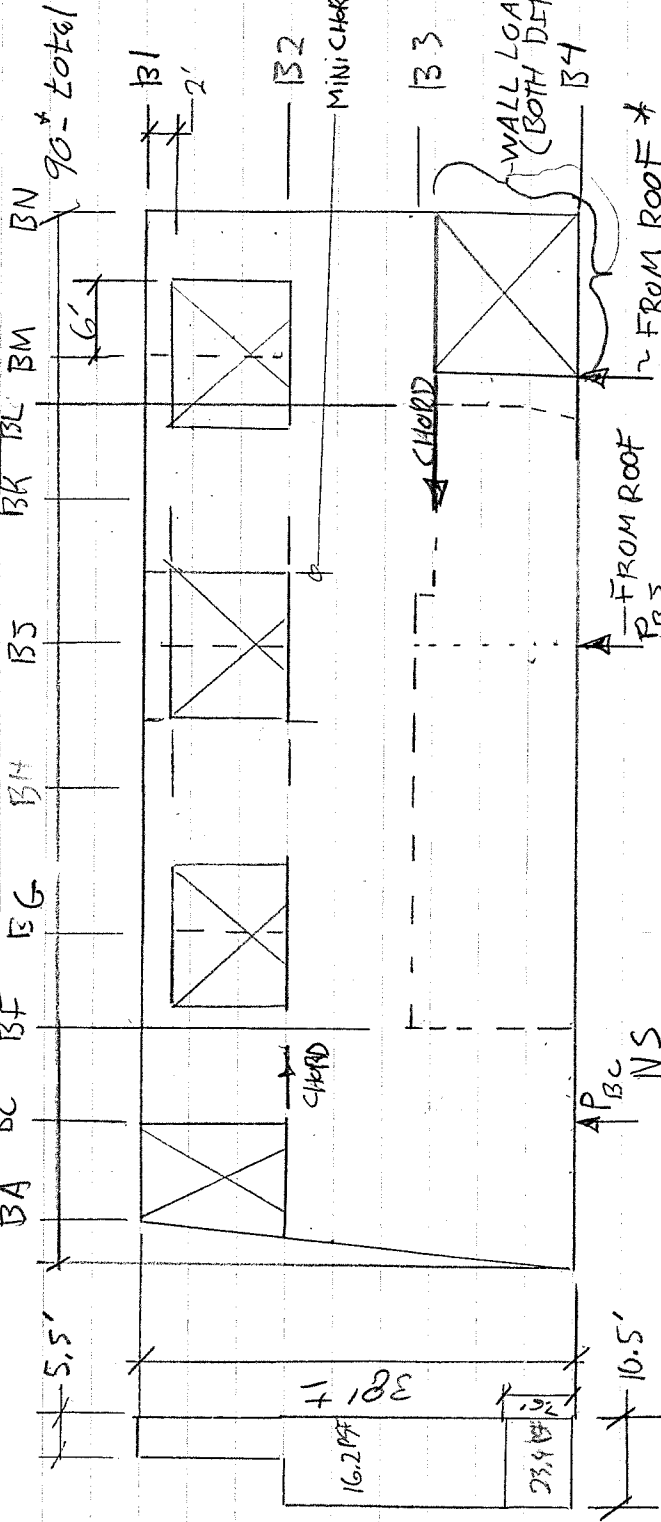
* PROVIDE STRAPS AT ALL DEAPHRAGM OPENINGS PER FIGURE 2308.11.3.3 OF THE IBC, 2009 E.O.

3/4" OSB STR. SHEATHING W/ 10d NAILS @ 6" O.C. EDGES, 12" O.C. FIELD

2ND FLOOR DEAGHRAM

FLOOR DIAGRAM NS

74.7 BM



*TRANSFER DIRECTLY FROM 2ND STORY WALLS TO 1ST STORY WALLS DO NOT EFFECT DEAD.

MINICOROS FOR OPENINGS

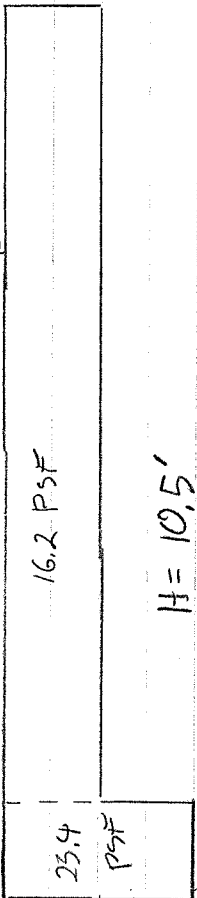
WALL LOAD HERE X-FERRED TO R22 (BOTH DIRECTIONS)

FROM ROOF *

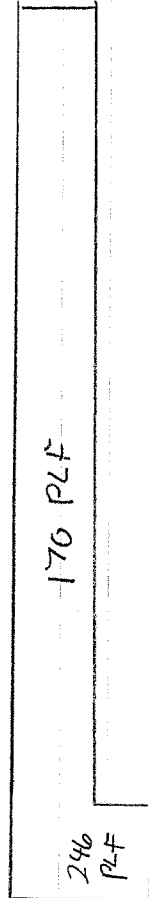
P_{BM} - SOME OF P_{BM} IS X-FERRED DIRECTLY TO ISM SHEAR WALL (NORTH) AND SOME IS X-FERRED TO B2 VIA CAMBUER ACTION, \therefore ONLY USE CAM. ACTION IN RESA

MODEL. (1/2 OF DIAP. 2) + ALL RD#4 1.7KIP/2 + 2KIP = 3.7KIP (RELEASE NODE BM TN RESA CALL TO ACCOUNT FOR THIS)

FROM ROOF P_{B3}



H = 10.5'



$A P_{BC} = 1.7KIP$

$A P_{B3} = 5.72 KIP$

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2ND FLOOR DIAPHRAGM E-W

$P_{B3} = 713 \text{ KIP (FROM ROOF)}$

* - SWAP EDGE FOR

24.3

$w_1 = 24.3 \text{ PSF} \times 5.5' = 134 \text{ PLF}$

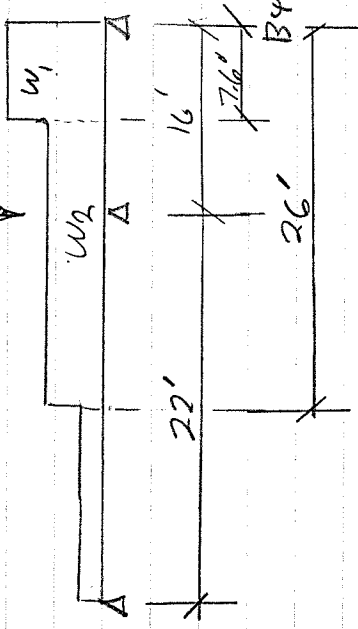
$w_1 = 24.3 \text{ PSF} \times 10.5' = 255 \text{ PLF}$

$w_2 = 16.2 \text{ PSF} \times 10.5' = 170 \text{ PLF}$

$w_3 = 16.2 \text{ PSF} \times 5.5' = 89.1 \text{ PLF}$

$T = 6.1 \text{ KIP}$

SEISMIC (ON DIAPHRAGM)



$1.2 \times 24 (10 \text{ PSF} \times 38' \times 90') = 1.6 \text{ KIP, USE WIND FOR DIAPHRAGM}$

6

2ND FLOOR D. CONT'D

BEAM RESULTS ATTACHED FOR BEAM ANALOGY

D CHECK OVERALL DIAGRAM CAPACITY

$V_{max} = 3780^{\#}$ @ BL, DON'T CONSIDER DEPTH OF LADDER WELL

$$v = \frac{3780}{24'} = 158^{\#}/ft$$

- USE $1\frac{1}{32}$ DOC PSI OR PS2 SHEATHING

W/ 10D NAILS, $1\frac{1}{2}$ " MIN. PEN, UN BLOCKED

$$v_{max} = 250^{\#}/ft \times .92 \times 1.4 = 322^{\#}/ft > 158^{\#}/ft, O.K.$$

CHORD FORCE AT NW CORNER

$$M_{BC} = 10.8 \text{ KIP-FT} \pm$$

$$F = 10.8 \text{ KIP-FT} / 26 \text{ FT} = 415^{\#}$$

CHORD FORCE AT SE CORNER

$$M_{CB} = 3.3 \text{ KIP-FT} \pm$$

$$F = 3.3 \text{ KIP-FT} / 12' = 275^{\#}, \text{ USE } 415^{\#} \text{ FOR DESIGN}$$

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DISTANCE AT SECTIONS
WITH HOLES

DIAPHRAM OPENINGS AT STALLS

USE WORST CASE V&M FOR DIAPHRAM STRAPS

$$M = 10.8 \text{ KIP-Ft}$$

$$T/C_{\text{CHORD}} = 10.8 \text{ KIP-Ft} / 30' = 284\#$$

$$V = 3625\# / 38' = 95.4\#/\text{Ft}$$

DIAPHRAM CHECK - ROOF

PER SPREAD SHEET & IBC TABLE, THE FOLLOWING DIAPHRAMS ARE O.K.
UNDER ALL LOAD CONDITIONS

#1, #3R, #4 & #6

PER SPREAD SHEET CONDITION #1 IS O.K. FOR #2 & #5
CHECK LOAD DIRECTION FOR PERFORMANCE w/ COND. #7

RD2

RD2 RAFTERS RUN E-W RD2 MEV IS E/W - O.K.

RD #5

RAFTERS RUN E-W, HE LOAD RUNS N-S - N.G.

- TRY REFINING LOAD CALC

RD #3R

- USE FLEXIBLE DIAGRAM ANALOGY, O.K. FOR WIND
LOAD PER NDS CURDANCE

Joint Reactions (By Combination)

LC	Joint Label	X [lb]	Y [lb]	Z [lb]	MX [k-ft]	MY [k-ft]	MZ [k-ft]
1	BA	0	2576.899	0	NC	NC	0
1	BN	0	362.059	0	0	0	0
1	BL	0	5594.389	0	0	0	0
1	BJ	0	9679.348	0	0	0	0
1	BG	0	2605.874	0	0	0	0
1	BF	0	3578.031	0	0	0	0
1	Totals:	0	24396.6	0			
1	COG (ft):	X: 43.166	Y: 0	Z: 0			

Member Section Forces (By Combination)

LC	Member Label	Sec	Axial[lb]	y Shear[lb]	z Shear[lb]	Torque[k-ft]	y-y Mome...	z-z Mome...
1	2D	1	0	2576.899	0	0	0	0
		2	0	1454.362	0	0	0	-9.197
		3	0	-1252.174	0	0	0	-8.047
		4	0	-2027.911	0	0	0	-.562
		5	0	774.383	0	0	0	5.979
		6	0	-1.354	0	0	0	4.215
		7	0	1828.783	0	0	0	4.223
		8	0	1053.047	0	0	0	-2.352
		9	0	277.31	0	0	0	-5.388
		10	0	-498.427	0	0	0	-4.884
		11	0	-1274.164	0	0	0	-.84
		12	0	-2049.901	0	0	0	6.744
		13	0	1133.71	0	0	0	1.804
		14	0	357.973	0	0	0	-1.6
		15	0	-417.764	0	0	0	-1.464
		16	0	-1193.5	0	0	0	2.213
		17	0	3625.152	0	0	0	1.537
		18	0	-362.059	0	0	0	-3.304
		19	0	-362.059	0	0	0	-1.652
		20	0	-362.059	0	0	0	0

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Company : P. B. Branagan Engine
 Designer :
 Job Number :

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July 25, 2017
 1:17 AM
 Checked By: _____

Envelope Joint Reactions

Joint		X [lb]	lc	Y [lb]	lc	Z [lb]	lc	MX [k-ft]	lc	MY [k-ft]	lc	MZ [k-ft]	lc
B4	max	0	1	1404.4	2	0	1	NC	NC	NC	NC	0	1
	min	0	1	913.865	1	0	1	NC	NC	NC	NC	0	1
B1	max	0	1	1121.556	1	0	1	0	1	0	1	0	1
	min	0	1	802.236	2	0	1	0	1	0	1	0	1
B3	max	0	1	3879.363	2	0	1	0	1	0	1	0	1
	min	0	1	3794.579	1	0	1	0	1	0	1	0	1
Totals:	max	0	1	6086	2	0	1						
	min	0	1	5830	1	0	1						

Envelope Member Section Forces

Member	Sec		Axial[lb]	lc	y Shear[lb]	lc	z Shear[lb]	lc	Torque[k...]	lc	y-y Mom...	lc	z-z Mom...	lc
M1	1	max	0	1	1404.4	2	0	1	0	1	0	1	0	1
		min	0	1	913.865	1	0	1	0	1	0	1	0	1
	2	max	0	1	894.4	2	0	1	0	1	0	1	-1.487	1
		min	0	1	573.865	1	0	1	0	1	0	1	-2.298	2
	3	max	0	1	384.4	2	0	1	0	1	0	1	-2.295	1
		min	0	1	233.865	1	0	1	0	1	0	1	-3.577	2
	4	max	0	1	-106.135	1	0	1	0	1	0	1	-2.423	1
		min	0	1	-125.6	2	0	1	0	1	0	1	-3.836	2
	5	max	0	1	-446.135	1	0	1	0	1	0	1	-1.87	1
		min	0	1	-601.6	2	0	1	0	1	0	1	-3.081	2
	6	max	0	1	-786.135	1	0	1	0	1	0	1	-.638	1
		min	0	1	-941.6	2	0	1	0	1	0	1	-1.538	2
	7	max	0	1	-1126.135	1	0	1	0	1	0	1	1.274	1
		min	0	1	-1281.6	2	0	1	0	1	0	1	.685	2
	8	max	0	1	-1466.135	1	0	1	0	1	0	1	3.866	1
		min	0	1	-1621.6	2	0	1	0	1	0	1	3.588	2
	9	max	0	1	1988.444	1	0	1	0	1	0	1	7.171	2
		min	0	1	-1961.6	2	0	1	0	1	0	1	7.138	1
	10	max	0	1	1648.444	1	0	1	0	1	0	1	3.675	2
		min	0	1	1577.764	2	0	1	0	1	0	1	3.501	1
	11	max	0	1	1308.444	1	0	1	0	1	0	1	.86	2
		min	0	1	1237.764	2	0	1	0	1	0	1	.544	1
	12	max	0	1	968.444	1	0	1	0	1	0	1	-1.276	2
		min	0	1	897.764	2	0	1	0	1	0	1	-1.732	1
	13	max	0	1	628.444	1	0	1	0	1	0	1	-2.731	2
		min	0	1	557.764	2	0	1	0	1	0	1	-3.329	1
	14	max	0	1	288.444	1	0	1	0	1	0	1	-3.507	2
		min	0	1	217.764	2	0	1	0	1	0	1	-4.246	1
	15	max	0	1	110.444	1	0	1	0	1	0	1	-3.772	2
		min	0	1	47.764	2	0	1	0	1	0	1	-4.645	1
	16	max	0	1	-67.556	1	0	1	0	1	0	1	-3.698	2
		min	0	1	-122.236	2	0	1	0	1	0	1	-4.688	1
	17	max	0	1	-292.236	2	0	1	0	1	0	1	-3.283	2
		min	0	1	-317.556	1	0	1	0	1	0	1	-4.317	1
	18	max	0	1	-462.236	2	0	1	0	1	0	1	-2.529	2
		min	0	1	-585.556	1	0	1	0	1	0	1	-3.414	1
	19	max	0	1	-632.236	2	0	1	0	1	0	1	-1.434	2
		min	0	1	-853.556	1	0	1	0	1	0	1	-1.975	1
	20	max	0	1	-802.236	2	0	1	0	1	0	1	0	1
		min	0	1	-1121.556	1	0	1	0	1	0	1	0	1

Shear Wall Design Spreadsheet

Shear Wall Calculator

Wall	Top shear (kip)	v (plf)	Panel Design	Cap	height (ft)	length (ft)	T/C(kip)	DL (kip)	Anchor	Cap.	Hold Down	Cap (kip)	Min Wood (in)
BJ North	9.72	810	DBL 7/16" Str. 8 10d@4" O.C.	960	10	12	7.4	1.4	SB1x30	7.2	HD12	9.2	3.5
BJ South 1*	1.9	262	7/16" Str. 1.8d@6" O.C.	360	15	7.25	3.7	0.87					
BJ South 2**	4.3	269	7/16" Str. 8 10d@4" O.C.	480	16	16	4.6						
BL	5.6	400	7/16" Str. 8 10d@4" O.C.	480	10	14	3.6	0.7	5/8 J	3.8	HDU5-SDS2.5	4.1	3
BM south**	2.4	253	7/16" Str. 1.8d@6" O.C.	360	10	9.5	2.8	0.6	5/8 J	3.8	HDU5-SDS2.5	4.1	3
BN	1.94	57	7/16" Str. 1.8d@6" O.C.	360	10	34	0.0						
BF 2nd floor	2.3	164	CS-PF method	2.8 kip	10	14	NA						
BF first floor#	5.9	421	CS 7/16" str 8D @ 4" O.C.	480	10	14	5.2	0.8	SB1x30	7.2	HD12	9.2	3.5
BA 2nd floor ##	4.23	176	7/16" Str. 1.8d@6" O.C.	360	6	24	2.8		NA		HDU5-SDS2.5	4.1	3
BA floor ##		0	7/16" Str. 1.8d@6" O.C.	360	6	24	1.8		NA		HDU5-SDS2.5	4.1	3
B4 Upper	10.62		CS-PF method										
B4 lower	12		CS-PF method										

* diaphragm 5 only

** (excluding Dia. 5)

*** load from D2 & D4 split between BM N&S, D1 to BM North

RD3 load redistributed to BJ & BA

Includes 2.5 kip redistributed from BF

Shear Wall Load Calculator

Shear Wall	WIND NS				WIND EW				SEISMIC EW										
	RD1R	RD1RF	RD2	RD3R	RD3F	RD4	RD5	RD6	DA	L2	L1	RD1R	RD2	RD3	RD4	RD5	RD6	DA	
B1	0		0.44							0.44	0.44	0.28	2.2	0.92	1.1	3.4	4.5		
B3	0									0	0					7.13	11		
B4	0		0.44							0.44	0.44					10.62	12		
BA	0							0.528	2.6	0	0					0	0		
BC (chord)	1.7	0.85			1.2					1.73	4.328					0.577	0.58		
BG	1.6	3.2								0.85	0.85								
BF	0				4.9		2.3			3.2	5.8								
BJ North	1.6	3.2								7.2	10.8					0.223	0.22		
BJ South (Chord)										4	9.72					2.417	2.42		
BL	0									0	5.72*					0	0		
BM	1.7	0.85	1.4			2				4.25	4.25					1.84	1.84		
BN	0		1.1							1.1	1.94					0	0		

* no south shear wall at level 1 BJ, load will be xferred to BJ North

* contribution from RD1 not counted in shear wall total because it covers the same profile as DA

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DIAPHRAGM LOAD CALCULATOR

	ns	ew	srs	SUM	Unblocked 10d OK? (277#/ft)	Condition 1 OK? (367#/ft)
R1R	141	29	144.0	170 OK		
R1F			0.0	0 OK		
R2	116	309	330.1	425 NG	OK	
R3R	508	53	510.8	561 NG	ng	
R3F**	304	53	308.6	357 NG		
R4	101	131	165.4	232 OK		
R5	192	119	225.9	311 OK		
R6	44	85	95.7	129 OK		

Use Flexible anology, O.K. for wind load per NDS guidance

0.099904 0.671791 0.878462
1.915999 0.019764 1.391317

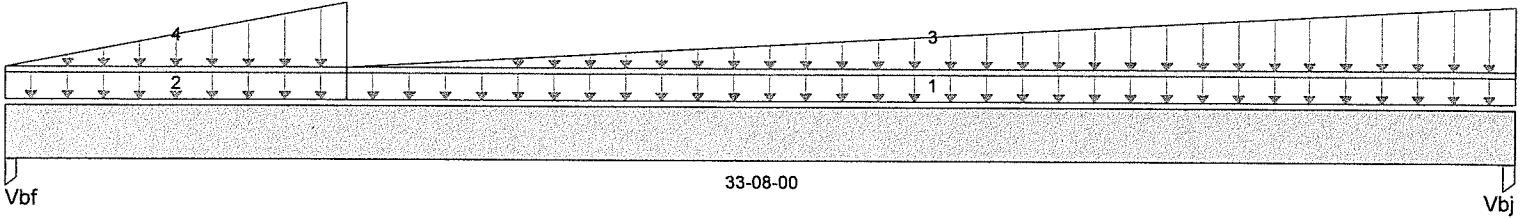
0.273697 0.099635 0.611009

** - simply supported

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Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

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Total Horizontal Product Length = 33-08-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
Vbf, 3-1/2"		119 / 0		2,309 / 0	
Vbj, 3-1/2"		119 / 0		1,944 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	W1	Unf. Lin. (lb/ft)	L	07-07-00	33-08-00				84		n/a
2	W2	Unf. Lin. (lb/ft)	L	00-00-00	07-07-00				185		n/a
3	W3	Trapezoidal (lb/ft)	L	07-07-00					0		n/a
					33-08-00				45		n/a
4	W4	Trapezoidal (lb/ft)	L	00-00-00					0		n/a
					07-07-00				19		n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	16,354 ft-lbs	70.4%	160%	2	16-09-13
End Shear	2,148 lbs	28.8%	160%	2	01-05-08
Total Load Defl.	L/135 (2.957")	178.1%	n/a	1	16-09-13
Live Load Defl.	L/147 (2.714")	326.9%	n/a	7	16-09-13
Max Defl.	2.957"	295.7%	n/a	1	16-09-13
Span / Depth	28.5	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
Vbf Post	3-1/2" x 1-3/4"	2,428 lbs	n/a	52.9%	Unspecified
Vbj Post	3-1/2" x 1-3/4"	2,063 lbs	n/a	44.9%	Unspecified

Cautions

Member is insufficient to carry loads for Code minimum Total load deflection at limit of L/240.
 Member is insufficient to carry loads for Code minimum Live load deflection at limit of L/360.
 Member is insufficient to carry loads for Maximum Total load deflection at limit of 1".

Notes

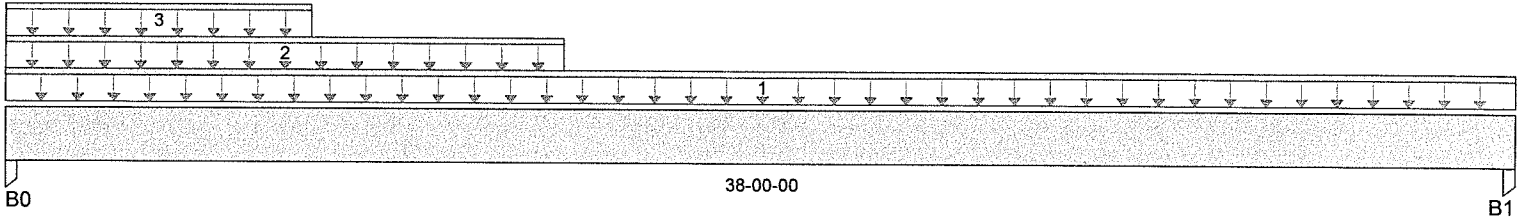
Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

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CONTROL SUMMARY IS IRRELEVANT, (TYPICAL FOR DRAGRAM ANALOGY CASES)

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
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Total Horizontal Product Length = 38-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		616 / 0		3,743 / 0	
B1, 3-1/2"		616 / 0		2,015 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Wbal	Unf. Lin. (lb/ft)	L	00-00-00	38-00-00				89		n/a
2	W2a-b3	Unf. Lin. (lb/ft)	L	00-00-00	14-00-00				81		n/a
3	Wb4-2a	Unf. Lin. (lb/ft)	L	00-00-00	07-08-00				162		n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	27,904 ft-lbs	23.3%	160%	2	16-05-06
End Shear	3,767 lbs	11.1%	160%	2	01-07-08
Total Load Defl.	L/395 (1.14")	60.7%	n/a	1	18-06-09
Live Load Defl.	L/538 (0.837")	89.2%	n/a	7	18-02-06
Max Defl.	1.14"	114%	n/a	1	18-06-09
Span / Depth	28.2	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	4,359 lbs	n/a	47.4%	Unspecified
B1 Post	3-1/2" x 3-1/2"	2,631 lbs	n/a	28.6%	Unspecified

Cautions

Member is insufficient to carry loads for Maximum Total load deflection at limit of 1".
 Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.

Notes

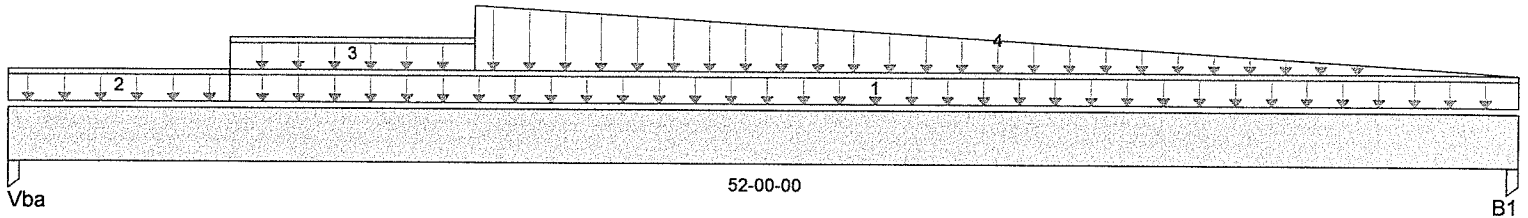
Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets User specified (L/480) Live load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.



FAILED

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
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 Date: 09/30/18
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Total Horizontal Product Length = 52-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
Vba, 3-1/2"		184 / 0		4,128 / 0	
B1, 3-1/2"		184 / 0		2,628 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Wb	Unf. Lin. (lb/ft)	L	07-07-00	52-00-00				52		n/a
2	Wf	Unf. Lin. (lb/ft)	L	00-00-00	07-07-00				231		n/a
3	WD	Unf. Lin. (lb/ft)	L	07-07-00	16-00-00				102		n/a
4	Wc	Trapezoidal (lb/ft)	L	16-00-00	52-00-00				102		n/a
									0		n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	44,575 ft-lbs	191.9%	160%	2	23-06-11
End Shear	3,966 lbs	53.2%	160%	2	01-05-08
Total Load Defl.	L/33 (18.937")	734.8%	n/a	1	25-02-02
Live Load Defl.	L/35 (17.531")	1,360.5%	n/a	7	25-02-02
Max Defl.	18.937"	1,893.7%	n/a	1	25-02-02
Span / Depth	44.2	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
Vba Post	3-1/2" x 1-3/4"	4,313 lbs	n/a	93.9%	Unspecified
B1 Post	3-1/2" x 1-3/4"	2,812 lbs	n/a	61.2%	Unspecified

Cautions

Member has insufficient Pos. Moment resistance to carry loads.
 Member is insufficient to carry loads for Code minimum Total load deflection at limit of L/240.
 Member is insufficient to carry loads for Code minimum Live load deflection at limit of L/360.
 Member is insufficient to carry loads for Maximum Total load deflection at limit of 1".

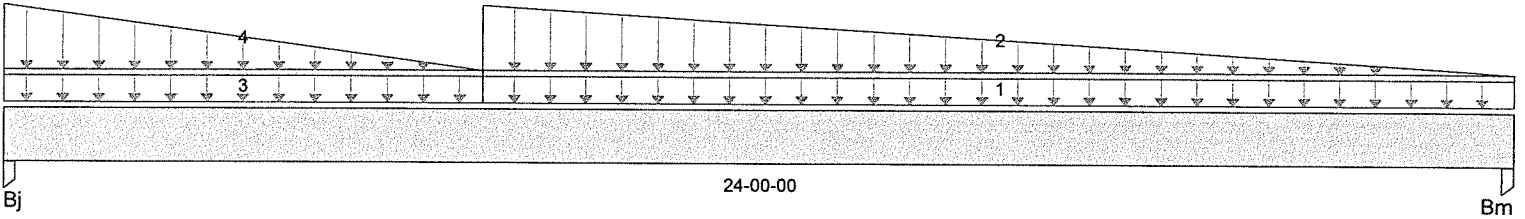
Notes

Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

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Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
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 Rev. 1
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Total Horizontal Product Length = 24-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
Bj, 3-1/2"		85 / 0		2,619 / 0	
Bm, 3-1/2"		85 / 0		1,583 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	W1	Unf. Lin. (lb/ft)	L	07-07-00	24-00-00				81		n/a
2	W2	Trapezoidal (lb/ft)	L	07-07-00	24-00-00				87		n/a
3	W3	Unf. Lin. (lb/ft)	L	00-00-00	07-07-00				254		n/a
4	W4	Trapezoidal (lb/ft)	L	00-00-00	07-07-00				61		n/a
									0		n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	11,932 ft-lbs	51.4%	160%	2	10-07-08
End Shear	2,306 lbs	31%	160%	2	01-05-08
Total Load Defl.	L/267 (1.059")	90%	n/a	1	11-06-11
Live Load Defl.	L/283 (0.998")	169.6%	n/a	7	11-06-11
Max Defl.	1.059"	105.9%	n/a	1	11-06-11
Span / Depth	20.2	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
Bj Post	3-1/2" x 1-3/4"	2,704 lbs	n/a	58.9%	Unspecified
Bm Post	3-1/2" x 1-3/4"	1,668 lbs	n/a	36.3%	Unspecified

Cautions

Member is insufficient to carry loads for Code minimum Live load deflection at limit of L/360.
 Member is insufficient to carry loads for Maximum Total load deflection at limit of 1".

Notes

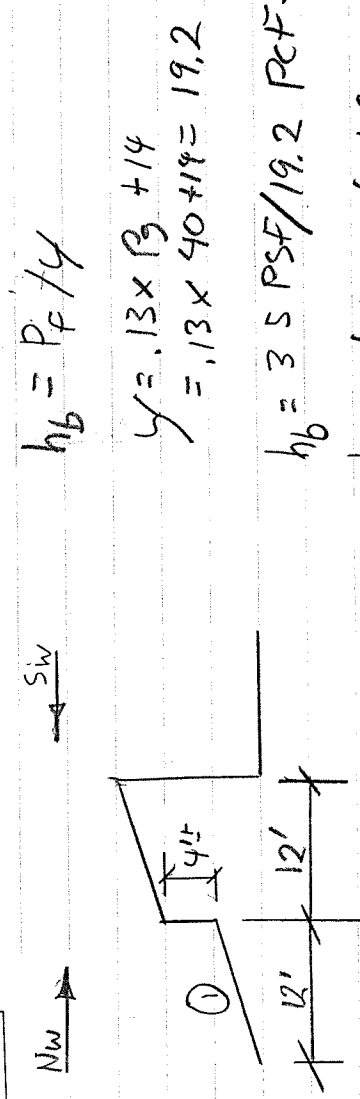
Design meets Code minimum (L/240) Total load deflection criteria.
 Calculations assume member is fully braced.
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 Design based on Dry Service Condition.

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SNOW LOADS (DIAPHRAM 1, 2, 3, 4 & 6)

① LEEWARD DRIFT



$h_b = P_e / 4$

$y = .13 \times 13 + 14$
 $= .13 \times 40 + 14 = 19.2 \text{ PCF}$

$h_b = 3.5 \text{ PSF} / 19.2 \text{ PCF} = 1.822$

$h_c = 4' - h_b = 4' - 1.822 = 2.18'$

$h_c / h_b = 2.18 / 1.8 = 1.2$, DESIGN FOR DRIFFT

LEEWARD

$w = 1.75'$

WINDWARD

$w = 1.3$, USE 1.75'

$w = 4h = 4 \times 1.75 = 7'$

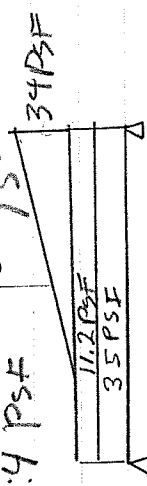
$P_s = h_p y = 1.75' \times 19.2 \text{ PCF} = 34 \text{ PSF}$

SLIDING SNOW

$P_s = 4 \text{ PSF}$
 $= .4 \times 35 \text{ PSF} \times 1.2 = 168 \# / \text{FE EAVE}$

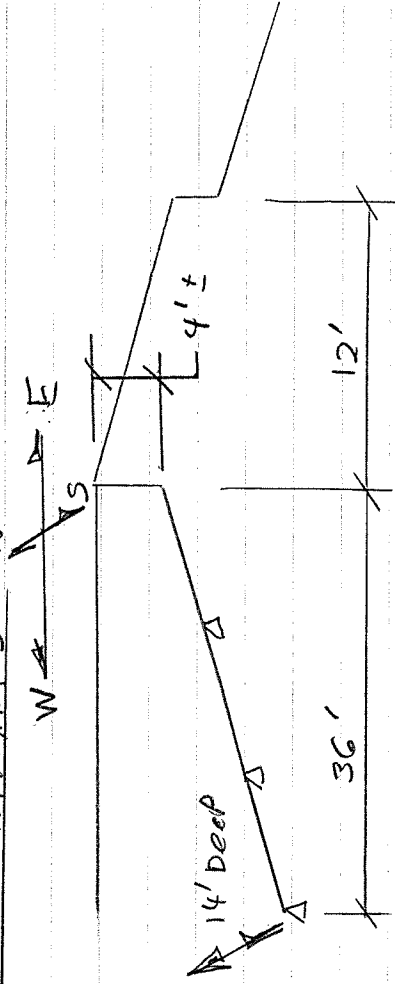
$P_s = 168 \# / 15' = 11.2 \text{ PSF}$ UPPER ROOF

- NO SLIDING OR DRIFFTING
 USE 2X8S PER CODE TABLE
 2308, 10, 3(G)



LOWER ROOF
 2X10 PER BC CALC

SNOW LOADS DEAPHRAM 5 N



DRAFT - E-W

LEEWARD - E-W
 $R_y = 1.75$

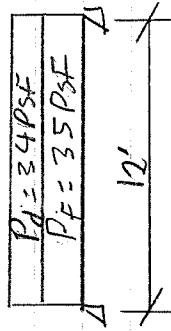
WINDWARD-E-W
 $R_y = 2 \times 1.75 = 3.5$, USE LEEWARD
 $W = 7'$

DRAFT - N-W
 LEWARD WELL GOV.

$h_j = 7.5$
 $W = 7'$

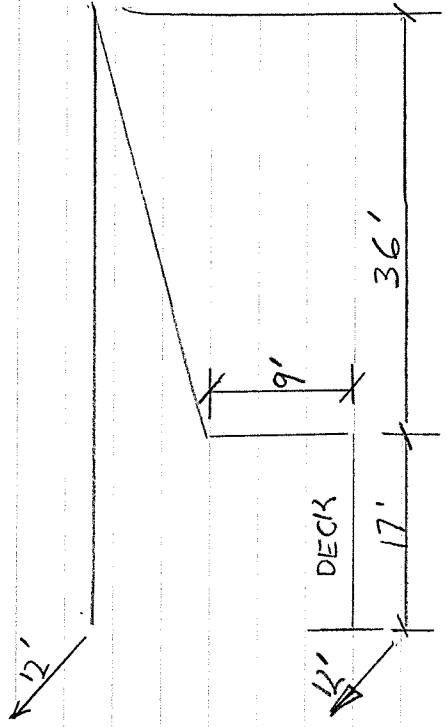
$P = R_y = 34 \text{ PSF (FROM PREV. PAGE)}$

WORST CASE SOI ST



2x10 O.K. PER B.C. CALL.

SNOW LOAD DECK



$h_d = 2'$ (LEWARD) E-W
 $w = 8'$

$h_d = 1.75'$ (LEWARD) N-S

$w = 7'$

USE N-S FOR FULL LENGTH OF SOFT + P_s FROM LONG ROOF

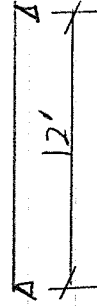
$P_d = 34 \text{ PSF}$

$D_L = 10 \text{ PSF}$

$P_f = 35 \text{ PSF}$

$P_s = \frac{4 \times 34 \text{ PSF} \times 36 \text{ Ft}}{15'} = 32 \text{ PSF}$

$P_L = 34 \text{ PSF} + 35 \text{ PSF} + 32 \text{ PSF} = 101 \text{ PSF}$



ROOF BEAM #1

USE SINGLE SPAN, 12'

LOADS:

① UPPER ROOF

CA = 6'

SL = 35 PSF

DL = 15 PSF

② LOWER ROOF

CA = 6'

SL = 39 $\frac{12}{6}$ = 300 LB/FT x

DL = 120 $\times \frac{12}{6}$ = 90 #/FT

③ WALL D.L. = 10 PSF x 4 = 40 PLF

* FROM LOWER ROOF RAFTER B.C. CALC.

ROOF BEAM #2

LOADS:

CA = 12'

S.L. = 34 PSF + 35 PSF

SINGLE SPAN 16'

D.L. = 15 PSF

ROOF BEAM #3

LOADS:

CA = 12'

SL = 35 PSF

DL = 15 PSF

DUAL SPAN, 14' @ 5'

CA = 6' LEFT

LINEAR LOAD (RIGHT)

SL 6 x 35 = 210 PLF

DL 6 x 15 = 90 PLF

ROOF BEAM #6

SAME AS #1 EXCEPT

HIP FOR UPPER ROOF

SAME AS #4, FULL SPAN

ROOF BEAM #7

SL = 35 PSF x 9' CA

DL = 15 PSF x 9' CA

SPAN = 12'

+ 40 PLF WALL DL

ROOF BEAM #4

LOADS SAME AS RB01 *

SPAN = 12' + 4'-8" \approx 17'

* HIP AREA OF UPPER ROOF, 11' @ 12'

C.A. = 6' x 3.5 = 210 PLF SL

x 15 = 90 PLF DL

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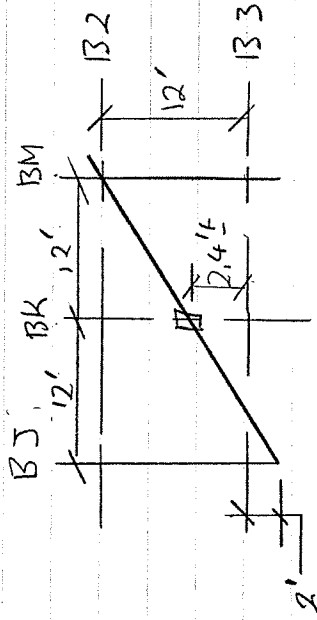
Project: WildStar Farm

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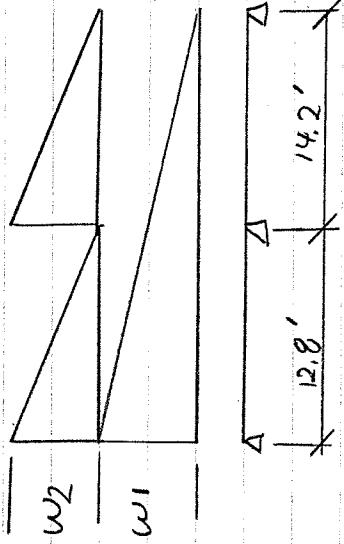
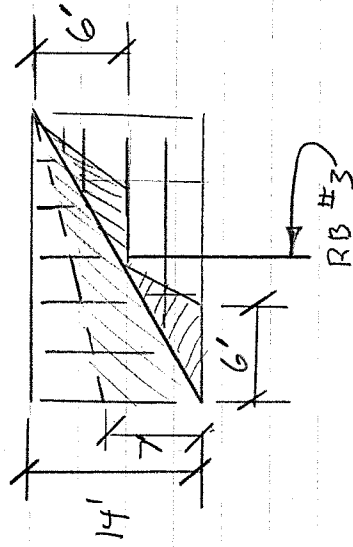
HFP BEAM #1



$$L = \sqrt{24^2 + 12^2} = 27'$$

$$L_1 = \sqrt{4.4^2 + 12^2} = 12.8'$$

C.A.



$$w_{1DL} = 15 \text{ PSF} \times 7' = 105 \text{ PLF}$$

$$w_{1SL} = 35 \text{ PSF} \times 7' = 245 \text{ PLF}$$

$$w_{2DL} = 15 \text{ PSF} \times 6' = 90 \text{ PLF}$$

$$w_{2SL} = 35 \text{ PSF} \times 6' = 210 \text{ PLF}$$

DESIGN AS SIMPLE SPAN
TO ALLOW NOTCHING, FOR
HFP RAFTER BUT CONTINUOUS FOR
SUPPORT LOAD ON RB #3

2ND FLOOR POST @ COL. LINE B2

INTERIOR SUPPORTS

FROM RB #1 -

3.5 KIP SL x2 = 7 KIP

1.5 KIP DL x2 = 3 KIP

TRY 8x8 NATIVE LUMBER, ASSUME SIMILAR TO SPF NO. 2
- 6x6 SPF NO. 2 O.K.

2ND FLOOR POST @ COL. LINE B2 & BM

FROM RB06

2.7 KIP SL

SLT = 2.7 + 4.4 + 1.1 + 2.4 = 10.6 KIP

1 KIP DL

PLT = 1 + 1.8 + .2 + 1.2 = 3.4 KIP

FROM RB #4

4.4 KIP SL

1.8 KIP DL

FROM HEP 01

1.1 KIP SL

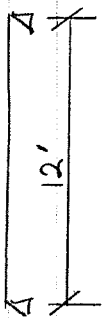
.2 KIP DL

FROM HEP 02

2.4 KIP SL

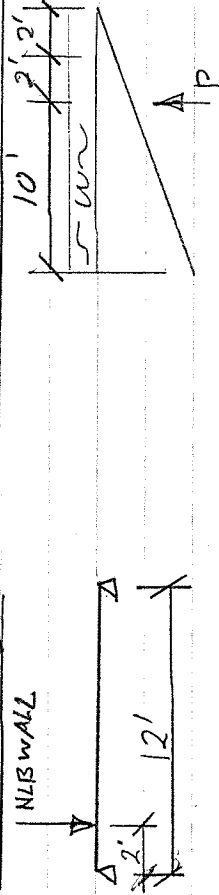
1.2 KIP DL

FLOOR BEAM FB01



C.A. = 12'
 FLOOR LOAD = 40 PSF LL, 10 PSF DL

JOIST JOIB (ASSUMES WALL IS LOAD BEARING)



$$P = \frac{w}{2} \times 10' + (10' + 4) \times 2$$

$$= 9.8w$$

C.A. = 16"

$$P = 10 \text{ PSF} \times 10' = 100 \text{ \$/ft DL From wall}$$

$$+ 15 \text{ PSF} \times 9.8 = 147 \text{ DL FROM ROOF}$$

$$+ 35 \text{ PSF} \times 9.8 = 343 \text{ SL FROM ROOF}$$

* - PER BC CALC 2X10 STEEL O.K.

FLOOR BEAM FB02

SPAN = 14'-6"
 LL = 40 PSF
 DL = 20 PSF
 CA = 6'

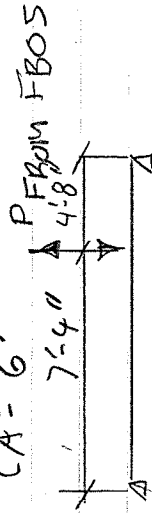
FLOOR BEAM FB03

SPAN = 9'-6"
 LL = 40 PSF
 DL = 10 PSF
 CA = 6'

NL WALL = 10 PSF x 12' = 120 PLF (5' OF SPAN)

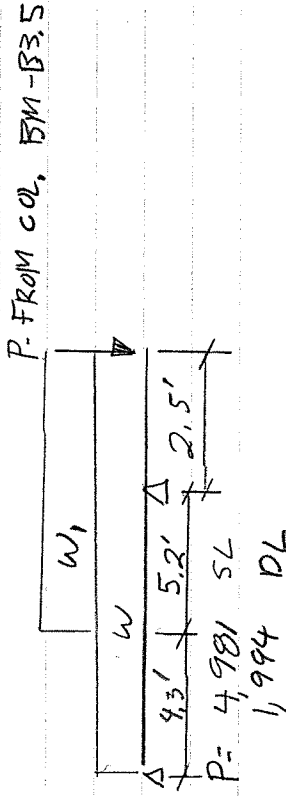
FLOOR BEAM FB04

SPAN = 14'
 LL = 40 PSF
 DL = 10 PSF
 CA = 6'



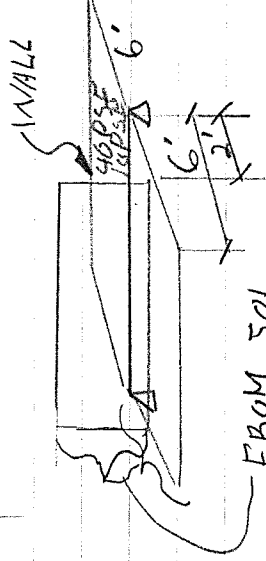
P = 1167 #LL
 268 #DL
 - 1343 SL (UP LEFT)

FLOOR BEAM FB05



W = 40 PSF LL }
 = 10 PSF DL }
 W₁ = 10 PSF x 10' = 100 PLF

FLOOR BEAM FB06



FROM 501
 LL = 513 x 12/16 = 385 PLF

DL = 357 x 12/16 = 268 PLF

SL = 385 x 12/16 = 300 PLF

2ND FLOOR PISIS AT COL LINE B3

2-B3-B5

FROM HIP D1'

SL = 1,136 #

DL = 203 #

FROM UPPER ROOF

SL = 9' x 35 PSF x 6' = 1,890 #

DL = 9' x 15 PSF x 6' = 810 #

FROM WEST UPPER SLOPED ROOF

SL = 7' x 35 PSF x 6' = 1,470 #

DL = 7' x 15 PSF x 6' = 630 #

SL TOTAL = 1,136 + 1,890 + 1,470 = 4,496 #

DL TOTAL = 203 + 810 + 630 = 1,643 #

REDUCE LIVE LOAD DUE TO OPEN AREA,

-L.L. = 6' x 6' x 40 PSF x .25 = 360 #

2-B3-B5, B6, B7

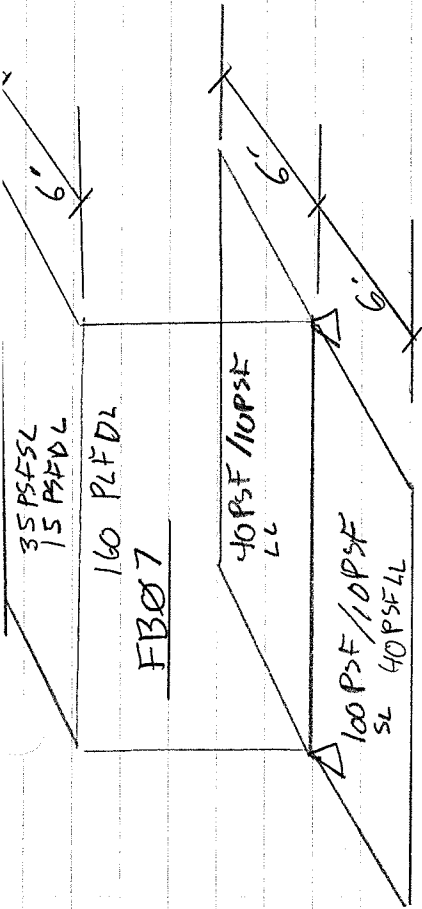
FROM RB07

SL = 1890 x 2 = 3,780

DL = 1163 x 2 = 2,326

L = 16 (MAX)

-LAT. BRACKET FROM CEILING OVER CABINET AT 10'±



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1ST FLOOR POSTS

1-B2-13C BK

FROM FLOOR BEAM @ 1
2 x 2,534 LL = 5,068 #
2 x 706 DL = 1,412 #

FROM RB @ 1
SL = 3060 x 2 = 6,120 #
DL = 1392 x 2 = 2,784 #
L = 10'

TOTALS

LL = 5068 #
DL = 1412 # + 2784 # = 4,196 #
SL = 6120 #

1-B3-BF

1-B2-BM

FROM 2-B2-BM

DL = 3,400 #
SL = 10,600 #

FROM FB @ 1
5068 # LL
1412 DL

TOTALS

DL = 3,400 # + 1,412 # = 4812 #
SL = 10,600 #
LL = 5068 #



Build 6536

Job Name: WildStar Equistrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: ESR-1040

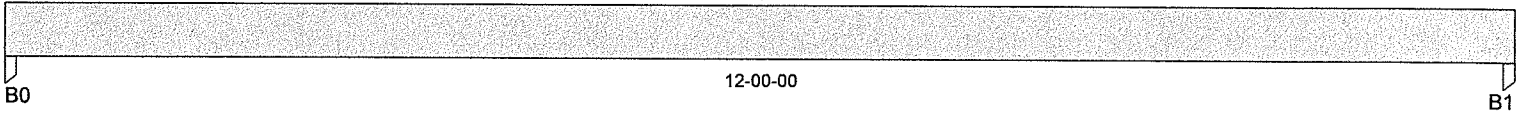
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Project: WildStar Farm

Date: 09/30/18

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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		103 / 0		3,450 / 0	
B1, 3-1/2"		103 / 0		3,450 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	T/C from SW-BJ-S-2	Conc. Pt. (lbs)	L	06-00-00	06-00-00			6,900			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	20,194 ft-lbs	43.8%	160%	2	06-00-00
End Shear	3,531 lbs	19.7%	160%	2	01-02-12
Total Load Defl.	L/629 (0.22")	38.1%	n/a	1	06-00-00
Live Load Defl.	L/645 (0.215")	74.4%	n/a	7	06-00-00
Max Defl.	0.22"	22%	n/a	1	06-00-00
Span / Depth	12.3	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	3,553 lbs	n/a	38.7%	Unspecified
B1 Post	3-1/2" x 3-1/2"	3,553 lbs	n/a	38.7%	Unspecified

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.

Member is not fully supported at post B1. A connector is required at this bearing.

Notes

Design meets Code minimum (L/240) Total load deflection criteria.

Design meets User specified (L/480) Live load deflection criteria.

Design meets arbitrary (1") Maximum Total load deflection criteria.

Calculations assume member is fully braced.

BC CALC® analysis is based on IBC 2009.

Design based on Dry Service Condition.

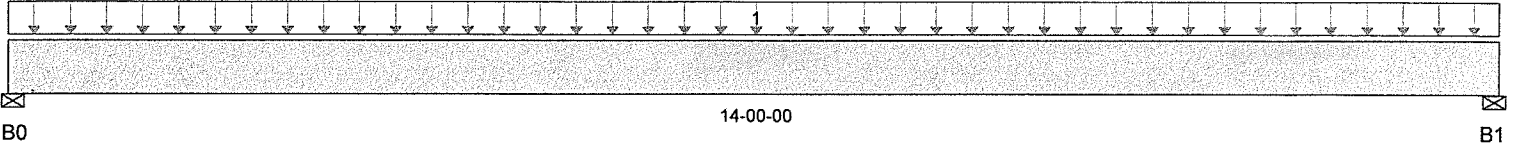
BC CALC® Design Report


 Dry | 1 span | No cantilevers | 0/12 slope
 12 OCS | Repetitive | Member construction

September 29, 2018 10:06:53

Build 6536

 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: NLGA

 VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Total Horizontal Product Length = 14-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 2-1/2"		70 / 0	707 / 0		
B1, 2-1/2"		70 / 0	707 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	OCS
1	Standard Load	Unf. Area (lb/ft ²)	L	00-00-00	14-00-00	10	101				12

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	2,607 ft-lbs	85.5%	115%	1	07-00-00
End Shear	650 lbs	37.2%	115%	1	01-01-12
Total Load Defl.	L/465 (0.354")	51.6%	n/a	1	07-00-00
Live Load Defl.	L/511 (0.322")	70.5%	n/a	2	07-00-00
Max Defl.	0.354"	35.4%	n/a	1	07-00-00
Span / Depth	14.6	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material	
B0	Wall/Plate	2-1/2" x 1-1/2"	777 lbs	n/a	48.8%	Unspecified
B1	Wall/Plate	2-1/2" x 1-1/2"	777 lbs	n/a	48.8%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets Code minimum (L/360) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, SIMPLE FRAMING SYSTEM®, VERSA-LAM®, VERSA-RIM PLUS®, VERSA-RIM®, VERSA-STRAND®, VERSA-STUD® are trademarks of Boise Cascade Wood Products L.L.C.

BC CALC® Design Report

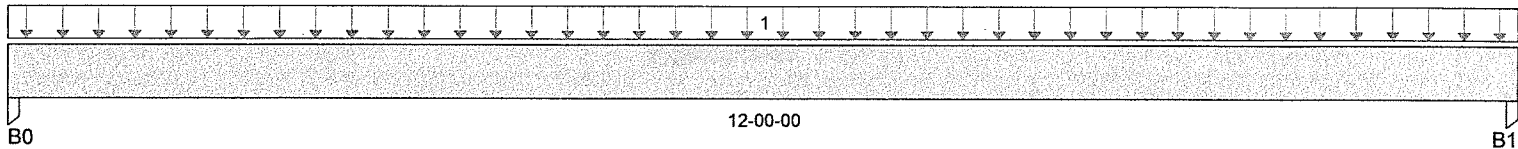


Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:06:55

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"	2,880 / 0	792 / 0			
B1, 3-1/2"	2,880 / 0	792 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00	40	10				12-00-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	10,191 ft-lbs	47.9%	100%	1	06-00-00
End Shear	2,888 lbs	36.6%	100%	1	01-03-06
Total Load Defl.	L/554 (0.25")	43.3%	n/a	1	06-00-00
Live Load Defl.	L/706 (0.196")	51%	n/a	2	06-00-00
Max Defl.	0.25"	25%	n/a	1	06-00-00
Span / Depth	11.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	3,672 lbs	n/a	40%	Unspecified
B1 Post	3-1/2" x 3-1/2"	3,672 lbs	n/a	40%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets Code minimum (L/360) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

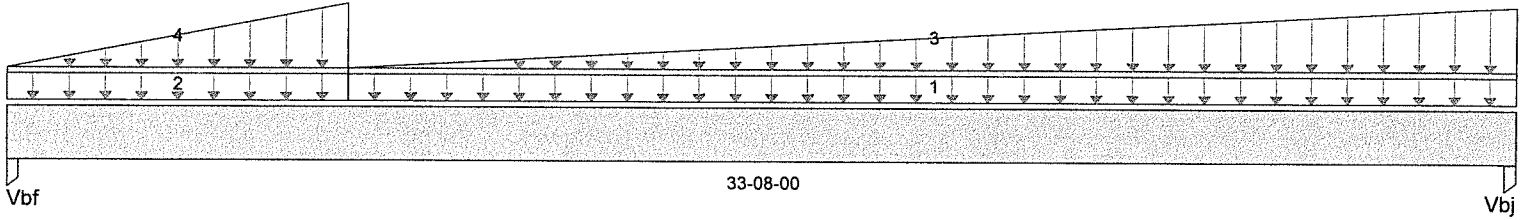


FAILED

Build 6536

Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Total Horizontal Product Length = 33-08-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
Vbf, 3-1/2"		119 / 0		2,309 / 0	
Vbj, 3-1/2"		119 / 0		1,944 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	W1	Unf. Lin. (lb/ft)	L	07-07-00	33-08-00				84		n/a
2	W2	Unf. Lin. (lb/ft)	L	00-00-00	07-07-00				185		n/a
3	W3	Trapezoidal (lb/ft)	L	07-07-00					0		n/a
					33-08-00				45		n/a
4	W4	Trapezoidal (lb/ft)	L	00-00-00					0		n/a
					07-07-00				19		n/a

Controls Summary

Value	% Allowable	Duration	Case	Location
Pos. Moment	16,354 ft-lbs	70.4%	160%	2 16-09-13
End Shear	2,148 lbs	28.8%	160%	2 01-05-08
Total Load Defl.	L/135 (2.957")	178.1%	n/a	1 16-09-13
Live Load Defl.	L/147 (2.714")	326.9%	n/a	7 16-09-13
Max Defl.	2.957"	295.7%	n/a	1 16-09-13
Span / Depth	28.5	n/a	n/a	0 00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
Vbf Post 3-1/2" x 1-3/4"	2,428 lbs	n/a	52.9%	Unspecified
Vbj Post 3-1/2" x 1-3/4"	2,063 lbs	n/a	44.9%	Unspecified

Cautions

Member is insufficient to carry loads for Code minimum Total load deflection at limit of L/240.
 Member is insufficient to carry loads for Code minimum Live load deflection at limit of L/360.
 Member is insufficient to carry loads for Maximum Total load deflection at limit of 1".

Notes

Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BC®, BOISE GLULAM™, SIMPLE FRAMING SYSTEM®, VERSA-LAM®, VERSA-RIM PLUS®, VERSA-RIM®, VERSA-STRAND®, VERSA-STUD® are trademarks of Boise Cascade Wood Products L.L.C.

BC CALC® Design Report



Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:06:59

Build 6536

Job Name: WildStar Equestrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: ESR-1040

VPop Inc.

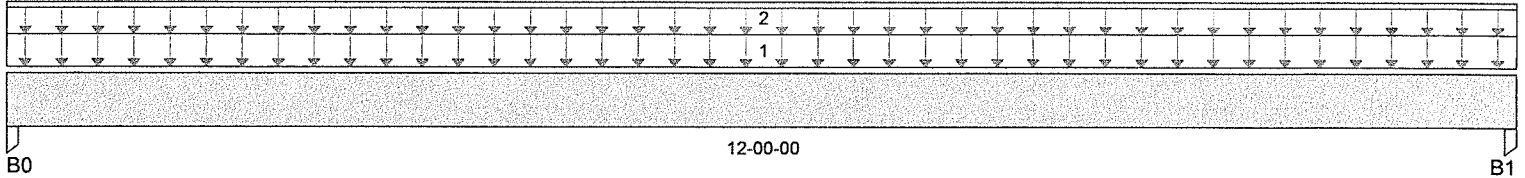
75 Gardner St. Hingham MA 02043

Project: WildStar Farm

Date: 09/30/18

Rev. 1

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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"	1,920 / 0	1,752 / 0			
B1, 3-1/2"	1,920 / 0	1,752 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00	40	10				08-00-00
2	wall above	Unf. Lin. (lb/ft)	L	00-00-00	12-00-00		200				n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	10,191 ft-lbs	47.9%	100%	1	06-00-00
End Shear	2,888 lbs	36.6%	100%	1	01-03-06
Total Load Defl.	L/554 (0.25")	43.3%	n/a	1	06-00-00
Live Load Defl.	L/1,059 (0.131")	45.3%	n/a	2	06-00-00
Max Defl.	0.25"	25%	n/a	1	06-00-00
Span / Depth	11.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	3,672 lbs	n/a	40%	Unspecified
B1 Post	3-1/2" x 3-1/2"	3,672 lbs	n/a	40%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets User specified (L/480) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

BC CALC® Design Report



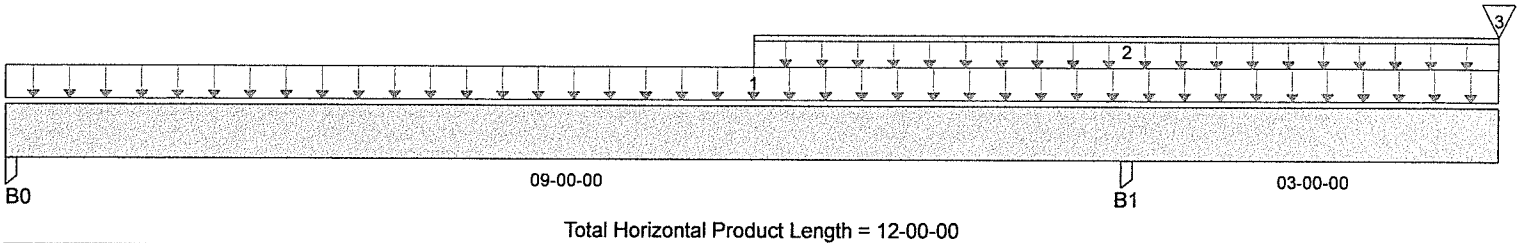
Dry | 2 spans | Right cantilever | 0/12 slope

September 29, 2018 10:07:02

Build 6536

Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"	246 / 27	125 / 0		0 / 1,368	
B1, 3-1/2"	421 / 0	840 / 0		5,368 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft^2)	L	00-00-00	12-00-00	40	10				01-04-00
2	wall	Unf. Lin. (lb/ft)	L	06-00-00	12-00-00		100				n/a
3		Conc. Pt. (lbs)	L	12-00-00	12-00-00				4,000		n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	738 ft-lbs	2.6%	100%	2	04-04-05
Neg. Moment	-12,586 ft-lbs	27.3%	160%	5	09-00-00
End Shear	1,281 lbs	7.1%	160%	13	01-02-12
Cont. Shear	4,250 lbs	23.7%	160%	5	10-01-00
Total Load Defl.	2xL/519 (0.139")	46.3%	n/a	4	12-00-00
Live Load Defl.	2xL/525 (0.137")	68.6%	n/a	17	12-00-00
Total Neg. Defl.	L/999 (-0.056")	n/a	n/a	12	05-03-15
Max Defl.	-0.056"	n/a	n/a	12	05-03-15
Cant. Max Defl.	0.139"	13.9%	n/a	4	12-00-00
Span / Depth	9.4	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	371 lbs	n/a	4%	Unspecified
B1 Post	3-1/2" x 3-1/2"	6,208 lbs	n/a	67.6%	Unspecified

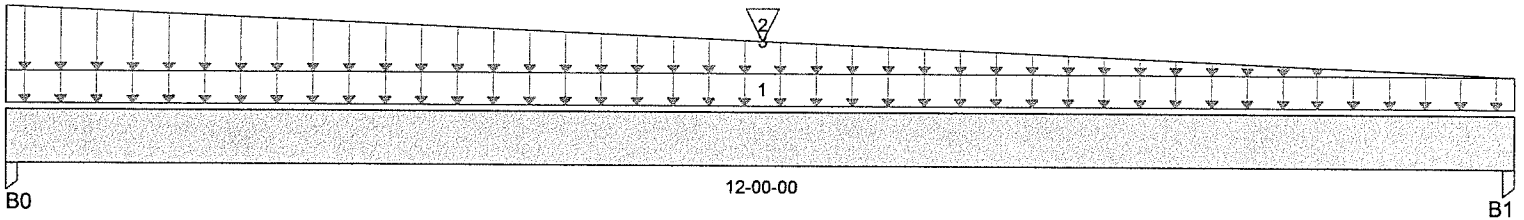
Cautions

Uplift of -1,293 lbs found at span 1 - Left.
 Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.

Notes

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		2,292 / 0	3,689 / 0		
B1, 5-1/2"		2,135 / 0	3,701 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	direct from rafters	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00		15	35			06-00-00
2	from roof	Conc. Pt. (lbs)	R	06-00-00	06-00-00		2,500	4,600			n/a
3	bottom have of hip ...	Trapezoidal (lb/ft)	L	00-00-00	12-00-00		105	45			n/a
							0	0			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	26,553 ft-lbs	72.4%	115%	1	06-00-00
End Shear	5,530 lbs	40.6%	115%	1	01-03-06
Total Load Defl.	L/381 (0.358")	62.9%	n/a	1	06-00-00
Live Load Defl.	L/604 (0.226")	59.6%	n/a	2	06-00-00
Max Defl.	0.358"	35.8%	n/a	1	06-00-00
Span / Depth	11.5	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	5,981 lbs	n/a	65.1%	Unspecified
B1 Post	5-1/2" x 5-1/4"	5,836 lbs	23.8%	26.9%	Douglas Fir

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets Code minimum (L/360) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

BC CALC® Design Report



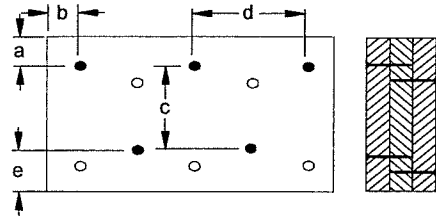
Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:07:05

Build 6536
 Job Name: WildStar Equistrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Connection Diagram



a minimum = 2" c = 6-7/8"
 b minimum = 3" d = 24"
 e minimum = 3"

Connection design assumes point load is top-loaded. For connection design of side-loaded point loads, please consult a technical representative or professional of Record.
 Nailing schedule applies to both sides of the member.
 Member has no side loads.
 Connectors are: 16d Sinker Nails

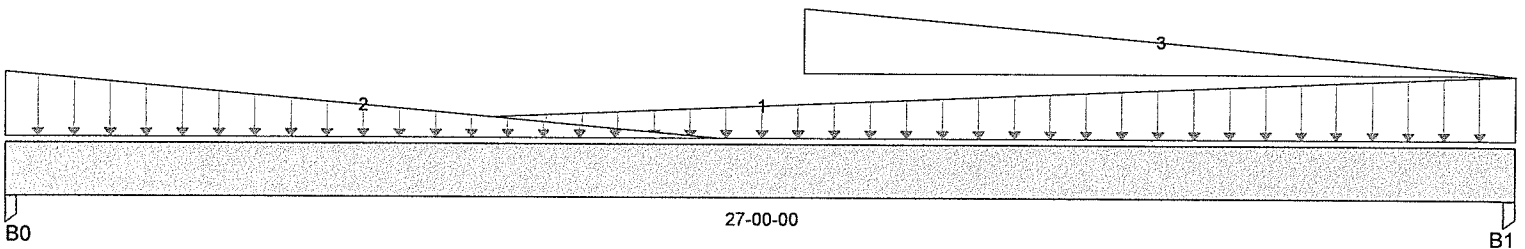
Accuracy of input must be the responsibility of the user. Output here based on building code accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, SIMPLE FRAMING SYSTEM®, VERSA-LAM®, VERSA-RIM PLUS®, VERSA-RIM®, VERSA-STRAND®, VERSA-STUD® are trademarks of Boise Cascade Wood Products L.L.C.



Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Total Horizontal Product Length = 27'-0"

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		815 / 0	1,136 / 0		
B1, 3-1/2"		415 / 0	203 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	Live 100%	Dead 90%	Snow 115%	Wind 160%	Roof Live 125%	Trib.
1	From NS running jo...	Trapezoidal (lb/ft)	L	00-00-00	27-00-00	0	105	0	245		n/a
2	From EW running j...	Trapezoidal (lb/ft)	R	14-03-00	27-00-00	0	90	0	210		n/a
3	From EW running j...	Trapezoidal (lb/ft)	R	12-09-00	00-00-00	0	90	0	210		n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	6,843 ft-lbs	10.6%	115%	4	08-11-15
End Shear	1,825 lbs	9.9%	115%	4	01-07-08
Total Load Defl.	L/1,409 (0.226")	12.8%	n/a	4	12-03-04
Live Load Defl.	L/999 (0.106")	n/a	n/a	5	11-11-10
Max Defl.	0.226"	22.6%	n/a	4	12-03-04
Span / Depth	19.9	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	1,951 lbs	n/a	21.2%	Unspecified
B1 Post	3-1/2" x 3-1/2"	693 lbs	n/a	7.5%	Unspecified

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.
 For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.
 For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes

BC CALC® Design Report

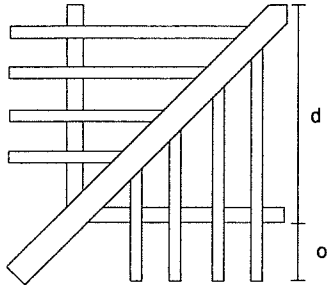


Dry | 2 spans | Left cantilever | 4.2/12 slope

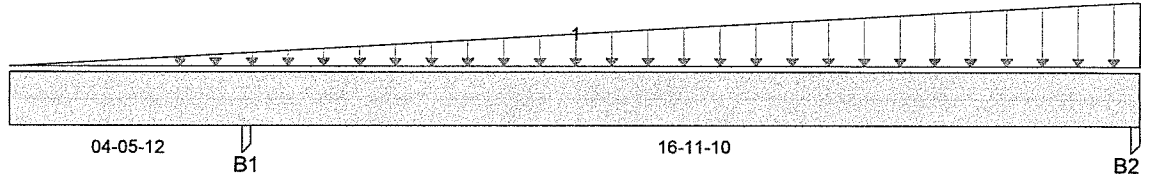
September 29, 2018 10:07:09

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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d = 12-00-00
 o = 03-02-00



Total Horizontal Product Length = 21-05-06

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B1, 3-1/2"		927 / 0	1,663 / 0		
B2, 3-1/2"		1,177 / 0	2,375 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Equivalent Load	Trapezoidal (lb/ft)	L	00-00-00	21-05-06		0	0			n/a
							161	375			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	11,862 ft-lbs	48.5%	115%	8	13-10-04
Neg. Moment	-619 ft-lbs	2.3%	125%	1	04-05-12
End Shear	3,382 lbs	37.2%	115%	8	21-01-14
Cont. Shear	2,262 lbs	24.9%	115%	9	04-07-08
Total Load Defl.	L/314 (0.679")	57.3%	n/a	8	13-00-04
Live Load Defl.	2xL/311 (-0.367")	77.3%	n/a	11	00-00-00
Total Neg. Defl.	2xL/209 (-0.545")	86.1%	n/a	8	00-00-00
Max Defl.	0.679"	n/a	n/a	8	13-00-04
Span / Depth	16.9	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material	
B1	Post	3-1/2" x 3-1/2"	2,590 lbs	n/a	28.2%	Unspecified
B2	Post	3-1/2" x 3-1/2"	3,552 lbs	n/a	38.7%	Unspecified

Slope and Cut Length

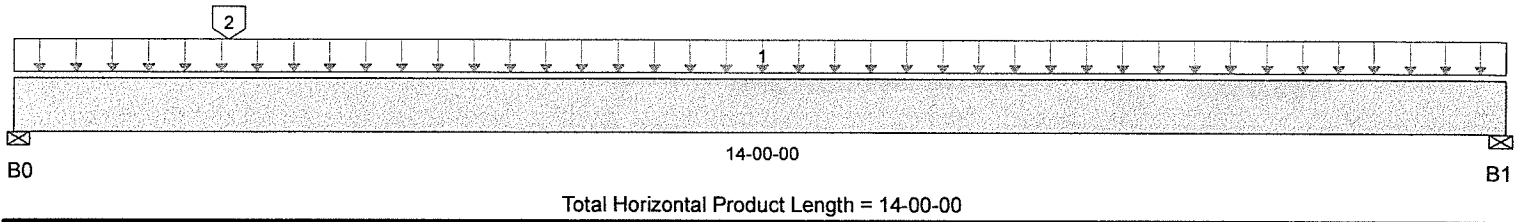
	Slope	Fascia Depth	Horiz. Length	Product Length
Plumb Cut with Hanger to dbl. top plate	4.2/12	11-7/8"	21-05-06	23-01-00

Notes

Design meets Code minimum (L/180) Total load deflection criteria.
 Design meets Code minimum (2xL/240) Live load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 Cantilevers require sheathed bottom flanges, blocking at cantilever support and closure at ends.

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: NLGA

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Reaction Summary (Down / Uplift) (lbs)					
Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 2-1/2"	373 / 0	209 / 0			
B1, 2-1/2"	373 / 0	111 / 0			

Load Summary		Live	Dead	Snow	Wind	Roof Live	OCS
Tag	Description	100%	90%	115%	160%	125%	
1	Standard Load	40	10				16
2	NLB WALL above		100				16

Controls Summary		Value	% Allowable	Duration	Case	Location
Pos. Moment		1,692 ft-lbs	85.7%	100%	1	06-07-13
End Shear		517 lbs	41.4%	100%	1	00-11-12
Total Load Defl.		L/394 (0.418")	61%	n/a	1	06-11-15
Live Load Defl.		L/538 (0.306")	89.3%	n/a	2	06-11-15
Max Defl.		0.418"	41.8%	n/a	1	06-11-15
Span / Depth		17.8	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports		Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0	Wall/Plate	2-1/2" x 1-1/2"	582 lbs	n/a	36.5%	Unspecified
B1	Wall/Plate	2-1/2" x 1-1/2"	485 lbs	n/a	30.4%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets User specified (L/480) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.

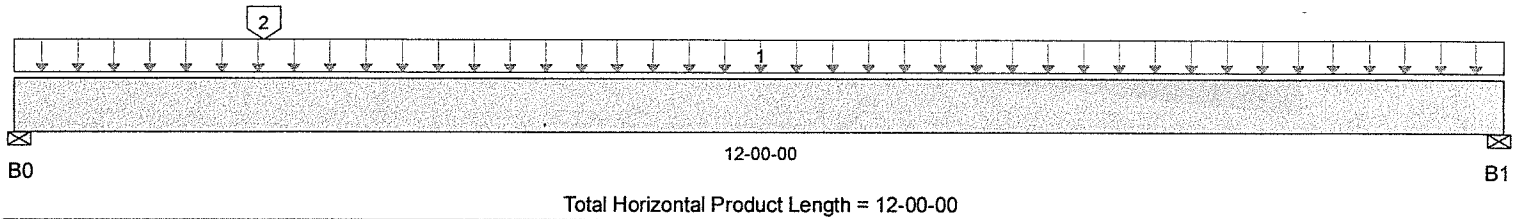
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BC CALC® Design Report


 Dry | 1 span | No cantilevers | 0/12 slope
 16 OCS | Repetitive | Member construction

September 29, 2018 10:07:14

 Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: NLGA

 VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
 Page: 53 of 128


Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 2-1/2"	513 / 0	357 / 0	385 / 0		
B1, 2-1/2"	356 / 0	132 / 0	72 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	OCS
1	Standard Load	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00	40	10				16
2	LB WALL ABOVE	Conc. Lin. (lb/ft)	L	02-00-00	02-00-00	172	247	343			16

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	1,719 ft-lbs	87.1%	100%	1	04-08-02
End Shear	978 lbs	68.1%	115%	3	00-11-12
Total Load Defl.	L/431 (0.326")	55.7%	n/a	3	05-08-00
Live Load Defl.	L/634 (0.222")	75.7%	n/a	6	05-08-00
Max Defl.	0.326"	32.6%	n/a	3	05-08-00
Span / Depth	15.2	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material	
B0	Wall/Plate	2-1/2" x 1-1/2"	1,031 lbs	n/a	64.7%	Unspecified
B1	Wall/Plate	2-1/2" x 1-1/2"	488 lbs	n/a	30.6%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets User specified (L/480) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, SIMPLE FRAMING SYSTEM®, VERSA-LAM®, VERSA-RIM PLUS®, VERSA-RIM®, VERSA-STRAND®, VERSA-STUD® are trademarks of Boise Cascade Wood Products L.L.C.

BC CALC® Design Report



Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:07:16

Build 6536

Job Name: WildStar Equestrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: ESR-1040

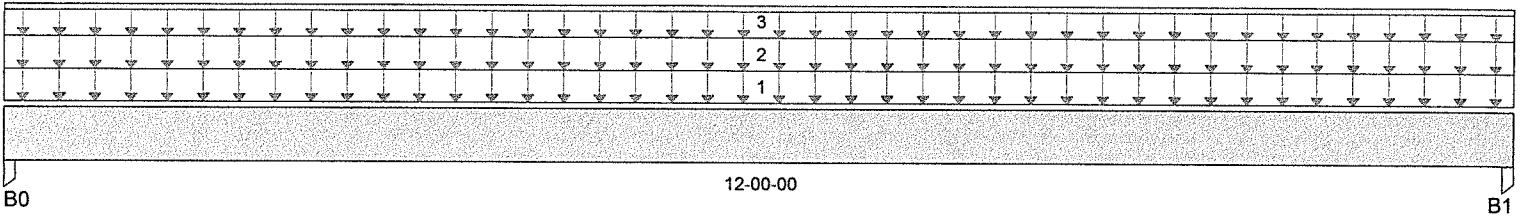
VPop Inc.

75 Gardner St. Hingham MA 02043

Project: WildStar Farm

Date: 09/30/18

Rev. 1

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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		1,392 / 0	3,564 / 0		
B1, 3-1/2"		1,392 / 0	3,564 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	From Upper Roof	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00		15	35			06-00-00
2	From Lower Roof	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00		15	64			06-00-00
3	Wall	Unf. Lin. (lb/ft)	L	00-00-00	12-00-00		40				n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	13,755 ft-lbs	56.2%	115%	4	06-00-00
End Shear	3,898 lbs	42.9%	115%	4	01-03-06
Total Load Defl.	L/410 (0.338")	43.9%	n/a	4	06-00-00
Live Load Defl.	L/570 (0.243")	42.1%	n/a	5	06-00-00
Max Defl.	0.338"	33.8%	n/a	4	06-00-00
Span / Depth	11.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	4,956 lbs	n/a	53.9%	Unspecified
B1 Post	3-1/2" x 3-1/2"	4,956 lbs	n/a	53.9%	Unspecified

Cautions

For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.

For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes

Design meets Code minimum (L/180) Total load deflection criteria.

Design meets Code minimum (L/240) Live load deflection criteria.

Design meets arbitrary (1") Maximum Total load deflection criteria.

Calculations assume member is fully braced.

BC CALC® analysis is based on IBC 2009.

Design based on Dry Service Condition.

Fastener Manufacturer: Simpson Strong-Tie, Inc.

BC CALC® Design Report

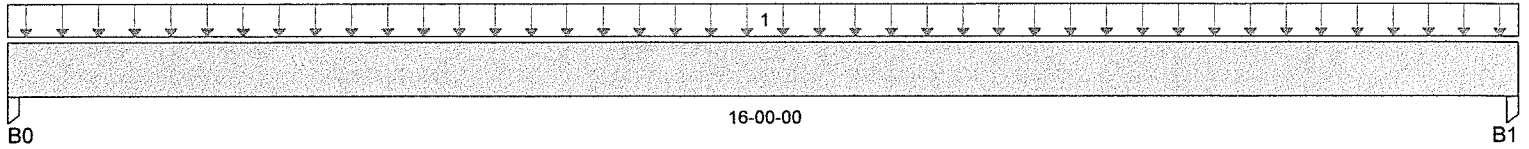


Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:07:18

Build 6536
 Job Name: WildStar Equistrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Total Horizontal Product Length = 16-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		1,584 / 0	6,624 / 0		
B1, 3-1/2"		1,584 / 0	6,624 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Roof Load	Unf. Area (lb/ft ²)	L	00-00-00	16-00-00	15	69				12-00-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	30,980 ft-lbs	84.4%	115%	4	08-00-00
End Shear	6,894 lbs	50.6%	115%	4	01-03-06
Total Load Defl.	L/203 (0.919")	88.7%	n/a	4	08-00-00
Live Load Defl.	L/251 (0.742")	95.5%	n/a	5	08-00-00
Max Defl.	0.919"	91.9%	n/a	4	08-00-00
Span / Depth	15.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	8,208 lbs	n/a	89.3%	Unspecified
B1 Post	3-1/2" x 3-1/2"	8,208 lbs	n/a	89.3%	Unspecified

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.
 For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.
 For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes

Design meets Code minimum (L/180) Total load deflection criteria.
 Design meets Code minimum (L/240) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

BC CALC® Design Report

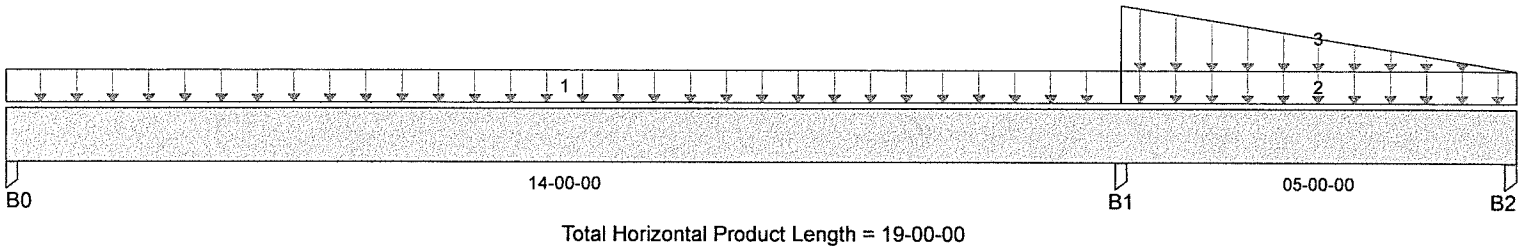


Dry | 2 spans | No cantilevers | 0/12 slope

September 29, 2018 10:07:20

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		1,113 / 0	2,443 / 0		
B1, 3-1/2"		2,698 / 0	5,889 / 0		
B2, 3-1/2"		0 / 387	0 / 1,209		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Roof	Unf. Area (lb/ft ²)	L	00-00-00	14-00-00		15	35			12-00-00
2	Roof left	Unf. Area (lb/ft ²)	L	14-00-00	19-00-00		15	35			06-00-00
3	Roof left hip	Trapezoidal (lb/ft)	L	14-00-00	19-00-00		90	210			n/a
							0	0			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	9,527 ft-lbs	38.9%	115%	7	05-10-01
Neg. Moment	-11,125 ft-lbs	45.5%	115%	9	14-00-00
End Shear	2,771 lbs	30.5%	115%	7	01-03-06
Cont. Shear	4,327 lbs	47.6%	115%	9	12-10-06
Total Load Defl.	L/590 (0.28")	30.5%	n/a	7	06-05-08
Live Load Defl.	L/856 (0.193")	28%	n/a	10	06-05-08
Total Neg. Defl.	L/999 (-0.025")	n/a	n/a	7	15-11-13
Max Defl.	0.28"	28%	n/a	7	06-05-08
Span / Depth	13.9	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0	Post 3-1/2" x 3-1/2"	3,555 lbs	n/a	38.7%	Unspecified
B1	Post 3-1/2" x 3-1/2"	8,586 lbs	n/a	93.5%	Unspecified
B2	Post 3-1/2" x 3-1/2"	0 lbs	n/a	n/a	Unspecified

Cautions

Uplift of -1,595 lbs found at span 2 - Right.
 For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.
 For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes

BC CALC® Design Report

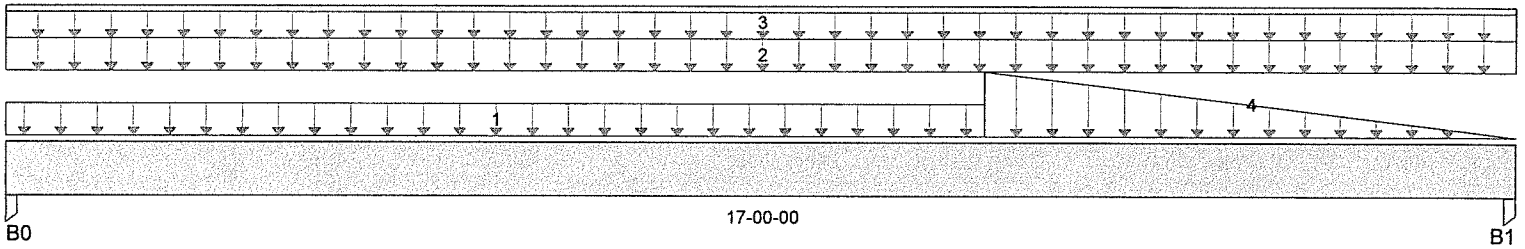


Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:07:22

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Total Horizontal Product Length = 17-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		1,994 / 0	4,981 / 0		
B1, 3-1/2"		1,783 / 0	4,487 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	From Upper Roof	Unf. Area (lb/ft^2)	L	00-00-00	11-00-00	15		35			06-00-00
2	From Lower Roof	Unf. Area (lb/ft^2)	L	00-00-00	17-00-00	15		64			06-00-00
3	Wall	Unf. Lin. (lb/ft)	L	00-00-00	17-00-00	40					n/a
4	hip area	Trapezoidal (lb/ft)	L	11-00-00	17-00-00	90		210			n/a
						0		0			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	27,663 ft-lbs	75.4%	115%	4	08-04-03
End Shear	5,910 lbs	43.4%	115%	4	01-03-06
Total Load Defl.	L/214 (0.926")	84%	n/a	4	08-06-00
Live Load Defl.	L/300 (0.661")	80%	n/a	5	08-06-00
Max Defl.	0.926"	92.6%	n/a	4	08-06-00
Span / Depth	16.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	6,976 lbs	n/a	75.9%	Unspecified
B1 Post	3-1/2" x 3-1/2"	6,269 lbs	n/a	68.2%	Unspecified

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.
 For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.
 For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes



Build 6536

Job Name: WildStar Equestrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: ESR-1040

VPop Inc.

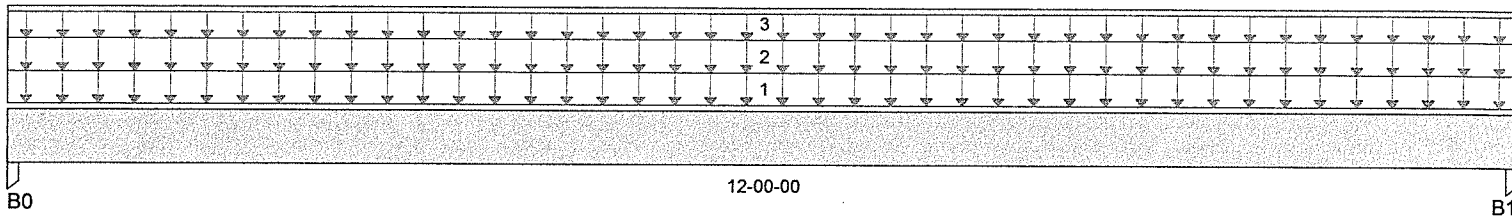
75 Gardner St. Hingham MA 02043

Project: WildStar Farm

Date: 09/30/18

Rev. 1

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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		1,392 / 0	3,564 / 0		
B1, 3-1/2"		1,392 / 0	3,564 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	From Upper Roof	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00	15	35				06-00-00
2	From Lower Roof	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00	15	64				06-00-00
3	Wall	Unf. Lin. (lb/ft)	L	00-00-00	12-00-00	40					n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	13,755 ft-lbs	56.2%	115%	4	06-00-00
End Shear	3,898 lbs	42.9%	115%	4	01-03-06
Total Load Defl.	L/410 (0.338")	43.9%	n/a	4	06-00-00
Live Load Defl.	L/570 (0.243")	42.1%	n/a	5	06-00-00
Max Defl.	0.338"	33.8%	n/a	4	06-00-00
Span / Depth	11.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	4,956 lbs	n/a	53.9%	Unspecified
B1 Post	3-1/2" x 3-1/2"	4,956 lbs	n/a	53.9%	Unspecified

Cautions

For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.

For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes

Design meets Code minimum (L/180) Total load deflection criteria.

Design meets Code minimum (L/240) Live load deflection criteria.

Design meets arbitrary (1") Maximum Total load deflection criteria.

Calculations assume member is fully braced.

BC CALC® analysis is based on IBC 2009.

Design based on Dry Service Condition.

Fastener Manufacturer: Simpson Strong-Tie, Inc.

BC CALC® Design Report

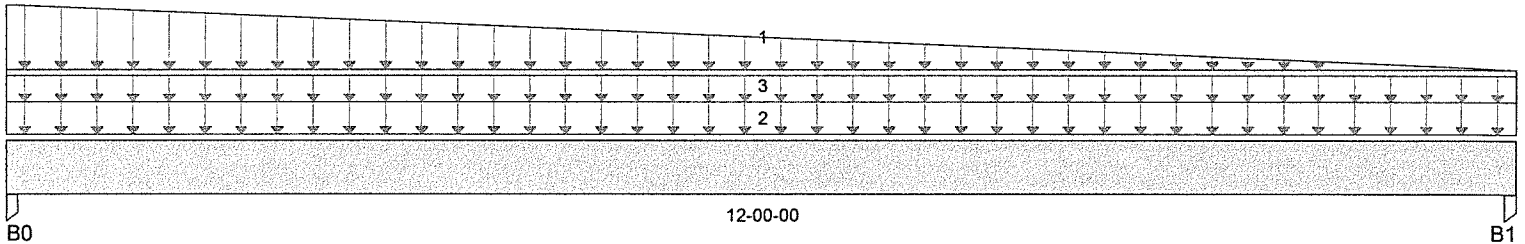


Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:07:25

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		1,216 / 0	3,152 / 0		
B1, 3-1/2"		1,029 / 0	2,716 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	UPPER ROOF	Trapezoidal (lb/ft)	L	00-00-00	12-00-00		90	210			n/a
2	From Lower Roof	Unf. Area (lb/ft^2)	L	00-00-00	12-00-00		0	0			n/a
3	Wall	Unf. Lin. (lb/ft)	L	00-00-00	12-00-00		15	64			06-00-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	11,270 ft-lbs	46.1%	115%	4	05-10-03
End Shear	3,607 lbs	39.7%	115%	4	01-03-06
Total Load Defl.	L/501 (0.276")	35.9%	n/a	4	06-00-00
Live Load Defl.	L/693 (0.2")	34.6%	n/a	5	06-00-00
Max Defl.	0.276"	27.6%	n/a	4	06-00-00
Span / Depth	11.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	4,367 lbs	n/a	47.5%	Unspecified
B1 Post	3-1/2" x 3-1/2"	3,745 lbs	n/a	40.8%	Unspecified

Cautions

For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.
 For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

Notes



Build 6536

Job Name: WildStar Equestrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: ESR-1040

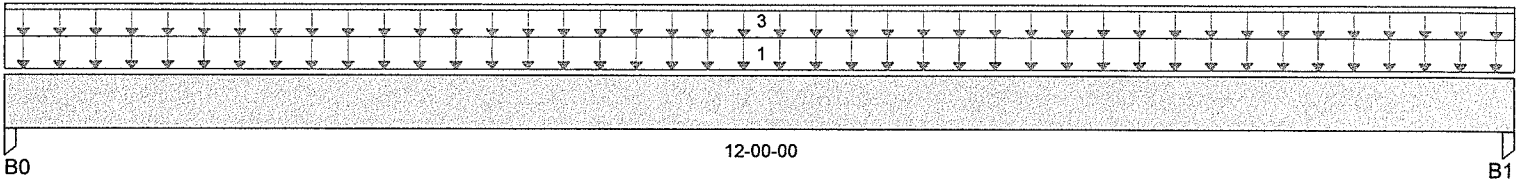
VPop Inc.

75 Gardner St. Hingham MA 02043

Project: WildStar Farm

Date: 09/30/18

Rev. 1

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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		1,163 / 0	1,890 / 0		
B1, 3-1/2"		1,163 / 0	1,890 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	From Upper Roof	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00	15	35				09-00-00
3	Wall	Unf. Lin. (lb/ft)	L	00-00-00	12-00-00	40					n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	8,471 ft-lbs	27.8%	115%	4	06-00-00
End Shear	2,512 lbs	17.8%	115%	4	01-00-12
Total Load Defl.	L/630 (0.22")	28.6%	n/a	4	06-00-00
Live Load Defl.	L/1,017 (0.136")	23.6%	n/a	5	06-00-00
Max Defl.	0.22"	22%	n/a	4	06-00-00
Span / Depth	15	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	3,053 lbs	n/a	33.2%	Unspecified
B1 Post	3-1/2" x 3-1/2"	3,053 lbs	n/a	33.2%	Unspecified

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.
 For roof members with slope (1/4)/12 or less final design must ensure that ponding instability will not occur.
 For roof members with slope (1/2)/12 or less final design must account for Rain-on-Snow surcharge load.

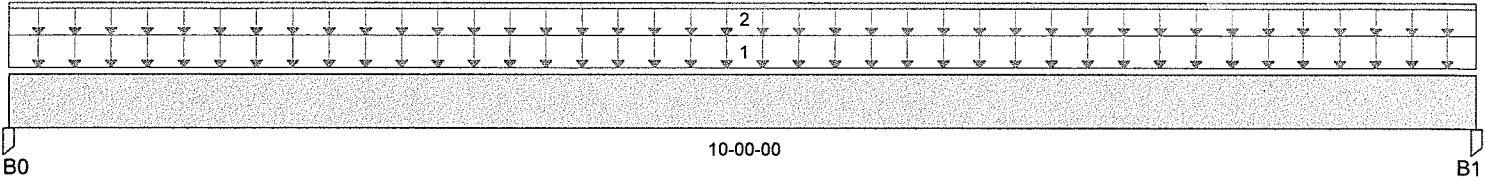
Notes

Design meets Code minimum (L/180) Total load deflection criteria.
 Design meets Code minimum (L/240) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 Fastener Manufacturer: Simpson Strong-Tie, Inc.



Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: NLGA

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Total Horizontal Product Length = 10-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 1-3/4"		698 / 0	1,050 / 0		
B1, 1-3/4"		698 / 0	1,050 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft^2)	L	00-00-00	10-00-00	15		35			06-00-00
2	WALL	Unf. Lin. (lb/ft)	L	00-00-00	10-00-00	40					n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	4,225 ft-lbs	71.4%	115%	1	05-00-00
End Shear	1,427 lbs	33.1%	115%	1	00-11-00
Total Load Defl.	L/667 (0.177")	36%	n/a	1	05-00-00
Live Load Defl.	L/999 (0.106")	n/a	n/a	2	05-00-00
Max Defl.	0.177"	17.7%	n/a	1	05-00-00
Span / Depth	12.8	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	1-3/4" x 3-1/2"	1,748 lbs	39.4%	67.1%	Spruce Pine Fir
B1 Post	1-3/4" x 3-1/2"	1,748 lbs	39.4%	67.1%	Spruce Pine Fir

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.
 Distributed side-load exceeds allowable magnitude for connection design. Please consult a technical representative or Professional Engineer for the design of the connection.

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets User specified (L/480) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.



Quadruple 1-3/4" x 11-1/4" VERSA-LAM® 2.0 3100 SP Floor Beam\...SH-BJ-S-1 BEAM 3

BC CALC® Design Report



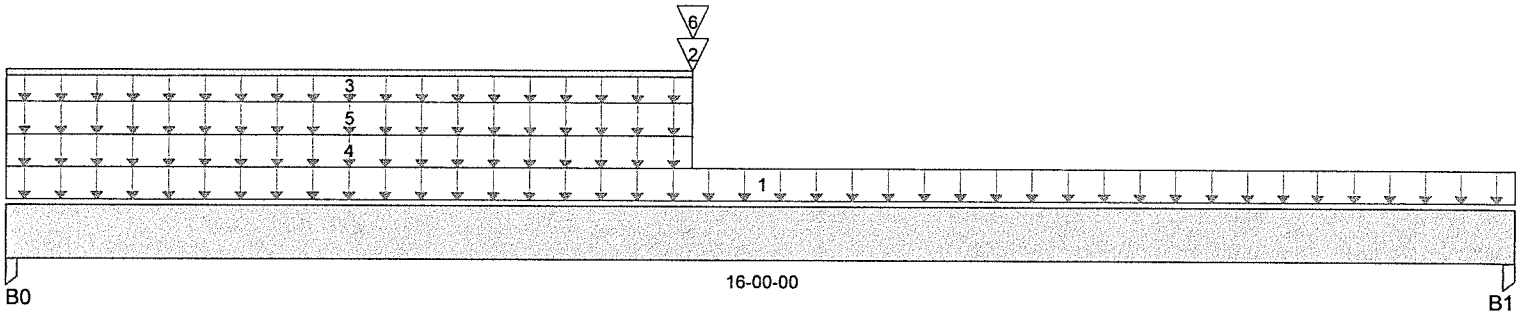
Dry | 1 span | No cantilevers | 0/12 slope

September 29, 2018 10:07:31

Build 6536

Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Total Horizontal Product Length = 16-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"	427 / 0	2,597 / 0	5,070 / 0	2,029 / 0	
B1, 3-1/2"	427 / 0	1,174 / 0	2,254 / 0	1,671 / 0	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft^2)	L	00-00-00	16-00-00	40	10				01-04-00
2	Shear Wall Couple	Conc. Pt. (lbs)	L	07-03-00	07-03-00				3,700		n/a
3	wall	Unf. Lin. (lb/ft)	L	00-00-00	07-03-00		150				n/a
4	From Dia. #4	Unf. Area (lb/ft^2)	L	00-00-00	07-03-00		15	69			06-00-00
5	From Diap. #5	Unf. Area (lb/ft^2)	L	00-00-00	07-03-00		15	35			06-00-00
6	from roof diaphragms	Conc. Pt. (lbs)	L	07-03-00	07-03-00		800	2,800			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	27,829 ft-lbs	63%	115%	2	07-03-00
End Shear	6,449 lbs	37.5%	115%	2	01-02-12
Total Load Defl.	L/260 (0.718")	92.4%	n/a	6	07-07-04
Live Load Defl.	L/363 (0.514")	99.2%	n/a	16	07-07-04
Max Defl.	0.718"	71.8%	n/a	6	07-07-04
Span / Depth	16.6	n/a	n/a	0	00-00-00


Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	8,241 lbs	92.8%	89.7%	Spruce Pine Fir
B1 Post	3-1/2" x 3-1/2"	4,438 lbs	50%	48.3%	Spruce Pine Fir

Cautions

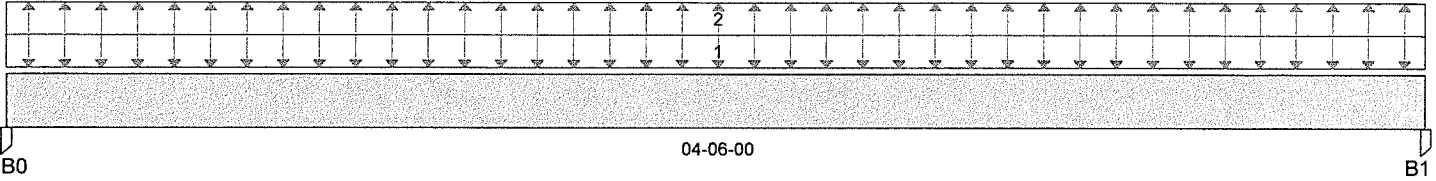
Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.

Notes

BC CALC® Design Report 

Build 6536
 Job Name: WildStar Equistrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: NLGA

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Total Horizontal Product Length = 04-06-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 1-3/4"		244 / 0	551 / 0	0 / 351	
B1, 1-3/4"		244 / 0	551 / 0	0 / 351	

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft^2)	L	00-00-00	04-06-00		15	35			07-00-00
2	wind uplift	Unf. Area (lb/ft^2)	L	00-00-00	04-06-00				-156		01-00-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	830 ft-lbs	50.3%	115%	1	02-03-00
Neg. Moment	-213 ft-lbs	9.3%	160%	7	02-03-00
End Shear	641 lbs	39.3%	115%	1	00-05-04
Total Load Defl.	L/999 (0.116")	n/a	n/a	1	02-03-00
Live Load Defl.	L/999 (0.081")	n/a	n/a	8	02-03-00
Total Neg. Defl.	L/999 (-0.014")	n/a	n/a	6	02-03-00
Max Defl.	0.116"	n/a	n/a	1	02-03-00
Span / Depth	14.9	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	1-3/4" x 3-1/2"	796 lbs	17.9%	30.6%	Spruce Pine Fir
B1 Post	1-3/4" x 3-1/2"	796 lbs	17.9%	30.6%	Spruce Pine Fir

Cautions

Uplift of -204 lbs found at span 1 - Right.
 Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.
 Distributed side-load exceeds allowable magnitude for connection design. Please consult a technical representative or Professional Engineer for the design of the connection.

Notes

BC CALC® Design Report



Build 6536

Job Name: WildStar Equestrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: ESR-1040

VPop Inc.

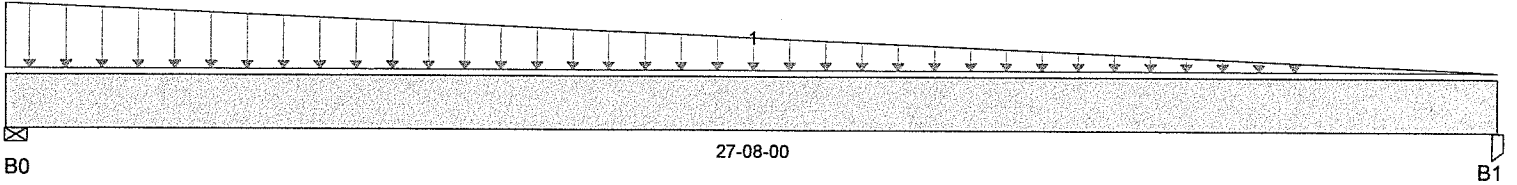
75 Gardner St. Hingham MA 02043

Project: WildStar Farm

Date: 09/30/18

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Total Horizontal Product Length = 27-08-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 5-1/4"		2,023 / 0	3,937 / 0		
B1, 3-1/2"		1,154 / 0	1,914 / 0		

Load Summary

Tag	Description	Load Type	Ref. Start	End	100%	90%	115%	160%	125%	Trib.
1		Trapezoidal (lb/ft)	L 00-00-00	27-08-00		181	423			n/a
						0	0			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	30,383 ft-lbs	47.1%	115%	1	12-00-02
End Shear	5,655 lbs	30.8%	115%	1	01-09-04
Total Load Defl.	L/297 (1.095")	80.9%	n/a	1	13-06-05
Live Load Defl.	L/458 (0.71")	78.7%	n/a	2	13-06-05
Max Defl.	1.095"	n/a	n/a	1	13-06-05
Span / Depth	20.3	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material	
B0	Wall/Plate	5-1/4" x 5-1/4"	5,961 lbs	n/a	28.8%	Unspecified
B1	Post	3-1/2" x 5-1/4"	3,068 lbs	n/a	22.3%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.

Design meets Code minimum (L/360) Live load deflection criteria.

Calculations assume member is fully braced.

BC CALC® analysis is based on IBC 2009.

Design based on Dry Service Condition.

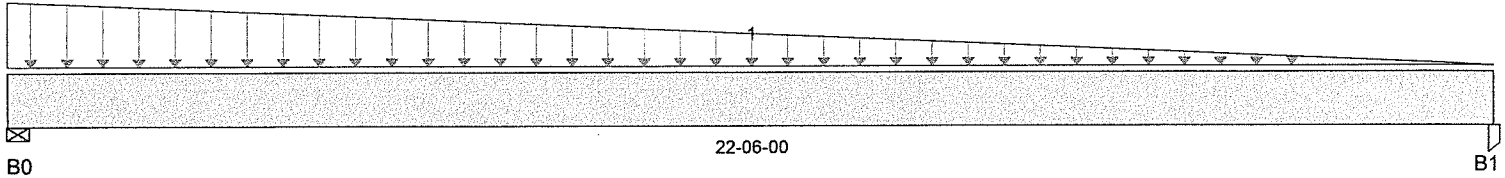
BC CALC® Design Report



FAILED

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Total Horizontal Product Length = 22-06-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 5-1/4"		1,268 / 0	2,746 / 0		
B1, 3-1/2"		659 / 0	1,326 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1		Trapezoidal (lb/ft)	L	00-00-00	22-06-00		155	362			n/a
						0	0	0			n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	16,254 ft-lbs	75.7%	115%	1	09-10-00
End Shear	3,775 lbs	61.7%	115%	1	01-09-04
Total Load Defl.	L/229 (1.149")	104.9%	n/a	1	11-00-05
Live Load Defl.	L/337 (0.78")	106.8%	n/a	2	11-00-05
Max Defl.	1.149"	n/a	n/a	1	11-00-05
Span / Depth	16.4	n/a	n/a	0	00-00-00

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material	
B0	Wall/Plate	5-1/4" x 1-3/4"	4,014 lbs	n/a	58.2%	Unspecified
B1	Post	3-1/2" x 1-3/4"	1,985 lbs	n/a	43.2%	Unspecified

Cautions

Member is insufficient to carry loads for Code minimum Total load deflection at limit of L/240.
 Member is insufficient to carry loads for Code minimum Live load deflection at limit of L/360.

Notes

Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.

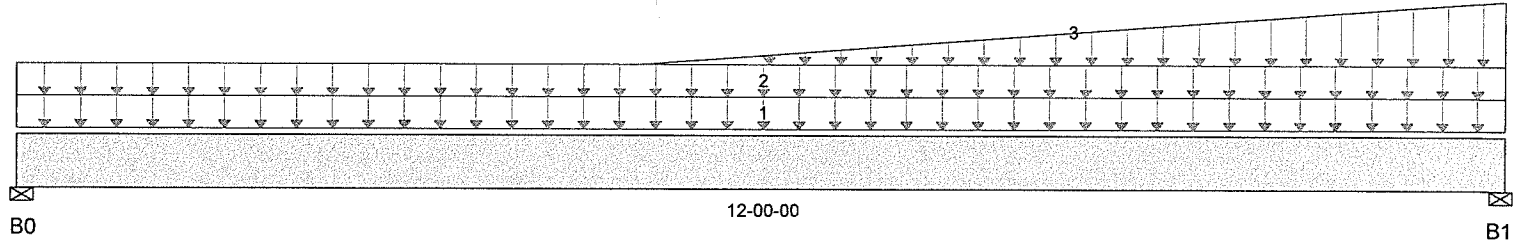
* - O.K., SUPPORTS ROOF WITH NO PLASTER, $\Delta_{max} = L/180 = \frac{270}{180} = 1.5" > 1.149", O.K.$



Build 6536

Job Name: WildStar Equestrian Facility
Address: 16 Nathan Hill Lane
City, State, Zip: Sherborn, MA 01770
Customer: Polly Kornblith & Micheal Newman
Code reports: NLGA

VPop Inc.
75 Gardner St. Hingham MA 02043
Project: WildStar Farm
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Total Horizontal Product Length = 12-00-00

Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 2-1/2"		120 / 0	399 / 0		
B1, 2-1/2"		120 / 0	498 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	OCS
1	Pf	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00		15	35			16
2	Ps	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00			11			16
3	Pd	Trapezoidal (lb/ft)	L	05-00-00	12-00-00			0			n/a
								45			n/a

Controls Summary

Value	% Allowable	Duration	Case	Location
Pos. Moment	1,573 ft-lbs	79.7%	115%	1 06-03-13
End Shear	528 lbs	36.8%	115%	1 11-00-04
Total Load Defl.	L/500 (0.281")	48%	n/a	1 06-00-07
Live Load Defl.	L/639 (0.22")	56.3%	n/a	2 06-00-07
Max Defl.	0.281"	28.1%	n/a	1 06-00-07
Span / Depth	15.2	n/a	n/a	0 00-00-00

Disclosure

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Bearing Supports

Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Wall/Plate 2-1/2" x 1-1/2"	519 lbs	n/a	32.6%	Unspecified
B1 Wall/Plate 2-1/2" x 1-1/2"	618 lbs	n/a	38.8%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
Design meets Code minimum (L/360) Live load deflection criteria.
Design meets arbitrary (1") Maximum Total load deflection criteria.
Calculations assume member is fully braced.
BC CALC® analysis is based on IBC 2009.
Design based on Dry Service Condition.
The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, SIMPLE FRAMING SYSTEM®, VERSA-LAM®, VERSA-RIM PLUS®, VERSA-RIM®, VERSA-STRAND®, VERSA-STUD® are trademarks of Boise Cascade Wood Products L.L.C.

Single 2 x 10 SPF #2

Joistshed over apt

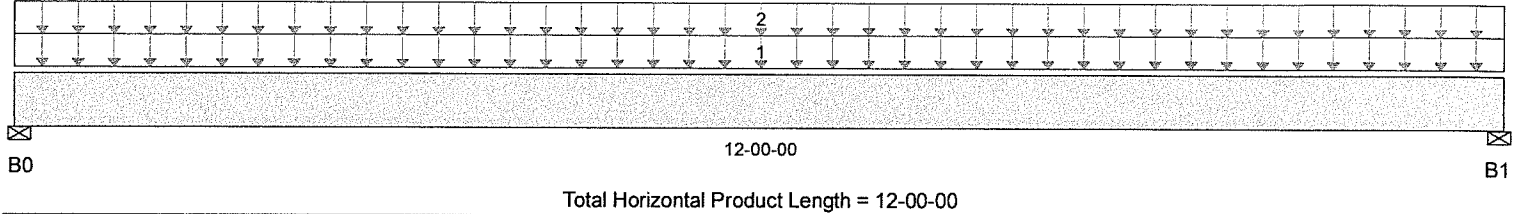
BC CALC® Design Report


 Dry | 1 span | No cantilevers | 0/12 slope
 16 OCS | Non-Repetitive | Member construction

September 29, 2018 10:07:44

Build 6536

 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblieth & Micheal Newman
 Code reports: NLGA

 VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 2-1/2"		120 / 0	552 / 0		
B1, 2-1/2"		120 / 0	552 / 0		

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	OCS
1	Pf	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00		15	35			16
2	Pd	Unf. Area (lb/ft ²)	L	00-00-00	12-00-00			34			16

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	1,919 ft-lbs	97.3%	115%	1	06-00-00
End Shear	562 lbs	39.2%	115%	1	00-11-12
Total Load Defl.	L/411 (0.342")	58.4%	n/a	1	06-00-00
Live Load Defl.	L/500 (0.281")	72%	n/a	2	06-00-00
Max Defl.	0.342"	34.2%	n/a	1	06-00-00
Span / Depth	15.2	n/a	n/a	0	00-00-00

Disclosure

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Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material	
B0	Wall/Plate	2-1/2" x 1-1/2"	672 lbs	n/a	42.2%	Unspecified
B1	Wall/Plate	2-1/2" x 1-1/2"	672 lbs	n/a	42.2%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets Code minimum (L/360) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.

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Build 6536

Job Name: WildStar Equestrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: NLGA

VPop Inc.

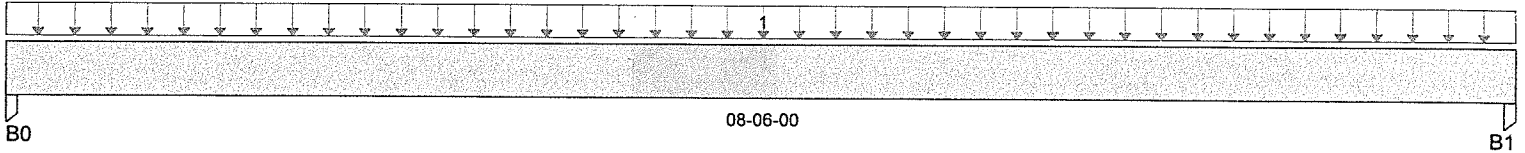
75 Gardner St. Hingham MA 02043

Project: WildStar Farm

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Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"		446 / 0	1,243 / 0		
B1, 3-1/2"		446 / 0	1,243 / 0		

Load Summary

Tag	Description	Load Type	Ref. Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft ²)	L 00-00-00	08-06-00	15	45				06-06-00

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	3,213 ft-lbs	81%	115%	1	04-03-00
End Shear	1,333 lbs	39.5%	115%	1	00-10-12
Total Load Defl.	L/516 (0.187")	46.5%	n/a	1	04-03-00
Live Load Defl.	L/701 (0.138")	68.4%	n/a	2	04-03-00
Max Defl.	0.187"	18.7%	n/a	1	04-03-00
Span / Depth	13.3	n/a	n/a	0	00-00-00

Disclosure

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Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	1,689 lbs	n/a	32.4%	Unspecified
B1 Post	3-1/2" x 3-1/2"	1,689 lbs	n/a	32.4%	Unspecified

Cautions

Member is not fully supported at post B0. A connector is required at this bearing.
 Member is not fully supported at post B1. A connector is required at this bearing.
 Distributed side-load exceeds allowable magnitude for connection design. Please consult a technical representative or Professional Engineer for the design of the connection.

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets User specified (L/480) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.
 The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, SIMPLE FRAMING SYSTEM®, VERSA-LAM®, VERSA-RIM PLUS®, VERSA-RIM®, VERSA-STRAND®, VERSA-STUD® are trademarks of Boise Cascade Wood Products L.L.C.



Bois Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP Floor Beam...Window Header at B4

BC CALC® Design Report

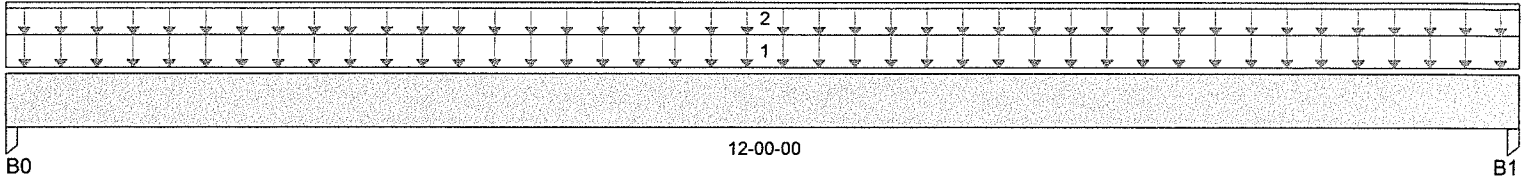


Dry | 1 span | No cantilevers | 0/12 slope

April 26, 2018 15:00:37

Build 6536
 Job Name:
 Address:
 City, State, Zip: ,
 Customer:
 Code reports: ESR-1040

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Reaction Summary (Down / Uplift) (lbs)

Bearing	Live	Dead	Snow	Wind	Roof Live
B0, 3-1/2"	1,920 / 0	1,752 / 0			
B1, 3-1/2"	1,920 / 0	1,752 / 0			

Load Summary

Tag	Description	Load Type	Ref.	Start	End	100%	90%	115%	160%	125%	Trib.
1	Standard Load	Unf. Area (lb/ft^2)	L	00-00-00	12-00-00	40	10				08-00-00
2	wall above	Unf. Lin. (lb/ft)	L	00-00-00	12-00-00		200				n/a

Controls Summary

	Value	% Allowable	Duration	Case	Location
Pos. Moment	10,191 ft-lbs	47.9%	100%	1	06-00-00
End Shear	2,888 lbs	36.6%	100%	1	01-03-06
Total Load Defl.	L/554 (0.25")	43.3%	n/a	1	06-00-00
Live Load Defl.	L/1,059 (0.131")	45.3%	n/a	2	06-00-00
Max Defl.	0.25"	25%	n/a	1	06-00-00
Span / Depth	11.7	n/a	n/a	0	00-00-00

Bearing Supports

	Dim. (L x W)	Value	% Allow Support	% Allow Member	Material
B0 Post	3-1/2" x 3-1/2"	3,672 lbs	n/a	40%	Unspecified
B1 Post	3-1/2" x 3-1/2"	3,672 lbs	n/a	40%	Unspecified

Notes

Design meets Code minimum (L/240) Total load deflection criteria.
 Design meets User specified (L/480) Live load deflection criteria.
 Design meets arbitrary (1") Maximum Total load deflection criteria.
 Calculations assume member is fully braced.
 BC CALC® analysis is based on IBC 2009.
 Design based on Dry Service Condition.



Double 1-3/4" x 11-7/8" VERSA-LAM® 2.0 3100 SP Floor Beam\...Window Header at B4

BC CALC® Design Report



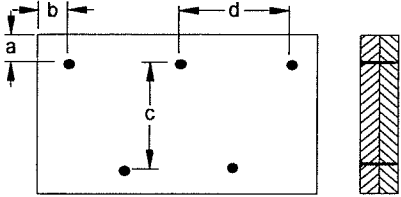
Div 1 span | No cantilevers | 0/12 slope

April 26, 2018 15:00:37

Build 6536
Job Name:
Address:
City, State, Zip: ,
Customer:
Code reports: ESR-1040

VPop Inc.
75 Gardner St. Hingham MA 02043
Project: WildStar Farm
Date: 09/30/18
Rev. 1
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Connection Diagram



a minimum = 2" c = 7-7/8"
b minimum = 3" d = 24"

Member has no side loads.
Connectors are: 16d Sinker Nails

Disclosure

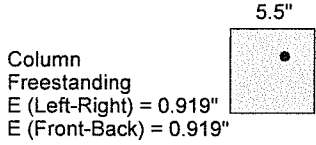
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Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: WCLIB

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
5.5" 1	from RBO1	Conc. Pt. (lbs)	00-00-00	00-00-00		3,400	10,600		

Bracing

	Elevation	Sheathing
Top	07-00-00	
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	47.7%	115%	1
Axial Compression and Bending Front-Back	n/a	68.9%	115%	1
Axial Compression and Bending Left-Right	n/a	68.7%	115%	1
Slenderness Ratio	15.27	30.5%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

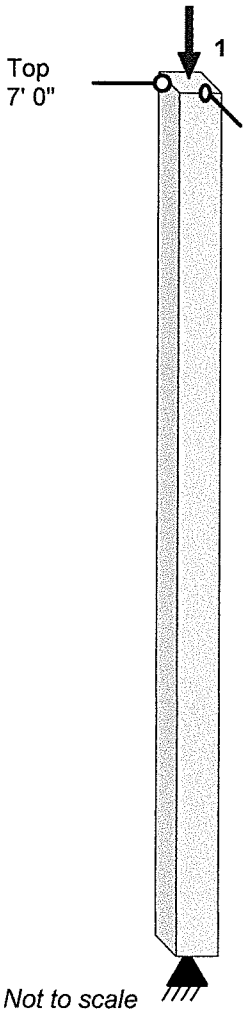
Notes

Allowable loads are based on a minimum eccentricity of 0.167 multiplied by the column thickness or width (worst case).
 BC Calc does not perform shear wall or connection design for in-plane load transfer.
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BC CALC® Design Report

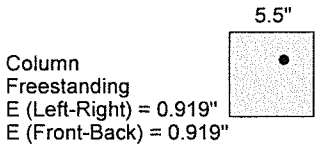


Dry | 7' 0" Column Freestanding

September 29, 2018 10:07:47

Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: WCLIB

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
1	from RBO1	Conc. Pt. (lbs)	00-00-00	00-00-00	3,720	3,485	4,078		

Bracing

	Elevation	Sheathing
Top	07-00-00	
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	31.9%	115%	3
Axial Compression and Bending Front-Back	n/a	37.7%	115%	3
Axial Compression and Bending Left-Right	n/a	37.6%	115%	3
Slenderness Ratio	15.27	30.5%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

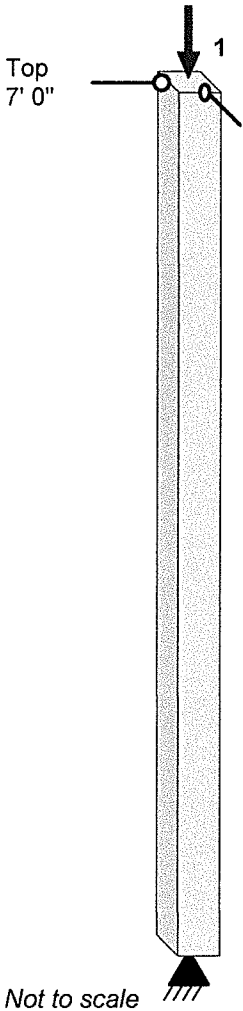
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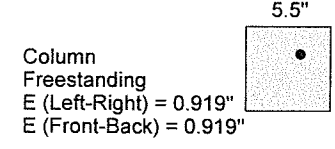
Not to scale

BC CALC® Design Report



Build 6536
 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: WCLIB

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
1	from RBO1	Conc. Pt. (lbs)	00-00-00	00-00-00		2,800		7,000	

Bracing

Bracing	Elevation	Sheathing
Top	11-00-00	
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	49.7%	115%	1
Axial Compression and Bending Front-Back	n/a	67.5%	115%	1
Axial Compression and Bending Left-Right	n/a	67.3%	115%	1
Slenderness Ratio	24	48%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

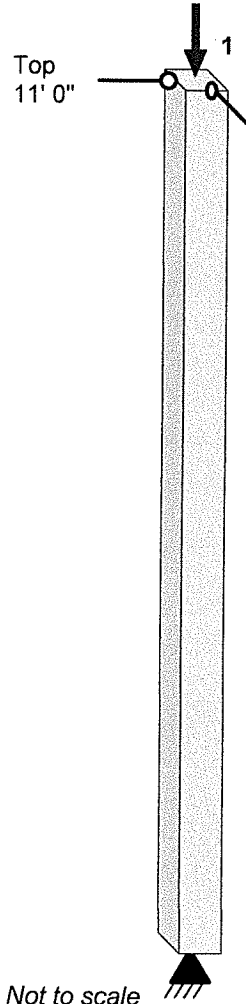
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Build 6536

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Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: NLGA

VPop Inc.

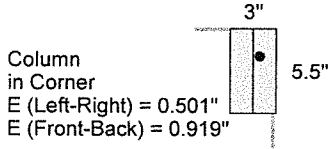
75 Gardner St. Hingham MA 02043

Project: WildStar Farm

Date: 09/30/18

Rev. 1

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Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
1		Conc. Pt. (lbs)	00-00-00	00-00-00		800	2,800	4,000	

Bracing

	Elevation	Sheathing
Top	16-00-00	Left-Right, Front-Back
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	29.8%	160%	5
Axial Compression and Bending Front-Back	n/a	28.8%	160%	5
Axial Compression and Bending Left-Right	n/a	26.2%	160%	5
Slenderness Ratio	0	n/a	n/a	

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

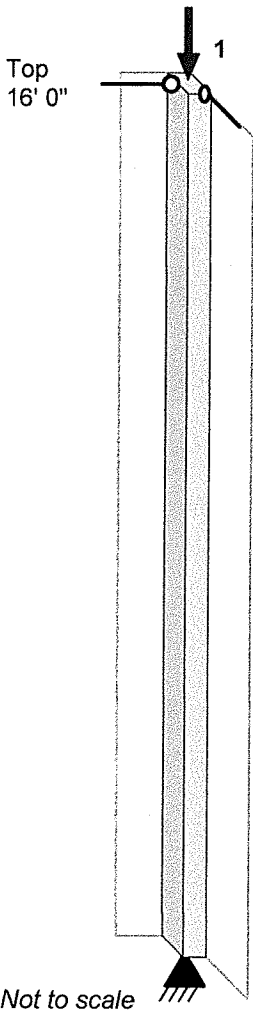
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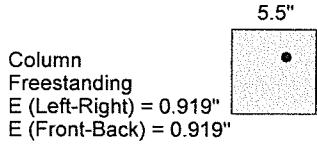
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 Customer: Polly Kornblith & Micheal Newman
 Code reports: WCLIB

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
5.5" 1	from RBO1	Conc. Pt. (lbs)	00-00-00	00-00-00		3,000	7,000		

Bracing

	Elevation	Sheathing
Top	08-00-00	
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	36.8%	115%	1
Axial Compression and Bending Front-Back	n/a	45.8%	115%	1
Axial Compression and Bending Left-Right	n/a	45.7%	115%	1
Slenderness Ratio	17.45	34.9%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

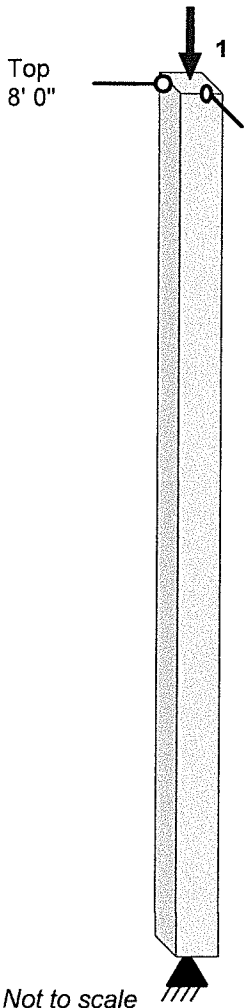
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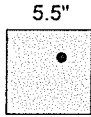
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 Code reports: WCLIB

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
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Column
 Freestanding
 E (Left-Right) = 0.919"
 E (Front-Back) = 0.919"



Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
5.5" 1	from RBO1	Conc. Pt. (lbs)	00-00-00	00-00-00		3,400		10,600	

Bracing

	Elevation	Sheathing
Top	07-00-00	
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	47.7%	115%	1
Axial Compression and Bending Front-Back	n/a	68.9%	115%	1
Axial Compression and Bending Left-Right	n/a	68.7%	115%	1
Slenderness Ratio	15.27	30.5%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

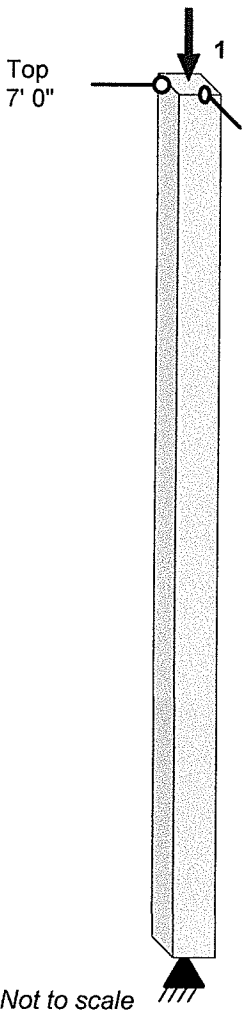
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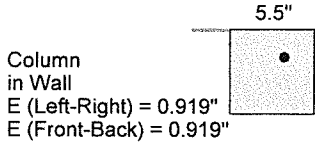
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 Job Name: WildStar Equestrian Facility
 Address: 16 Nathan Hill Lane
 City, State, Zip: Sherborn, MA 01770
 Customer: Polly Kornblith & Micheal Newman
 Code reports: WCLIB

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
 Page: 77 of 128



Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
1	from RBO1	Conc. Pt. (lbs)	00-00-00	00-00-00		2,326	3,780		

Bracing

	Elevation	Sheathing
Top	15-00-00	
Front-Back	10-01-00	
Left-Right	10-00-00	
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	37.3%	115%	1
Axial Compression and Bending Front-Back	n/a	48.3%	115%	1
Axial Compression and Bending Left-Right	n/a	48%	115%	1
Slenderness Ratio	22	44%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

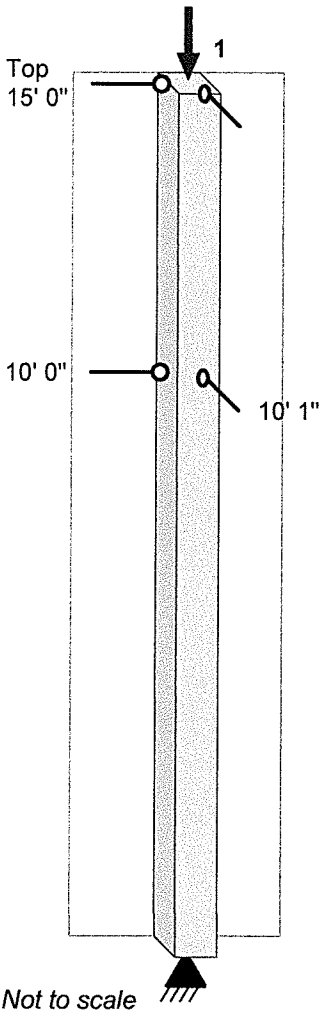
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Build 6536

Job Name: WildStar Equestrian Facility

Address: 16 Nathan Hill Lane

City, State, Zip: Sherborn, MA 01770

Customer: Polly Kornblith & Micheal Newman

Code reports: WCLIB

VPop Inc.

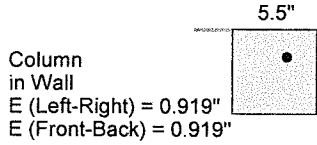
75 Gardner St. Hingham MA 02043

Project: WildStar Farm

Date: 09/30/18

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Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
5.5" 1	from RBO1	Conc. Pt. (lbs)	00-00-00	00-00-00		1,643		4,496	

Bracing

Bracing	Elevation	Sheathing
Top	20-00-00	Left-Right
Front-Back	13-06-00	
Left-Right	13-00-00	Left-Right
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Axial Compression	n/a	54.8%	115%	1
Axial Compression and Bending Front-Back	n/a	80.1%	115%	1
Axial Compression and Bending Left-Right	n/a	54.2%	115%	1
Slenderness Ratio	29.45	58.9%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

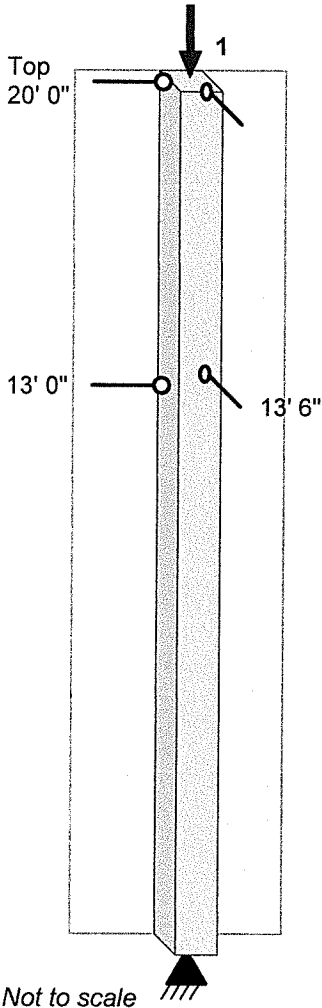
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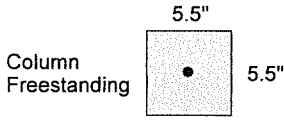


Build 6536
 Job Name:
 Address:
 City, State, Zip: ,
 Customer:
 Code reports: NLGA

VPop Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
 Page: 79 of 128

FAILED

ACTUAL MEMBER IS 8x8, SEE BELOW



Load Summary

Tag	Description	Load Type	Start	End	100%	90%	115%	160%	125%
1	from window ...	Conc. Pt. (lbs)	00-00-00	00-00-00	3,800	3,400			
2	wind	Unf. Lin. (lb/ft)	00-00-00	09-00-00				200	

Bracing

	Elevation	Sheathing
Top	09-00-00	
Base	00-00-00	

Controls Summary

	Value	% Allowable	Duration	Load Case
Left-Right Bending	2,025 ft-lbs	109.5%	160%	3
Left-Right Shear	900 lbs	22.3%	160%	3
Left-Right Defl.	L/383 (0.282")	31.3%	n/a	2
Axial Compression	n/a	58.5%	100%	1
Axial Compression and Bending Left-Right	n/a	132.5%	160%	3
Slenderness Ratio	19.64	39.3%	n/a	0

Cautions

Design does not consider perpendicular to grain stress on the sill plate or other supporting member.

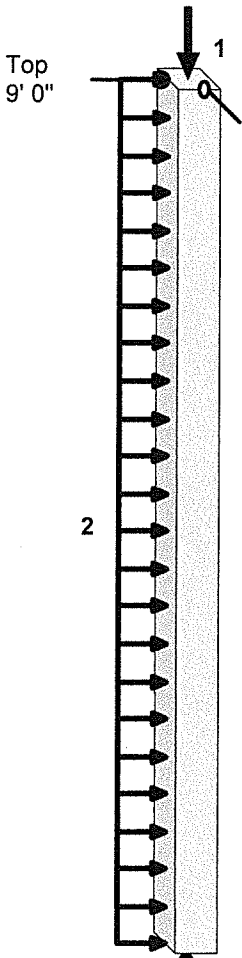
Notes

Design meets Code minimum (L/120) Total load deflection criteria. (Weak Axis)
 A generic column cap was used in the analysis of the column. Make sure to install and size the cap.
 BC Calc does not perform shear wall or connection design for in-plane load transfer.
 The analysis of solid sawn wood members is in accordance with the NDS and is limited to the output shown above. All other support and design for these products, including but not limited to notching, connections, installation, and engineer/architect certification is the responsibility of the project's design professional of record.
 BC CALC® analysis is based on IBC 2009.

Disclosure

Completeness and accuracy of input must be verified by anyone who would rely on output as evidence of suitability for particular application. Output here based on building code-accepted design properties and analysis methods. Installation of Boise Cascade engineered wood products must be in accordance with current Installation Guide and applicable building codes. To obtain Installation Guide or ask questions, please call (800)232-0788 before installation.

BC CALC®, BC FRAMER®, AJS™, ALLJOIST®, BC RIM BOARD™, BCI®, BOISE GLULAM™, SIMPLE FRAMING SYSTEM®, VERSA-LAM®, VERSA-RIM PLUS®, VERSA-RIM®, VERSA-STRAND®, VERSA-STUD® are trademarks of Boise Cascade Wood Products L.L.C.



Not to scale

ACTUAL TIMBER IS 8x8, ADJUSTMENT BELOW SHOW 8x8 TIMBER IS O.K.

$$\begin{aligned}
 A_{8 \times 8} &= 64 \text{ IN}^2 & A_{6 \times 6} &= 30.25 \text{ IN}^2 \\
 S_{8 \times 8} &= 8 \times 8^2 / 6 = 85.33 \text{ IN}^3 & S_{6 \times 6} &= 27.73 \text{ IN}^3 \\
 F_c_{8 \times 8} &= 350 \text{ PSE} & F_c_{6 \times 6} &= 500 \text{ PSE} \\
 F_b_{8 \times 8} &= 575 \text{ PSE} & F_b_{6 \times 6} &= 500 \text{ PSE} \\
 e &= 2.25 \text{ IN} & e &= 0
 \end{aligned}$$

8x8 Posts, CONT'D

$$\frac{F_b}{F_b} = \left(\frac{2,025 \text{ FT-LBS} + \frac{2.25 \text{ IN} \times 7200 \#}{12 \text{ IN/FT}}}{2,025 \text{ FT-LBS}} \right) \times \frac{27.73}{85.33} \times \frac{500}{575} \times 109.5\%$$

= 52% < 100%, O.K.

$$\frac{F_{c1}}{F_{c1}} = 58.5\% \times \frac{30.25}{64} \times \frac{500}{350} \times \frac{100\%}{160\%} = 25\%$$

$$\frac{F_b}{F_b} + \frac{F_{c1}}{F_{c1}} = 52\% + 25\% = \underline{77\% < 100\%}, \text{ O.K.}$$

SHEAR WALL B1, PERFORATED SHEAR WALL METHOD

$$\% \text{ FULL HEIGHT} = 7/12 = .58$$

$$\text{HEIGHT OF PERF.} = 8.14/3$$

$$\text{Adj. Factor} = .55$$

$$V = 4.5 \text{ KIP} / (.712 \times 72) = 107 \text{ PLF}$$

$$V_{\text{MAX}} = .58 \times 260 \times 1.4 = 211 > 107, \text{ O.K.}$$

$$T/C = [4.5 \text{ KIP} / (72' \times 7/12)] \times 10' = 1 \text{ KIP}$$

UPLIFT

OVERHANG, 3.5 FT

1/2 SPAN = 6 FL

$$P_u = (56.3 \text{ PSF} \times 3.5 \text{ FT}) + (43.8 \text{ PSF} \times 6 \text{ FT}) - (9.5 \text{ FL} \times 15 \text{ PSF} \times 6) \times \frac{16''}{12''} = 423 \# / \text{CONC.}$$

USE #8, CAP. = 565# > 423# FOR RAFTER / STUD

FOR: HEADER HOLD DOWN (MWFBS)

$$P_u = (29.5 \text{ PSF} \times 3.5 \text{ FT}) + (21.1 \text{ PSF} \times 6 \text{ FT}) - (9.5 \text{ FL} \times 15 \text{ PSF} \times 6) = 144 \# / \text{FL}$$

$$\text{STUD TO HDR} = 144 \times \frac{16}{12} = 192 \# - 0$$

$$\text{USE \#8, CAP.} = 565 \# > 192 \#, \text{ O.K.}, \text{ OR (2) END NAILS ON STUD \& HDR, } 2 \times 98 = 196 > 192 \#$$

$$\text{HDR TO BACK STUD, } 144 \# / \text{FL} \times 3' = 432 \#$$

$$\text{USE L STAG STRAP, CAP.} = 635 \# > 432 \#, \text{ O.K.}$$

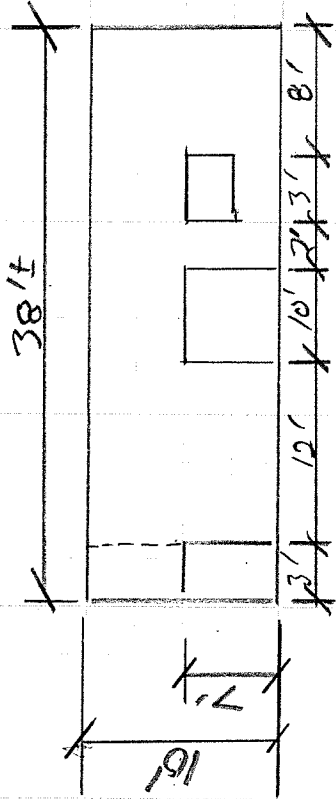
- OR NAIL HDR TO KENB STUD w/ (6) 16 d NAIL, CAP. = 128 x 6 = 768# > 432#, O.K.

- STUD TO FOUND. WALL - SIMILAR TO BSN, USE 1/2" S-BOLT 7" EMBEDDED W/ DITZ Z HOLD DM.

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BN SHEAR WALL
(EAST WALL OF BARN)

- USE PERFORATED SHEAR WALL METHOD
V = 1.94 KEP



Vol MA $\approx 2/3 H$

% FULL HEIGHT = $\frac{35 - (10+3)}{35} = 63\%$

Cap. Factor = 71%

$U_{MAX} = 360 \times .71 = 256 \text{ PLF}$ (7/16 STR 1 @ 6" O.C. @)
 $U = 2 \text{ KEP} / 35' = 57 < 256 \text{ O.K.}$
 $T/C = 2 \text{ KEP} \times 10' / 35' = 571 \#$

RAPER THE DOWNS.

EQUAL TO UPPER ROOF, 342 #/CON

USE 1/8" NAIL SHEATHING 2 ROW @ NAILS @ 3" O.C.
 @ 1" @ 2' OF STUDS

UPLIFT AT BOTTOM PLATE: (MWFERS)
 FROM PERF. SHEAR WALL: 2 KEP / 22' = 90 #/FT

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BN SHEAR WALL CONT'D
EAST OF BARN

DIRECT UPLIFT AT SELL PLATE:
93 PLF - SIMILAR TO UPPER ROOF

$$\text{TOTAL} = (90 \text{ PLF} + 93 \text{ PLF}) - (10 \text{ PSF} \times 10 \text{ FT} \times 0.6) = 123 \#$$

3" NAILING AT STUDS, $(123 \# \frac{16''}{12''}) / 117 = 2 \text{ NAILS}$
- NAIL @ 3" O.C. FOR 1'
- NAIL @ 3" O.C. AT SELL

- UPLIFT AT 10' BARN DOOR

* 93 PLF - NAIL HDR TO SHEATHING @ 3" O.C.

* UPLIFT = TO W ONLY
REQ'D AT FULL HEIGHT
SEGMENTS

- UPLIFT ON HDR ENDS

$$93 \text{ PLF} \times 10' / 2 = 465 \text{ KIP}$$

USE 1/2" 5 BOLT & DITZ Z HOLD DOWN AT BASE

- FOR HDR TO STUD USE LSTAG, CAP = 635#

- OR HDR TO KING STUD, 480# / 19# = 3 NAILS, 16d

- UPLIFT ON WINDOW HDRS:

$$480 \# \times 3' / 10' = 144 \#$$

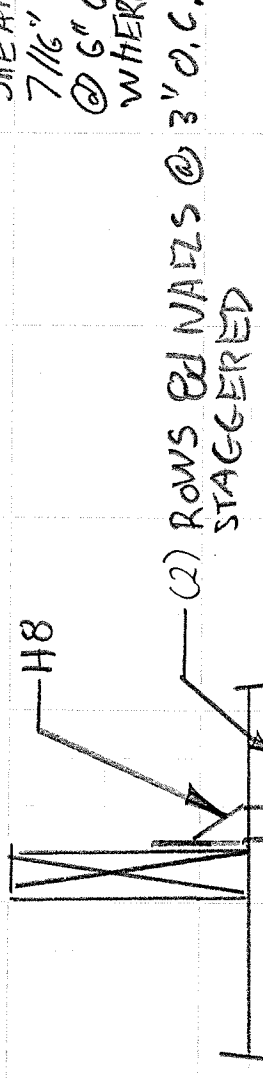
- SUBTRACT WEIGHT OF WALLS: $[(10' - 3') \times 10 \text{ PSF} \times 0.6] \times 3' = 63 \#$

- 144# - 63# = 81# - MORE THAN PROVIDED FOR w/ SHEATHING
NAILS NOT FULLY UTILIZED FOR SHEAR

BN SHEAR WALL / BI SHEAR WALL
EAST BARN WALL / NORTH BARN WALL

NORMAL FRAMING EXCEPT AS SHOWN.

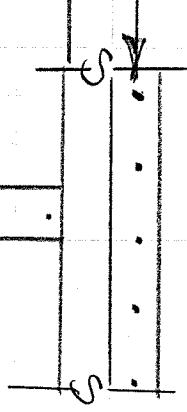
SHEATHING:
 7/16" STR. 1 RATED WITH ED NAILS
 @ 6" O.C. EDGES & 12" O.C. FIELD EXCEPT
 WHERE NOTED.



ED NAILS @ 3" O.C.
 FOR TOP 2' OF STUD

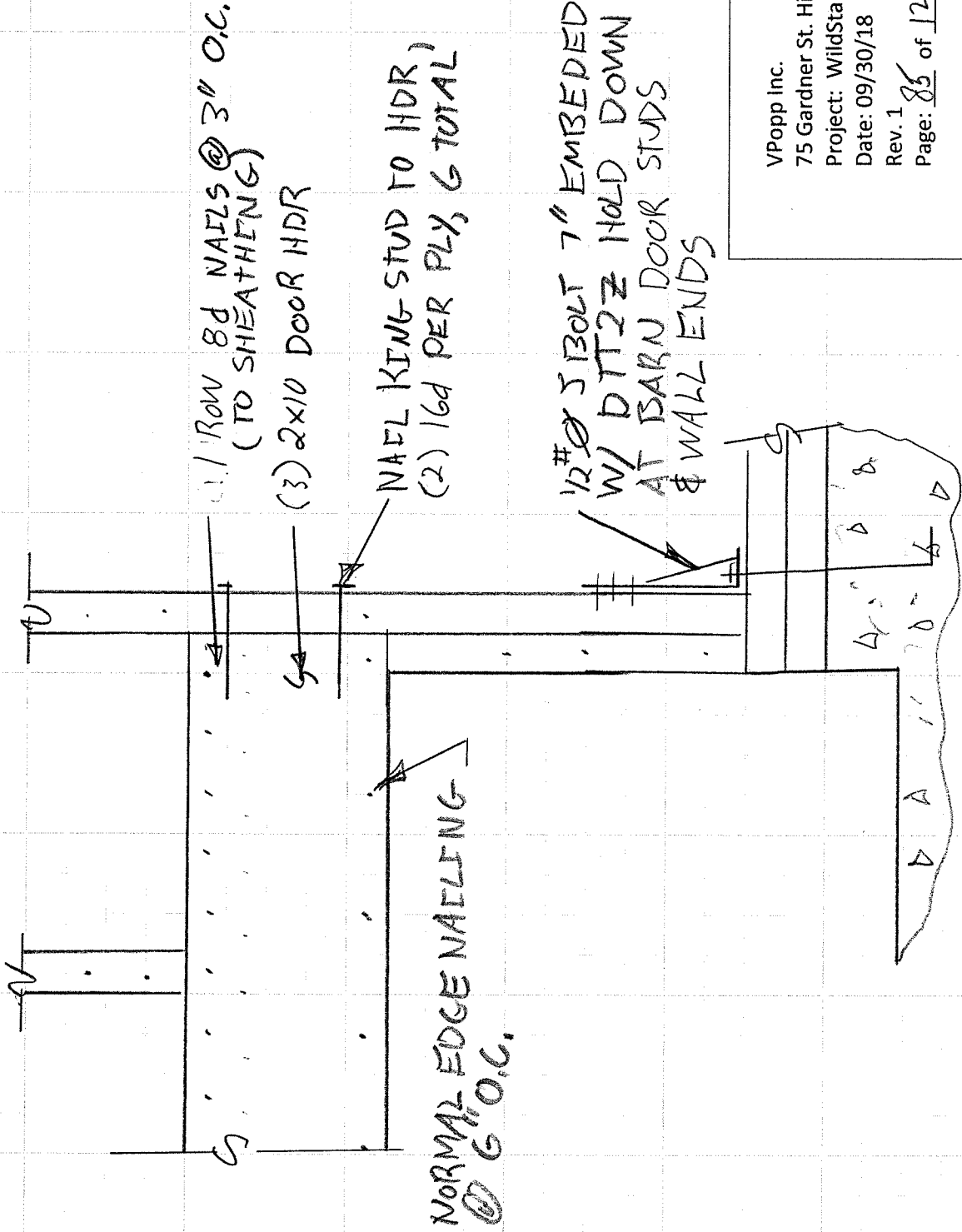


ED NAILS @ 3" O.C.
 FOR BOTTOM 1' OF STUD



TYPICAL RAFTER / STUD NAILING
 FOR UPLEFT, SEE SKETCH BN-2 FOR
 SPECIAL REQUIREMENTS AT BARN DOOR.

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1 ROW 8d NAILS @ 3" O.C.
(TO SHEATHING)

(3) 2x10 DOOR HDR

NAIL KING STUD TO HDR,
(2) 16d PER PLY, 6 TOTAL

1/2" #5 BOLT 7" EMBEDDED
W/ DTT22 HOLD DOWN
AT BARN DOOR STUDS
& WALL ENDS

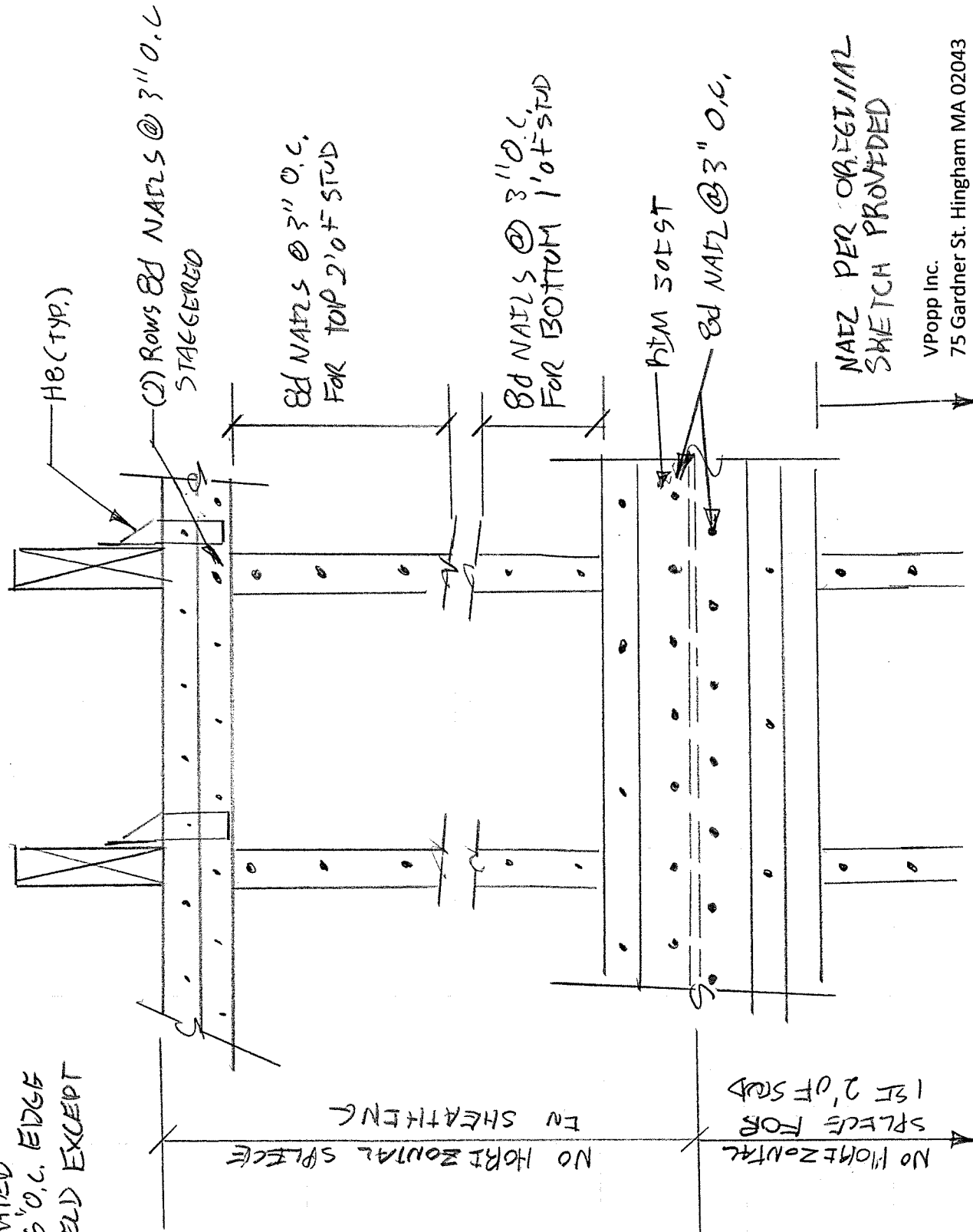
NORMAL EDGE NAILING
@ 6" O.C.

BN SHEAR WALL / BI SHEAR WALL
DETAIL AT BARN DOORS
SKETCH BN-2

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BN/B1 KNEE WALL

7/16" STR. 1 RATED
8d NAILS @ 6" O.C. EDGE
& 12" O.C. FIELD EXCEPT
AS NOTED



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SHORT ROOF DIAPHRAM WALL

UPLIFT AT SHORT ROOF DIAPHRAM WALL

C/K UPLIFT - FOR RAFTER HOLD DOWNS

$$P_1 A = (43.8 - 9) \times \frac{12'}{2} = 209 \#$$

$$+ \frac{(56.3 - 9) \times 1.75'}{2} = 35 \#$$

$$245 \# \times \frac{16}{12} = 327 \#$$

$$P_2 A = (43.8 - 9) \times \frac{12'}{2} = 209 \# \times \frac{16}{12} = 270 \#$$

$$H_8 A = 565 \# \text{ MAX} > 327 \#, \text{ O.K.}$$

OR

$$*H_{11} A = 400 \# \text{ MAX} > 327 \# \text{ O.K. - Preferable}$$

UP LEFT AT WINDOW HDRS (MWFRS)

$$P_3 = (21.1 \text{ PSF} - 9 \text{ PSF}) \times 6' \times 8 \frac{1}{2}' = 270 \#$$

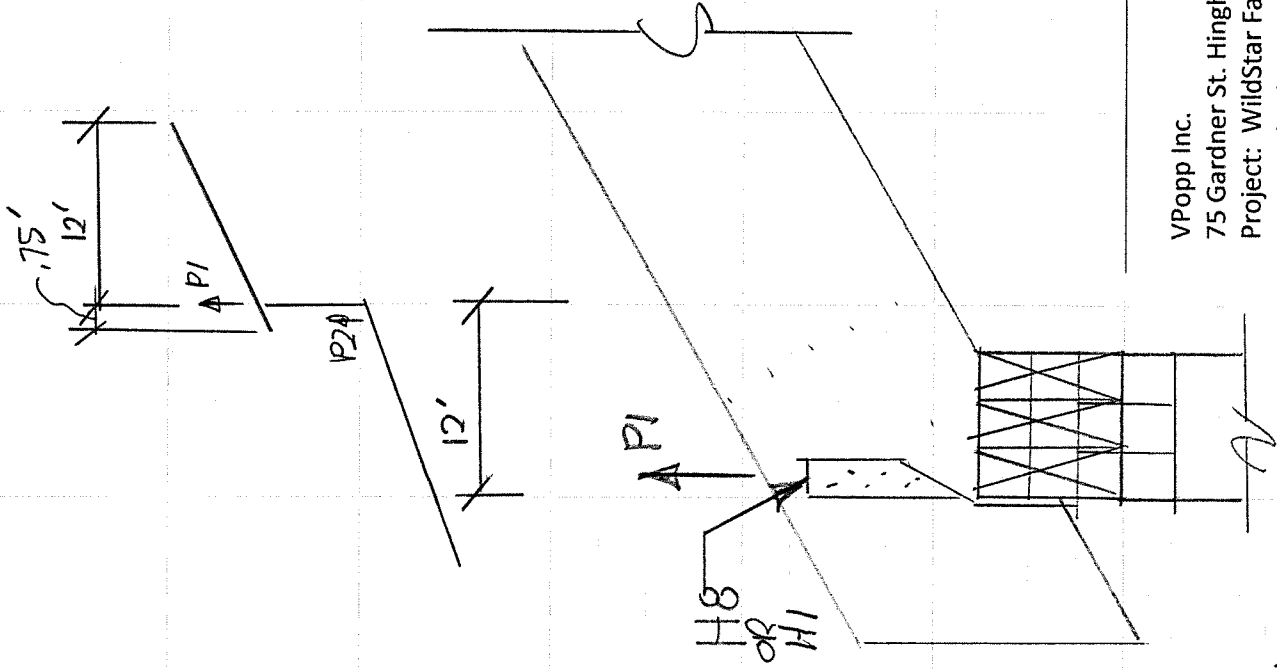
$$+ \frac{(29.5 \text{ PSF} - 9 \text{ PSF}) \times 7.5' \times 8 \frac{1}{2}'}{2} = 62$$

$$352 \#$$

4 XTRA 8D NAFELS, TO HDR TO
BOTTOM HDR

$$P_4 = 352 \# \times \frac{12'}{8'} + (21.1 - 9 \text{ PSF}) \times 6' \times 12' = 1900 \#$$

USE CCQ 48 SDS2.5, CAP. = 7145# > 1900#, O.K.



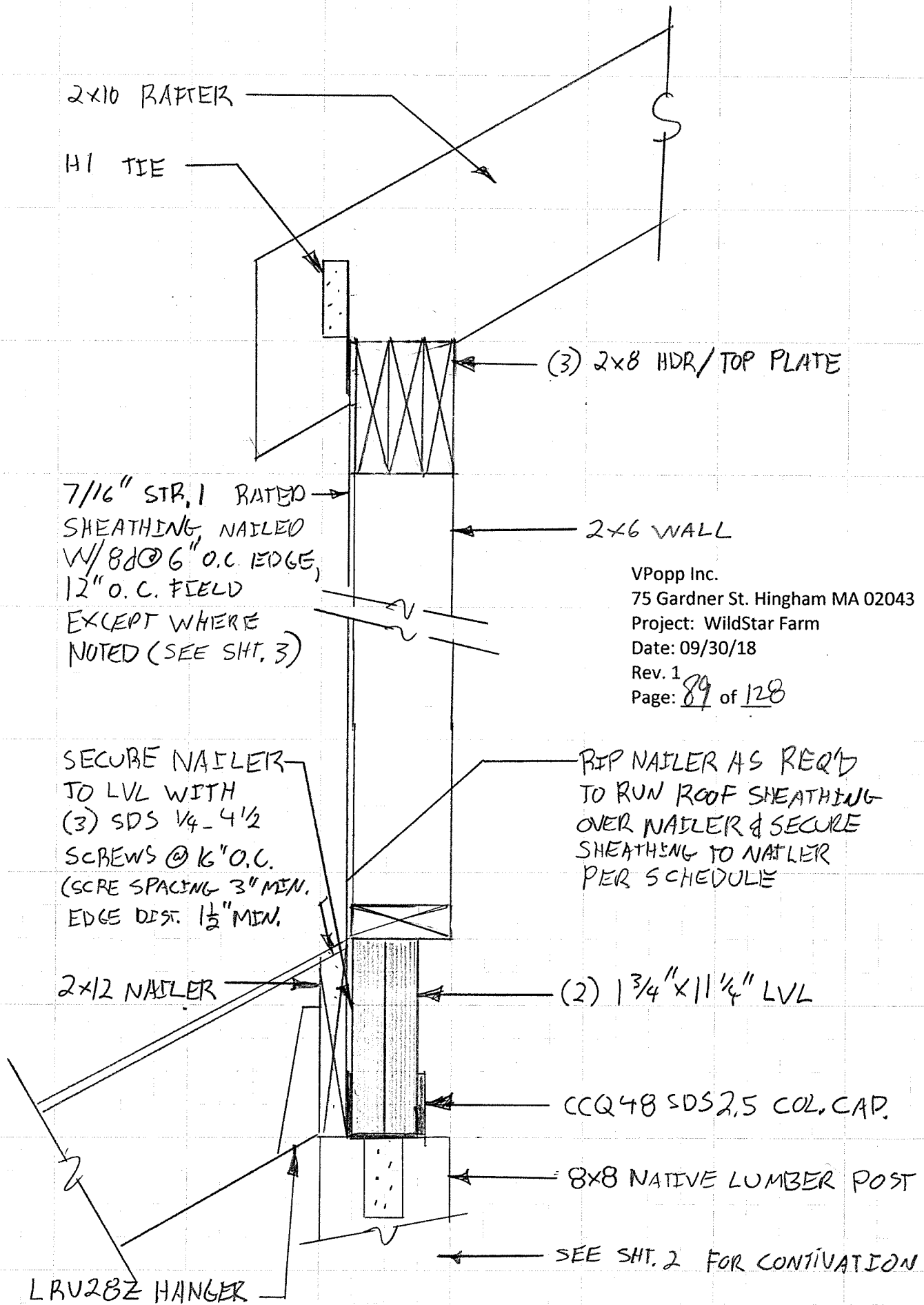
SHORT ROOF DEAPIRAM WALL CONT'D

UPPER POST TO LOWER POST:

$P_4 = 1400\#$, USE DTT2Z HOLD DOWN STRAPS,
CAP, = 1835# > 1400#, O.K.

LOWER POST TO FOOTING

USE ABJ88Z, UPLIFT CAP, = 2320# > 1400#, O.K.
GRAVITY LOAD CAP, = 24.3 KIP, O.K.



2x10 RAFTER

HI TIE

(3) 2x8 HDR/TOP PLATE

7/16" STR. I RATED SHEATHING NAILED W/ 8D @ 6" O.C. EDGE, 12" O.C. FIELD EXCEPT WHERE NOTED (SEE SHT. 3)

2x6 WALL

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SECURE NAILER TO LVL WITH (3) SDS 1/4 - 4 1/2 SCREWS @ 16" O.C. (SCRE SPACING 3" MIN. EDGE DIST. 1 1/2" MIN.)

RIP NAILER AS REQ'D TO RUN ROOF SHEATHING OVER NAILER & SECURE SHEATHING TO NAILER PER SCHEDULE

2x12 NAILER

(2) 1 3/4" x 1 1/4" LVL

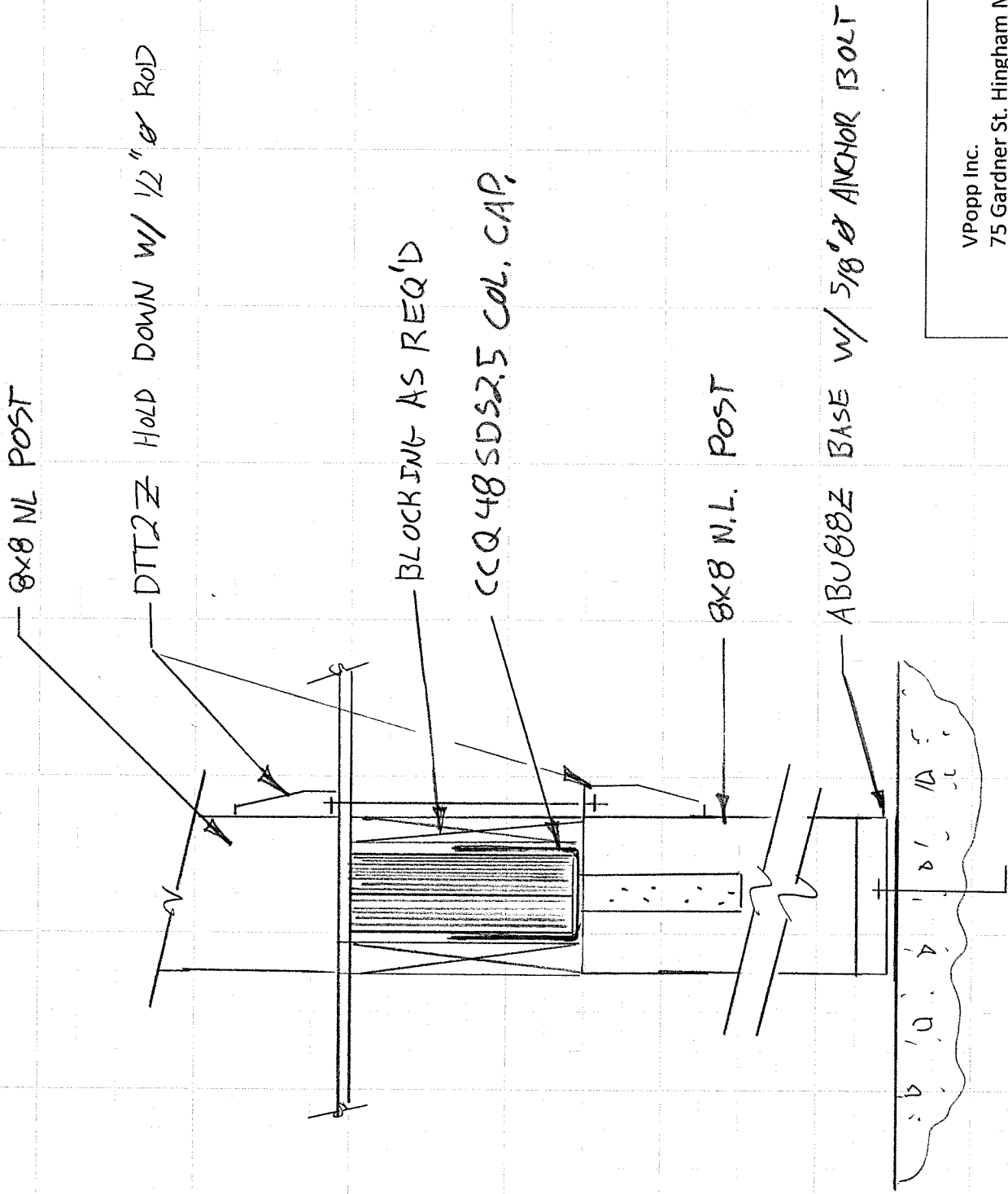
CCQ 48 SDS 2.5 COL. CAP.

8x8 NATIVE LUMBER POST

SEE SHT. 2 FOR CONTINUATION

LRV28Z HANGER

WALL SECTION AT B2 SHT. 1



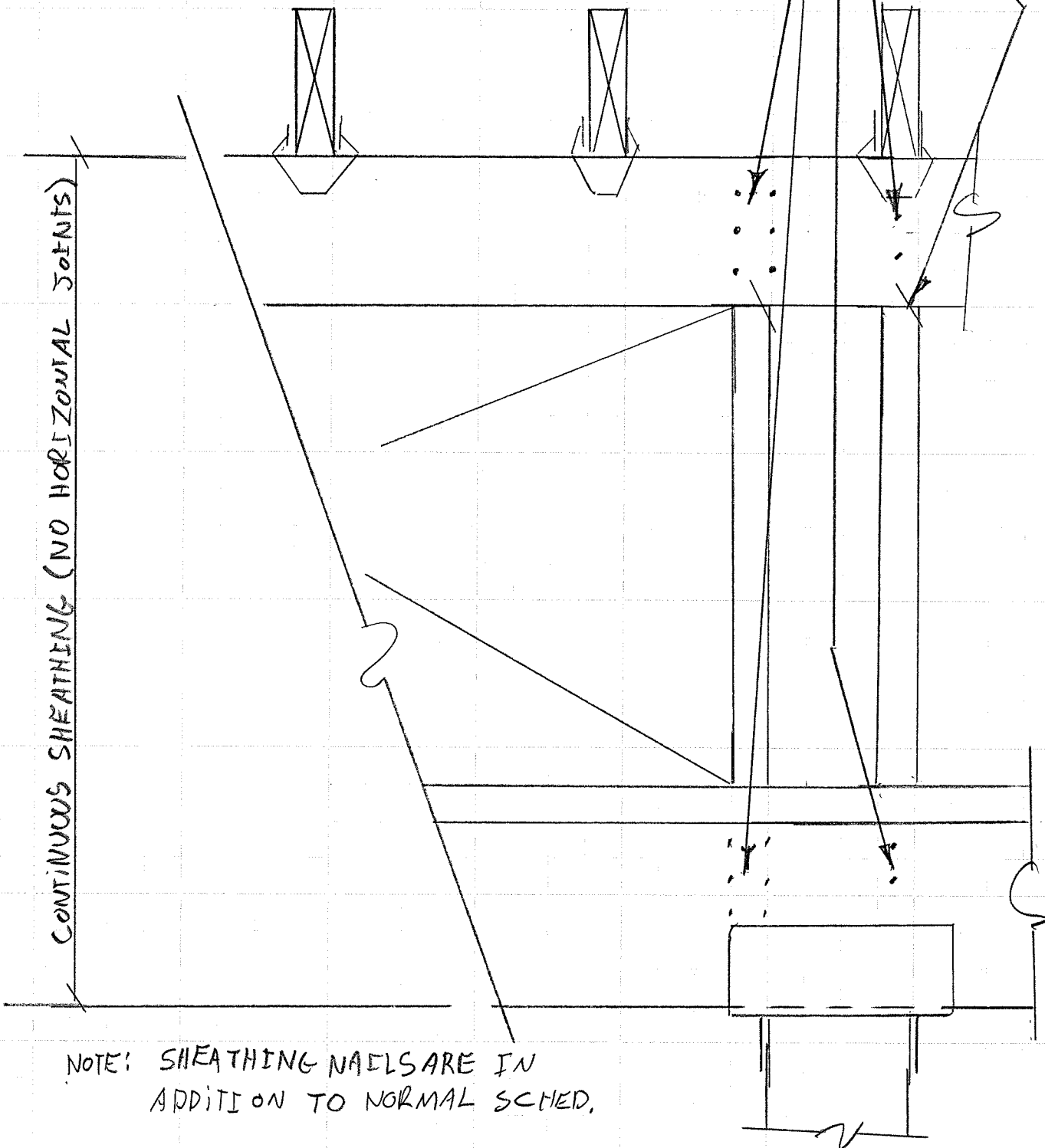
WALL SECTION AT B2 SHT. 2

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NAIL SHEATHING TO HDR/TOP PLATE
AND LVL W/ (2) 8d NAILS ABOVE & BELOW
STUDS @ 16" O.C.

NAIL SHEATHING TO HDR/TOP PLATE
AND LVL W/ (6) 8d NAILS AT EDGE
OF WINDOW OPENINGS

2 (16d) TOENAIL
PER STUD



NOTE: SHEATHING NAILS ARE IN
ADDITION TO NORMAL SCHED.

WALL SECTION AT B2 SHT. 3

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B3. SHEAR WALL

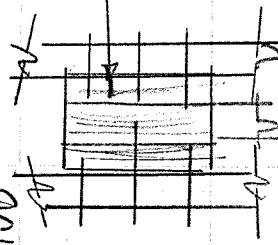
T/C PER SPREAD SHEET = 1.1 KEP, USE MSTC 20 CAP = 1.3 KEP > 1.1 KEP, O.K.
 - WIND IS 1 FOR B5 & BF: TAKE CREDIT FOR THOSE ANCHORS
 $V = 198 \#$, USE $7/16"$ STR. 1 W/ 6D NAILS @ 6" O.C. EDGE, 12" FIELD
 $T_{max} = 360 \# > 198 \#, O.K.$

UPLIFT FROM RAFTER HEADERS



$C.A = 12' \times 6' = 72 \text{ Ft}^2 \quad 16'$
 $P.A = (21.1 \text{ PSF}) - (15 \text{ PSF} \times .6) \times 72 \text{ Ft}^2 = 870 \#$

NAIL HEADER TO KING STUD W/ 870 # / 191 = 4.5 ≈ 5 NAILS, (2 Rows of 3)
 PER KING STUD



UPLIFT FOR INDIVI DUAL RAFTERS - FOR DIAPHRAM 5 RAFTERS
 $(43.8 \text{ PSF} - 15 \text{ PSF} \times .6) \times 12' \times \frac{16'}{12} = 557 \# / \text{CON}$

UPLIFT FOR IND. RAFTERS, DIAPHRAM 3
 - SIMILAR TO B5-S-1 - H2A

B3 SHEAR WALL CONT'D

UP LEFT AT SOLE PLATE:

$$256 \# / \text{STND} - 13' \times 10 \text{PSF} \times 1.6 \times \frac{1}{12} = 152 \#$$

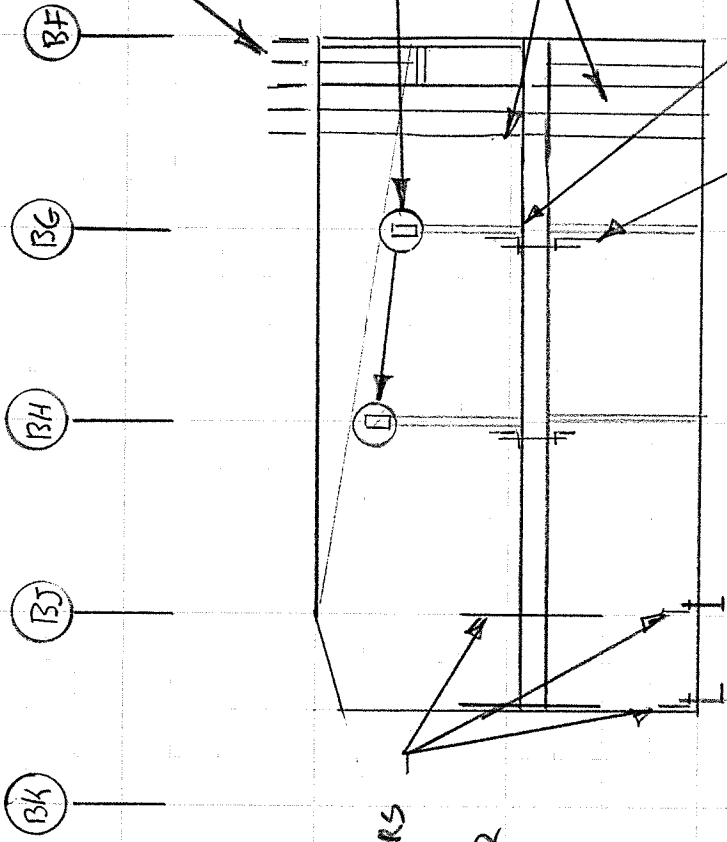
ADD - 152 # / 82 # \approx 2 16d EVERY 16"

STND. IS (3) 16d @ 16" O.C., SO

USE 3 (16d) @ 8" O.C. = 3 XTRA NAILS, O.K.

B3 SHEAR WALL LOWER:

$V = 262$ PER SPREAD SHEET, USE NORMAL SHEATHING
 $T/C = 1.1$ KIP PER SPREAD SHEET, RELATIVELY LOW,
TAKE CREDIT FOR N-S HOLD DOWNS



RAFTER @ 16" O.C., SECURE TO STUDS W/ H2A NUR. TIES

ROOF BEAMS, SEE DETAIL #1

STANDARD WALL, EXCEPT WHERE NOTED, 7/16" STR. 1 W/ 8" NAILS G" O.C. EDGE, 12" O.C. FIELD

SECURE SOLE PLATE TO RAFTERS OR BLOCKING W/ (3) 16d NAILS @ 8" O.C.

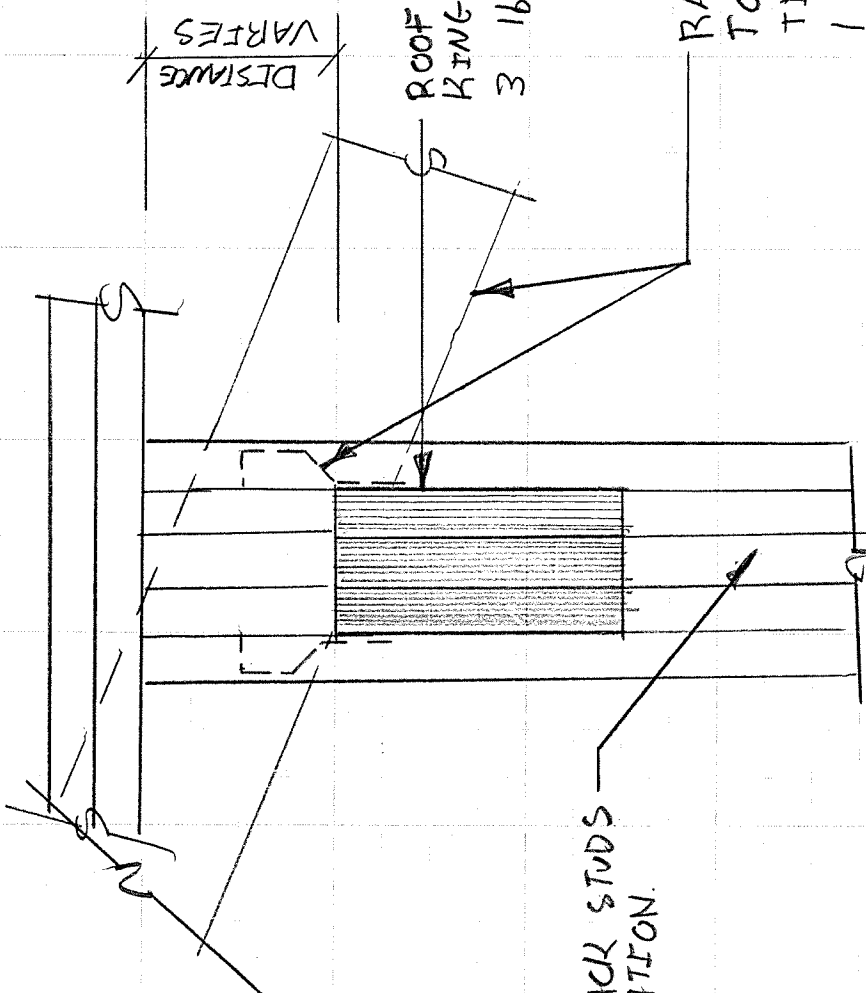
SECURE KING STUDS ACROSS FLOOR DEAGRAM W/ HDUS. SDS2.5 @ 5/8" BOLTS UNDER ALL ROOF BEAMS

STRAPS AND ANCHORS PER SHEAR WALL B3-S-1 & B3-S-2 REQUIREMENTS

SHEAR WALL B3
EL. LOOKING SOUTH

PT 7A-TZ
JSP
H2.5AZ

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DISTANCE VARIES

ROOF BEAM #2 SECURE TO KING STUDS W/ (2) ROWS OF 3 16d NAILS, EACH SIDE

TRIPLE JACK STUDS TO FOUNDATION.

RAFTER (BEHIND) SECURE TO ROOF BEAM W/ H3 TIES, 2 PER RAFTER, OR 1 PER RAFTER IF THE RAFTERS ARE LAPPED, IN BOTH CASES THERE WILL BE 2 TIES EVERY 16"

SHEAR WALL B3
DETAIL #1

B4 UPPER,

DESIGN AS PERFORATED SHEAR WALL

PERF. HEIGHT = 6'-6"
WALL HEIGHT = 10'
RATIO $\approx 2H/3$

% FULL HEIGHT SHEATHING:

TOTAL L = 52' E
FULL H L = 18.5' + 13' + 7' = 38.5'
% FULL HEIGHT = $38.5' / 52' = 75\%$
ADJUSTMENT FACTOR = $(777 + .03) / 2 = 8$

TRY STND. SHEATHING:

CAP. = $360^{\#} / Ft \times 8 = 288^{\#}$
 $V = 10.62 \text{ KIP} / 38.5' = 275^{\#} < 288^{\#}$

T/K

$$T = V_h / (L_i)$$

= $10.62 \text{ KIP} \times 10' / 38.5' = 2.8 \text{ KIP} - \text{USE MST 48 STRAP, CAP.} = 3640^{\#} > 2.8 \text{ KIP, O.K.}$

$T = V = 275^{\#} / Ft = 191 \approx 3 \text{ NAILS} / Ft (16d)$

- USE (3) 16d NAILS @ 8" INSTEAD OF 16", O.K. - SOLE PLATE TO JOIST / RIM BOARD

- RAFTERS || TO WALL SO NO DIRECT UPLIFT

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B4 LOWER

V = 12 KRF

DESIGN AS PERFORATED SHEAR WALL

Perf. H = 6'-6"

H = 10'

R = 2/3h

LENGTH OF FULL HEIGHT SHEATHING

9'4" + 19' + 2' = 30'

LENGTH OF WALL = 85'

% = 34/85 = 40%

Adj. Factor = 1.63

CAP. REQ'D =

(12KRF/34') (1.63 x 1.4) = 400#

USE 7/16" STR. 1 NAILED W/ 6d NAILS @ 4" O.C. EDGE, 12" FIELD, CAP = 480# > 400# O.K.

T/C = (12KRF/34') x 10' = 3.5 KRF

JOIST ICE DOWNS FOR DECK:

WIND AREA = 1.3' x 6' = 10 SF ±

0° slope, 105 MPH, P_{net} = (45.4 + .55.0)/2 = 50.2 PSF - 9 PSF = 41.2 PSF
41.2 PSF x 7' x 1.3 = 375#

OF NAILS ADDED = 375# / 128# = 3 NAILS, USE 6 TOTAL, 3 PER JOIST FOR SHEAR & 3 FOR UPLIFT

FOR BAND JOIST, USE MWFRS VALVES

(2.11 - 9) x 7 = 85' PLF USE 1 XTRA 8d TOE NAIL, CAP = 96# > 85#

- IN. ADD. TO NORMAL REQ., SO AT 4" O.C. VS. 6" PRESCRIBED

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B4 LOWER CONT'D

TRANSFER OF T/C ^{BY} UPPER TO FOUNDATION
T/C = 2.8 KIP,

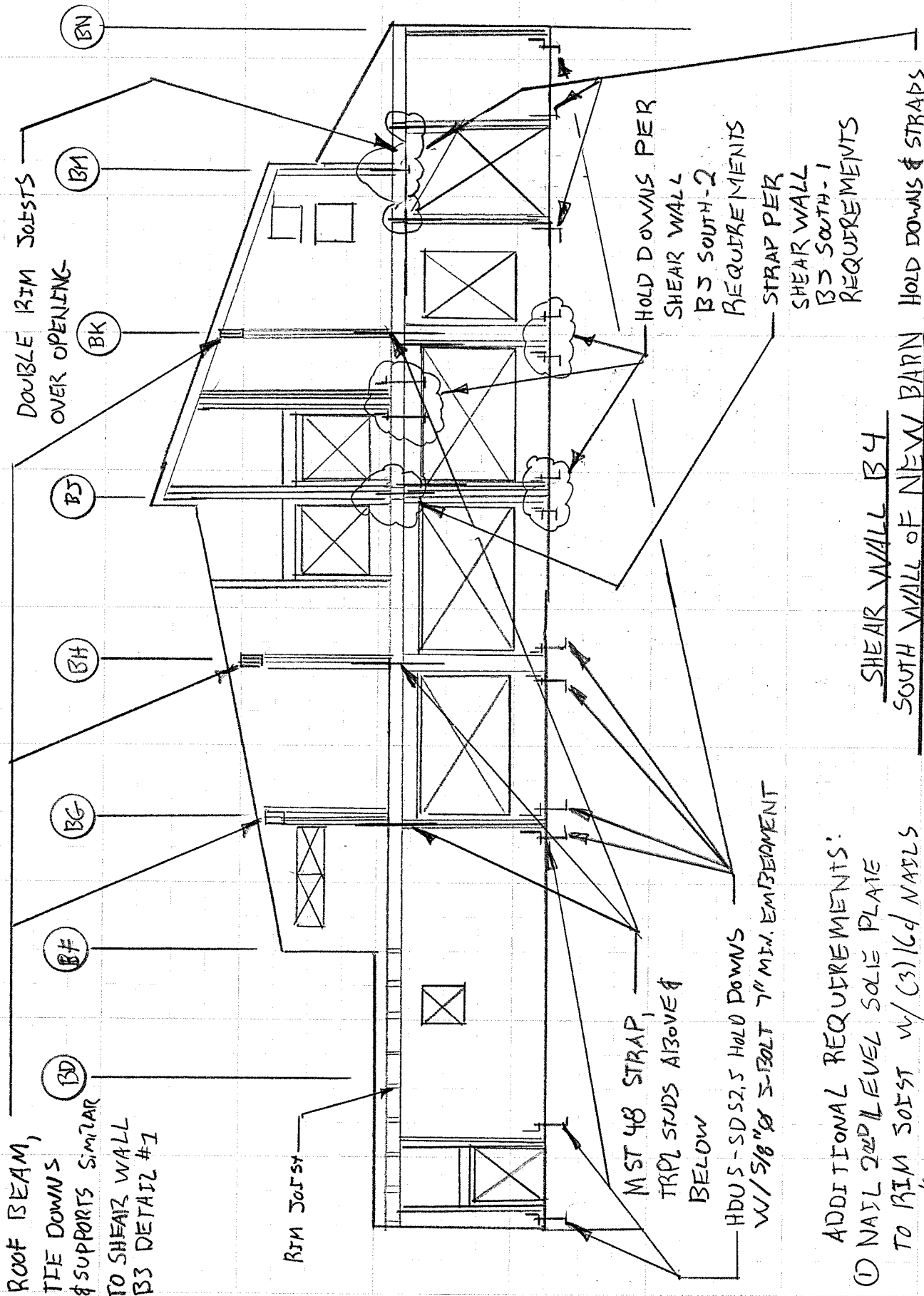
CONTINUOUS UPLIFT DO TO SHEAR

$$t = V = 12 \text{ KIP} / 34' = 353 \#/\text{FT}$$

353 #/FT \times 4' = 1,4 KIP, WELL WITHIN CAP. OF 5/8" S-BOLTS AT 4' O.C.

TRANSFER OF T/C FROM SHEAR WALL B5S-1 & B5S-2
B5S-1 - HDR TO POST, MST 48 STRAP, T/C = 1.7 KIP,
USE HDUS-SDS2.5 w/ 5/8" S-BOLT

B5S-2 - DESIGNED UNDER B5S-2 CALCS TO FOUNDATION



ROOF BEAM,
TIE DOWNS
& SUPPORTS SIMILAR
TO SHEAR WALL
BS DETAIL #1

DOUBLE RIM JOISTS
OVER OPENING

HOLD DOWNS PER
SHEAR WALL
BS SOUTH-2
REQUIREMENTS
STRAP PER
SHEAR WALL
BS SOUTH-1
REQUIREMENTS

HOLD DOWNS & STRAPS
PER SHEAR WALL BS
REQUIREMENTS

SHEAR WALL B4
SOUTH WALL OF NEW BARN
LOOKING NORTH

ADDITIONAL REQUIREMENTS:
① NAIL 2x4 LEVEL SOLID PLATE
TO RIM JOIST W/ (3) 16d NAILS
@ 8" O.C.

② FOR DECK AREA ONLY, NAIL DECK JOISTS
TO RIM JOISTS W/ (6) 16d NAILS, STAGGER
TO AVOID SPLITTING AND TOE NAIL RIM
JOIST TO TOP PLATE W/ 6d NAILS @ 4" O.C.

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SHEAR WALL BA - 1ST FLOOR

- USE PERFORATED SHEAR WALL METHOD

% FULL HEIGHT SHEATHING = $26' / 38' = 68\%$

DOOR HEIGHT = $5A/6$

SHEAR VALUE FACTOR = .65

$V = 6.8 \text{ KIP} / 26' = 262 \text{ PLF}$

TRY $7/16$ STR SHEATHING NAILED AT $4" \text{ O.C.}$,

$V_{\text{MAX}} = 395 \times .65 \times 1.4 = 360 \text{ PLF} > 262 \text{ PLF O.K.}$

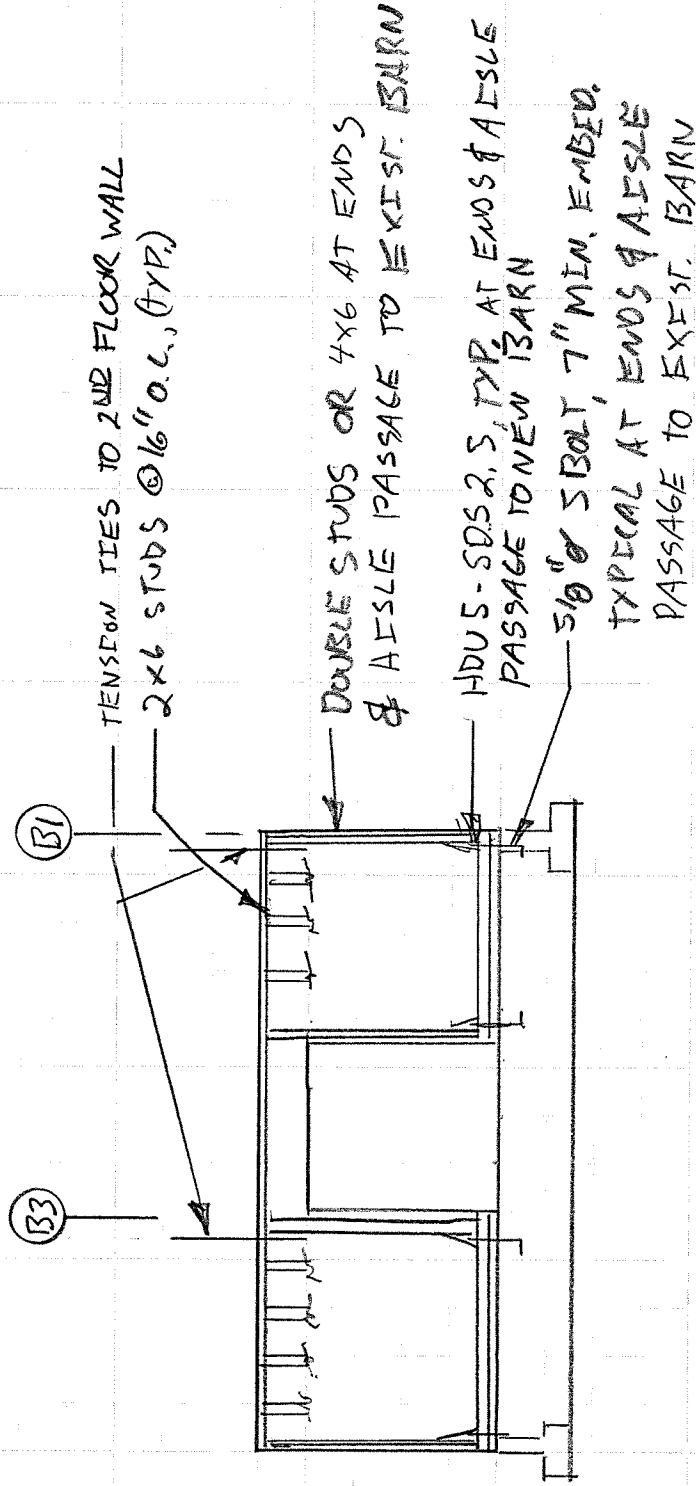
UPLEFT = 282 PLF - GO PLF WALL = 222 PLF

CHECK F_{CI} ON SOLE PLATE

$222 \# \times 4' / (3" \times 3") = 99 \text{ PSI} < 425, \text{ O.K.}$

SHEAR WALL BA, 1ST FLOOR
LOOKING WEST

SHEATHING:
 7/16" STR. 1 w/ 6d NAILS @ 4" O.C. EDGE
 & 12" O.C. FIELD



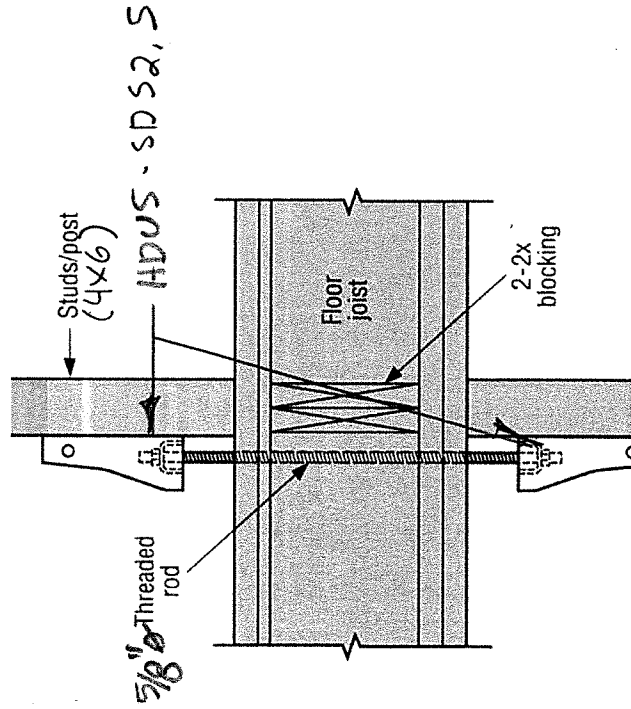
SHEAR WALL BA 2ND FLOOR

STANDARD SHEAR WALL,

SHEATHING

7/16" STR. I, ED NAILS @ 6" O.C. EDGE
12" O.C. FIELD

PROVIDE TENSION TIES TO BA 1ST FLOOR WALL AS SHOWN
BELOW, AT COLUMN LINES B3 & B1



(B1) & (B3)

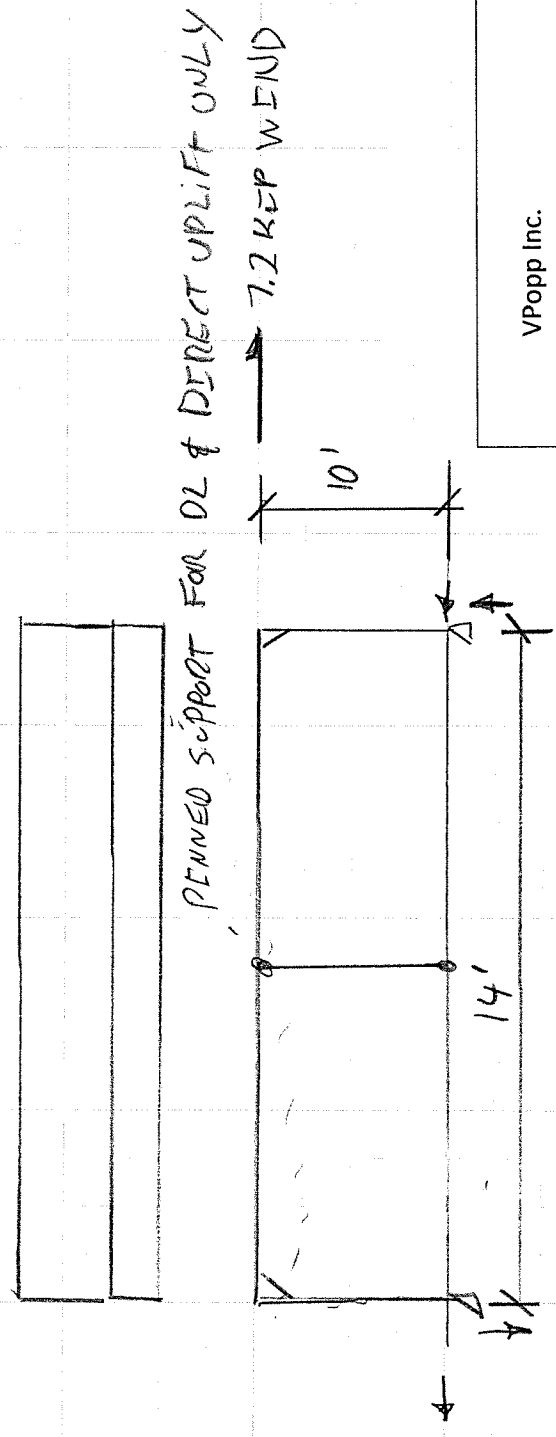
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SHEAR WALL BF

DUE TO LARGE DOOR FRAME, CHECK IF PRE DESIGNED MOMENT FRAME CAN BE USED.

2ND FLOOR V = 7.2 KIP

- NO, DESIGN STEEL MOMENT FRAME



$$R_{y1} = 7.2 \text{ KIP} \times 10' / 14' = 5.14 \text{ KIP}$$

$$R_{x1} = 7.2 \text{ KIP} / 2 = 3.6 \text{ KIP}$$

$$M_c = 7.2 \text{ KIP} \times 10 \text{ ft} = 72 \text{ KIP-ft}$$

- NOT FEASIBLE FOR 2ND FLOOR, RE DESIGN BUE LONG FROM DIAGRAM 3 & DESIGN ONLY FOR LOAD FROM DIAPHRAM #5

SHEAR WALL BF, REV. 1

UPPER LEVEL

V = 2.3 KEP

THERE IS INSUFFICIENT ROOM FOR NORMAL SHEAR WALL,
THEREFORE USE CONTINUOUS PORTAL FRAME,

PER THE IRC, ONE PORTAL FRAME IS EQ. TO
4' OF 3/8" STR. 1, NAILED W/ 8D NAILS, 6" O.C. EDGE, 12" O.C.
FIELD \therefore EQUIV. CAPACITY OF PORTAL FRAME IS:
 $230 \# \times 1.4 \times 4 = 1,288 \# \times 2 = 2,576 \# > 2300 \#$, O.K.

USE CONT. PORTAL FRAME PER IRC FIGURE R602.10.4.1.1

UPLEFT: - SIMILAR TO BS SOUTH-1 UPPER ROOF
USE H2A OR H6 HURRICANE STIMPS AS APPROPRIATE.

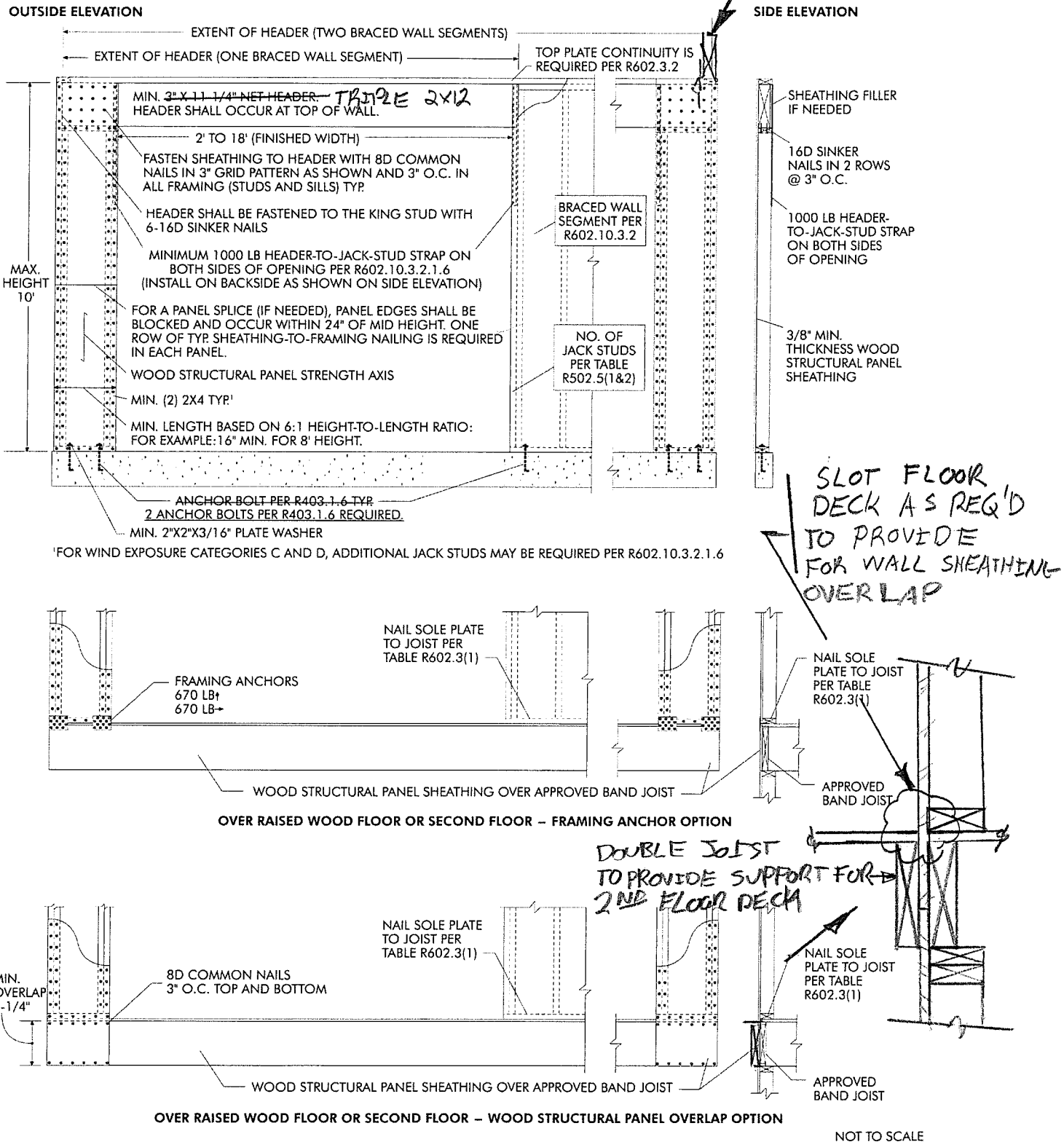
LOWER LEVEL

SEE SPREAD SHEET, 7/16" STR. 1 W/ 8D @ 4" O.C. EDGE, 12" O.C. FIELD
T/C PER SPREAD SHEET USE: HD12 W/ SBK30 ANCHOR

SHEAR WALL BF
UPPER FLOOR

3. Revise Figure R602.10.4.6 as follows:

H6 OR #2 RAFTER
TIES AS APPLICABLE



SLOT FLOOR
DECK AS REQ'D
TO PROVIDE
FOR WALL SHEATHING
OVERLAP

NOT TO SCALE

FIGURE R602.10.4.6 (Supp)
WALLS WITH 6:1 ASPECT RATIO USED WITH CONTINUOUS WOOD

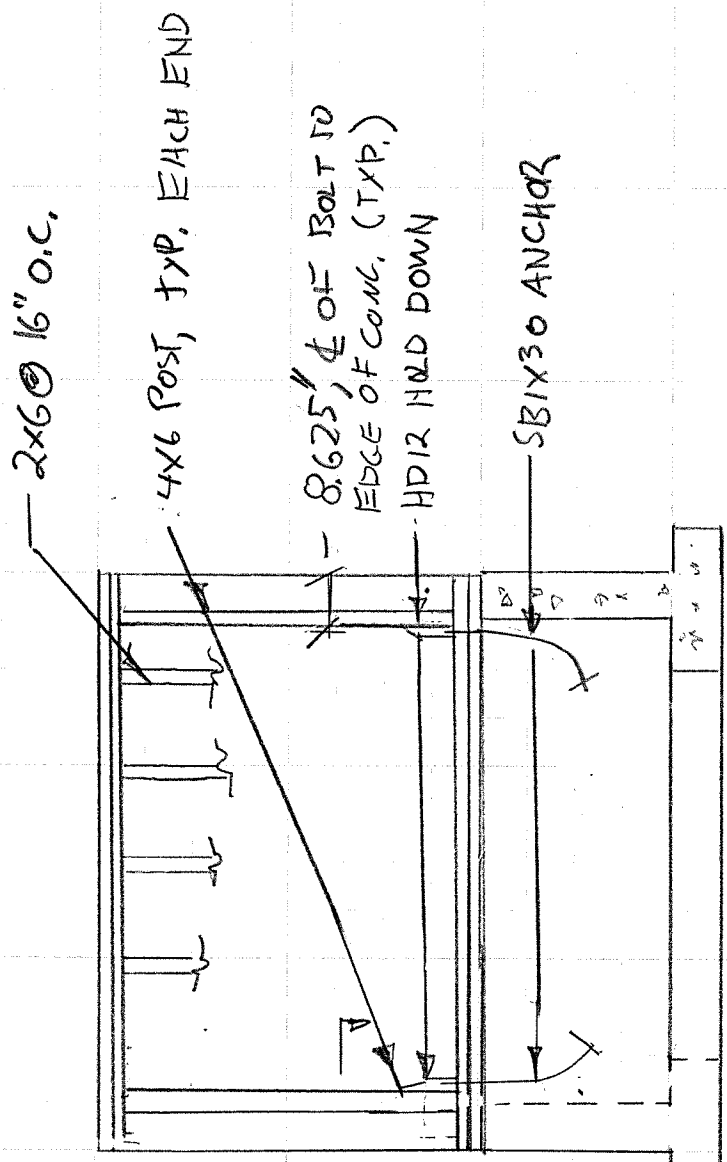
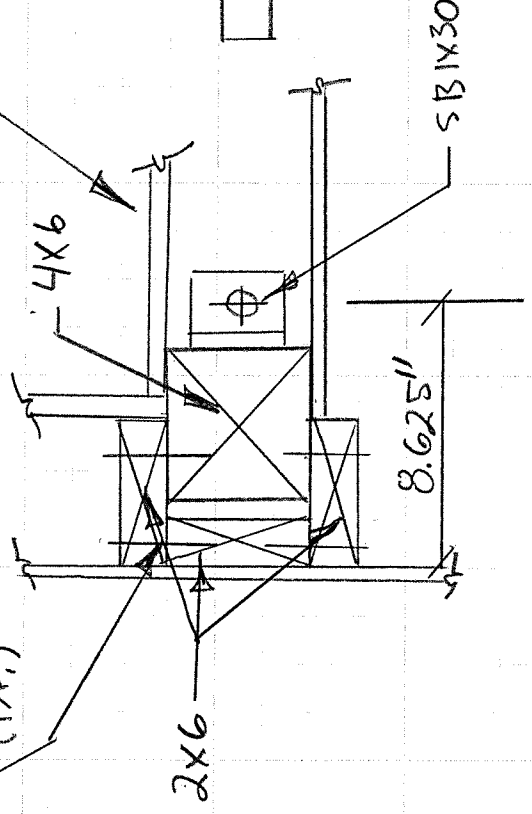
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SHEAR WALL BF
LOWER FLOOR
(LOOKING EAST)

SHEATHING:
 7/16" STR. 1 W/ 8d NAILS 4" O.C.
 EDGE, 6" O.C. FIELD,

NOTE: IN ADDITION TO ANCHORS
 DEPICTED, PLACE 5/8" Ø ANCHORS
 @ 48" O.C. W/ 3" SQ. WASHERS

16d NAILS, (2) ROWS @ 24" O.C.
 (TYP.)

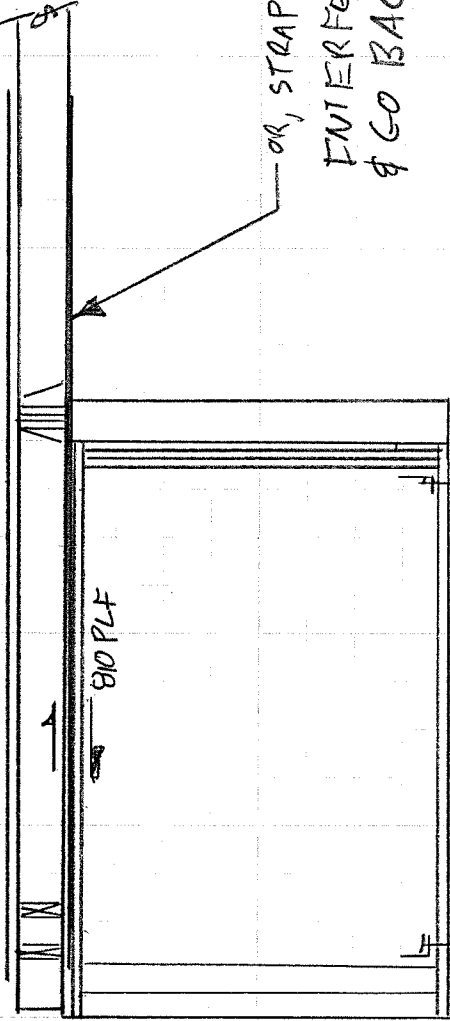


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B6, B5 & B3M DRAG STRUT

T_{MAX} = 9.72 KIP

9.72 KIP



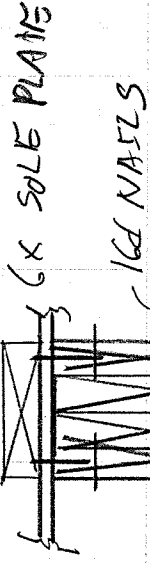
USE CMS172 STRAP w/ 98 TOTAL 10d NAILS
 CAP. = 9215# @ 9.72 KIP, OK GIVEN LARGE CONSERVATIVENESS OF CALC

JOIST TO TOP PLATE, REQ. CAP. = 810#/FL, USE 1 1/4" x 4 1/2" SDS SCREWS, 2 ROWS @ 6" O.C.

REV. 1

SHEATH. CONT. ACROSS TOP PLATE, JOISTS & SOLE PLATE

PER ESR-1539, 131 x 2 1/2 NAIL CAP. = 54# x 1.6cd = 87#, ~ 10 NAILS / FT REQ'D
 USE 2 ROWS 4" O.C., BOTH SIDES, CAP. = 87# x 2 x 3 x 2 = 1044# > 810, O.K.



USE CONTINUOUS SINGLE
 TOP PLATE

OR, STRAP UNDER TO AVOID
 INTERFERENCE W/ DECK NAILING
 & GO BACK TO DBL JOIST & PREFERABLE

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NOTE:

TOP PLATE & SOLE PLATES
CONTINUOUS (NO SPLICES)

CMST 12 STRAP (98) 10d NAILS TOTAL
1/2 IN SHEAR WALL TOP PLATE, 1/2 IN
FLOOR JOISTS END LENGTH = 48"
SECURE 4x4 & SPACER TO 8x8 POST
w/ SDS 1/4" x 8" SCREWS @ 24" O.C.

DBL JOIST

8x8 POST, NATIVE LUMBER

2x4 SHEAR WALL

7/16" STRUCTURAL I

RATED PLYWOOD BOTH SIDES
8d NAILS @ 4" O.C. EDGE,
6" FIELD

2x4 SPACER

HD-12 HOLD DN

HD-12 HOLD DOWN

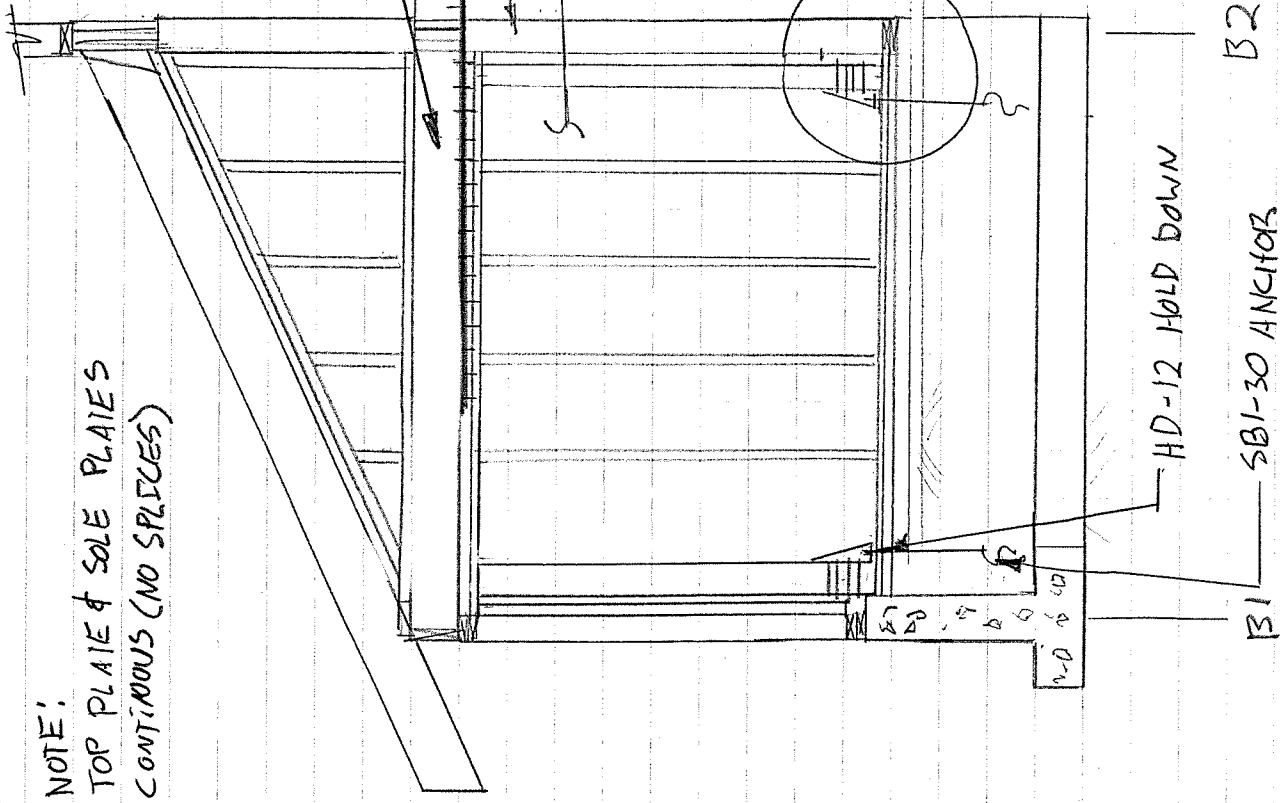
SB1-30 ANCHOR

B2

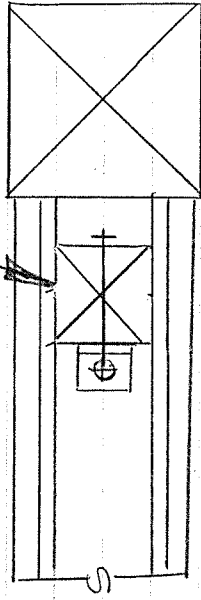
SB1-30 ANCHOR

SHEAR WALLS AT

BG, BS & BM, FROM B1 to B2



4x4 Post
SECURED w/ 2 Rows 16d
NAILS @ 6" O.C.



SEC. A-A

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B5 SOUTH #1 SHEAR WALL

#1 - HEADERS FOR UPPER WINDOW

DL = 15 PSF x 6' = 90 PLF

SL = 35 PSF x 6' = 210 PLF

L = 3'

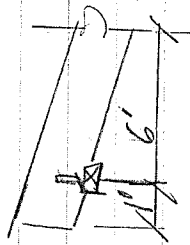
PER BC CALC - TRIPLE 2x4

#2 - BEAM FOR BACK 9'

LOAD EQUAL TO ABOVE + 40 PLF WALL
SPAN = 10' ±

PER BC CALC - TRIPLE 2x10

#3 - UPLIFT CONNECTIONS FOR DIA. #5 BAFTERS



ROOF ANGLE: $4/12 = 18^\circ$

EFF. WIND AREA = $1.3' \times 13' = 17 \text{ F}^2$

$Z_3 = 43.8 \text{ PSF}$

$O_H = 56.3 \text{ PSF}$

NET UPLIFT ON CON. = $43.8 \times 6 + 56.3 \times 1 - 15 \times 6 \times 7 =$

$= 256 \# / \text{CON.}$

USE H3 TIE, CAP. = $320 \# > 256 \#$, O.K.

OR H1, CAP. = 400 UP + 415 II TO PLATE

OR H2A, CAP. = 495# OR H8, CAP. = 565#

ADDITIONAL FASTENERS FOR UPLIFT - TOP PLATE TO STUD:

400# 10D NAILS: 94# / NAIL, USE 4 NAILS $> 375 \#$

BS SOUTH #1 SHEAR WALL CONT'D

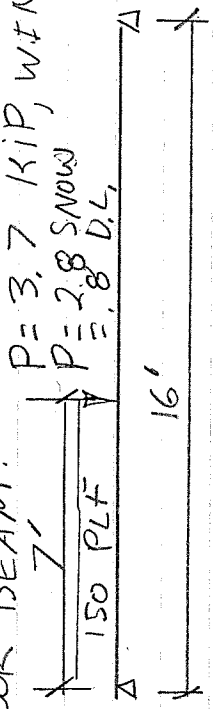
HANGERS FOR DIAPHRAGM #4 RAFTERS
SL W/DIAIET

DOWNLOAD = $(15 \text{ PSF} \times 6' + 69 \text{ PSF} \times 6') \times \frac{16''}{12''} = 672 \#$ / HANGER

UPLIFT - similar to DFA, #5, 256# MAX.

USE LRU2BZ S.L. CAP. = $900 \# \times .81 = 729 \# > 672 \# \rightarrow$ O.K.
 W.L. CAP. = $695 \# \times .81 = 563 \# > 256 \# \rightarrow$ O.K.

FLOOR BEAM:



USE B.C. Calc
 QUAD RULE $1\frac{3}{4}'' \times 1\frac{1}{4}''$ LVL

L.L. = 40 PSF } FLOOR
 D.L. = 10 PSF }

D.L. = $15' \times 10 \text{ PSF} = 150 \text{ PLF}$, WALL

S.L. = $69 \text{ PSF} \times 6'$ C.A. FROM D #4

= $35 \text{ PSF} \times 6'$ C.A. FROM D #5

D.L. = $15 \text{ PSF} \times 12'$ C.A. FROM D #4 & #5

NAILER TO STUDS / HDR
 $672 \# / 135 \# = 4.97$, 5 16d NAILS, TO CLOSE
 USE SDS SCREWS
 $672 \# / (340 \#) = 1.97$

$P_{SL} = 69 \text{ PSF} \times 6' \times 9' / 2$
 $+ 35 \text{ PSF} \times 6' \times 9' / 2$
 $= 2.8 \text{ KIP}$

$P_{DL} = 15 \text{ PSF} \times 12' \times 9' / 2 = .8 \text{ KIP}$

*USE $4\frac{1}{2}''$ SCREWS TO ACCOUNT FOR SWOLM

B5-1 SOUTH SHEAR WALL CONT'D

POST AT END OF WALL:

WL SL DL
P = 3.7 KIP + 2.8 KIP + 0.8 KIP

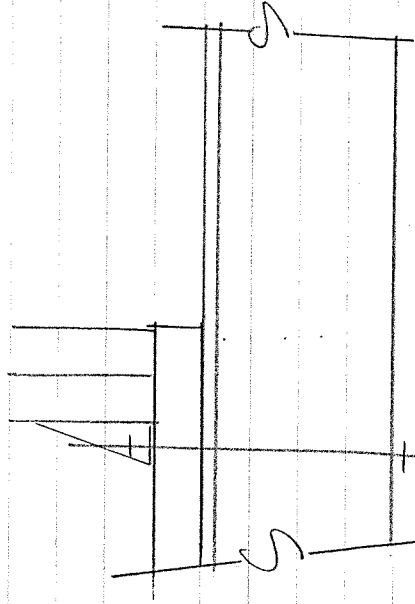
- PER B.C. CALC DBL 2x6 O.K., CHECK F_{c1}

- PER B.C. CALC SHEET MAX. FACTORED LOAD COMB.

$$= D + 1.5W + 1.75S = 5675 \#$$

$$f_{c1} = \frac{5675}{2 \times 1.5 \times 5.5} = 344 \text{ PSI} < F_{c1} = \underline{425 \text{ PSI O.K.}}$$

UPLIFT COM. @ MFD SPAN.
3700 #



USE HDUS-SDS2.5, CAP = 4065 # > 3700 #, O.K.

B5 SOUTH SHEAR WALL CONT'D

UP LIFT CON. AT NORTH END OF WALL

REACTION FROM (4) LVL

- 3.7 KIP - 2.0 KIP = 1.7 KIP FROM S.W. MOMENT

ADD DIRECT UP LIFT FROM - RAFTERS (MWFKS LOADS)

$$\text{ROOF} : = \left[(21.1 \text{ PSF} - 15 \text{ PSF} \times 1.6) \times 12' \times \frac{16'}{2} \right] + \left[(27.5 \text{ PSF} - 15 \text{ PSF} \times 1.6) \times 1' \times \frac{16'}{2} \right]$$

$$= 1.3 \text{ KIP}$$

$$+ 1.7 \text{ KIP}$$

$$3 \text{ KIP} - \text{WEIGHT OF WALL } 10 \text{ PSF} \times 15' \times 7' = 1 \text{ KIP}$$

$$- 2 \text{ KIP NET}$$

USE CS14 COIL STRAP $T_{MIN} = 2500\# > 2000\#, \text{ O.K.}$

FOR SOUTH SIDE OF UPPER HEADER :

$$\text{UP LIFT} = 1.3 \text{ KIP} \times \frac{9'}{16} = 730\# - \text{FROM SHEAR WALL MOMENT}$$

$$\text{DIRECT UP LIFT} = 1.7' \times \frac{4.5'}{9'} = 1000\#$$

$$\text{TOTAL} = 1.7 \text{ KIP, USE } 2 \text{ KIP}$$

SHEAR BJ-1 SOUTH CONT'D

UPLIFT AT END OF UPPER WINDOW HDR

$$256 \# \times \frac{12''}{16''} \times 5' = 480 \# - \text{USE (5) \& N\&T\&S, } 5 \times 94 = 470 \# \approx 480 \text{ P.L., O.K.}$$

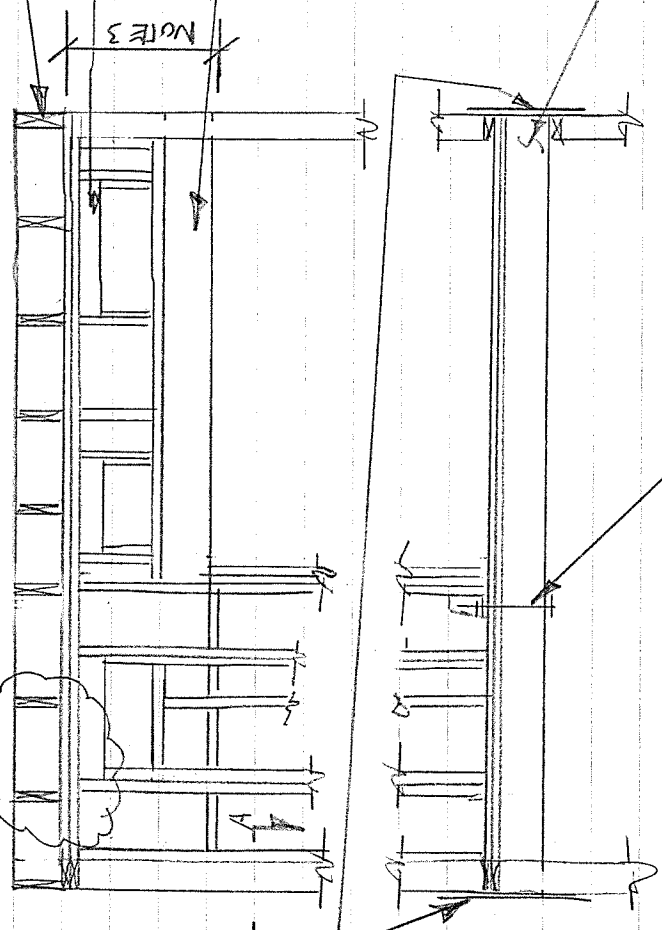
B5-11 SOUTH SHEAR WALL
(BATHROOM EAST WALL)
LOOKING EAST

SEE DETAIL #1 FOR RAFTER, STUD & TOP PLATE/HDR REQUIREMENTS

SEE DET. #4 FOR A-A

MST 48 STRAP, END LENGTH 16" MIN. (15) 10d NAILS IN STUD ABOVE & BELOW 30 TOTAL NAILS

2x10 RAFTERS SECURE TO TOP PLATE W/ H.I. TIES
(3) 2x4 HDR (TYP. ALL UPPER WINDOW HEADERS)
(3) 2x10 HDR, SEE DETAIL #2 FOR SPECIAL NAILING REQUIREMENTS



(4) 1 3/4" x 1 1/4" LVL

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HDU5-SDS2.5 HOLD DOWN W/ 5/8" ROD, DRILL THRU LVL & SECURE W/ 4x4 SQ. WASHER & NUT

NOTES:

- 1) ALL WALLS 2x6
- 2) ROOF WEST OF COLUMN LINE 13J NOT SHOWN FOR CLARITY, SEE DETAIL #3
- 3) EXTERIOR SHEATHING TO RUN TO BOTTOM OF 2x10 HDR, PROVIDE FULL DEPTH BLOCKING AT EXTERIOR/INTERIOR SHEATHING TRANSITION

EXTERIOR SHEATHING 7/16" STR. 1 RATED, 8d NAILS AT 6" O.C. EDGE, 12" O.C. FIELD
INTERIOR SHEATHING: 5/8" GYPSUM WALL BOARD, 6d cooler NAILS @ 4" O.C. EDGE, 12" FIELD BOTH SIDES

H2A HURRICANE STRAP

H6 HURRICANE STRAP

TRIPLE 2x4 HDR

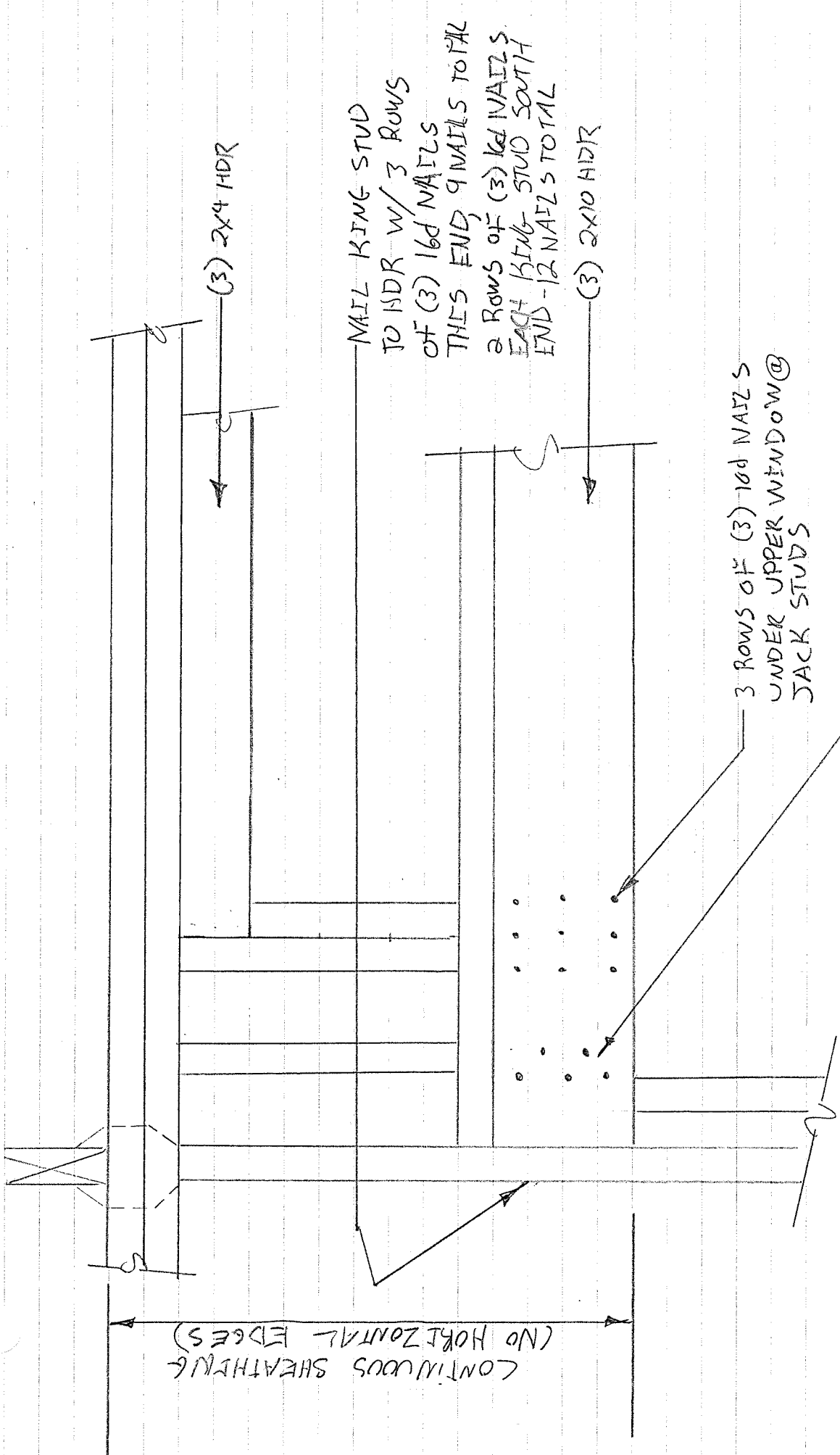
(6) 8d NAILS IN HDR, 3/4" MIN. EDGE DIST.
1" SPACING, AT END OF WINDOW HDR

(5) 8d NAILS IN CRIP, STUD 3" SPACING
STAGGER TO AVOID SPLITTING STUD

RAFTER / TOPPLATE / TIE DOWN REQUIREMENTS
DETAIL # 1

B5-S-1 SHEAR WALL

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CONTINUOUS SHEATHING
(NO HORIZONTAL EDGES)

(3) 2x4 HDR

MAIL KING STUD
TO HDR W/ 3 ROWS
OF (3) 16d NAILS
THES END, 9 NAILS TOTAL
2 ROWS OF (3) 16d NAILS
EACH KING STUD SOUTH
END - 12 NAILS TOTAL

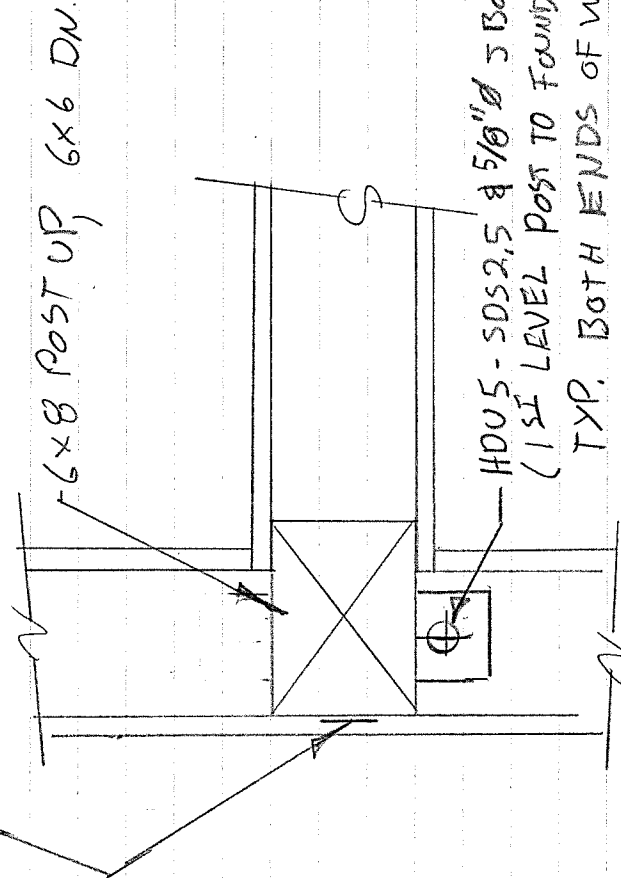
(3) 2x10 HDR

3 ROWS OF (3) 16d NAILS
UNDER UPPER WINDOW @
JACK STUDS

(5) 10d NAILS UNDER
TYPICAL STUD ABOVE HDR
UPPER WALL (2x10) HEADER NAILING
DETAIL #2

BJ-S-1 SHEAR WALL

MST 48 STRAP, END LENGTH = 16"
 (17) 10d NAILS EACH END, NO NAILS
 REQ'D IN JOISTS



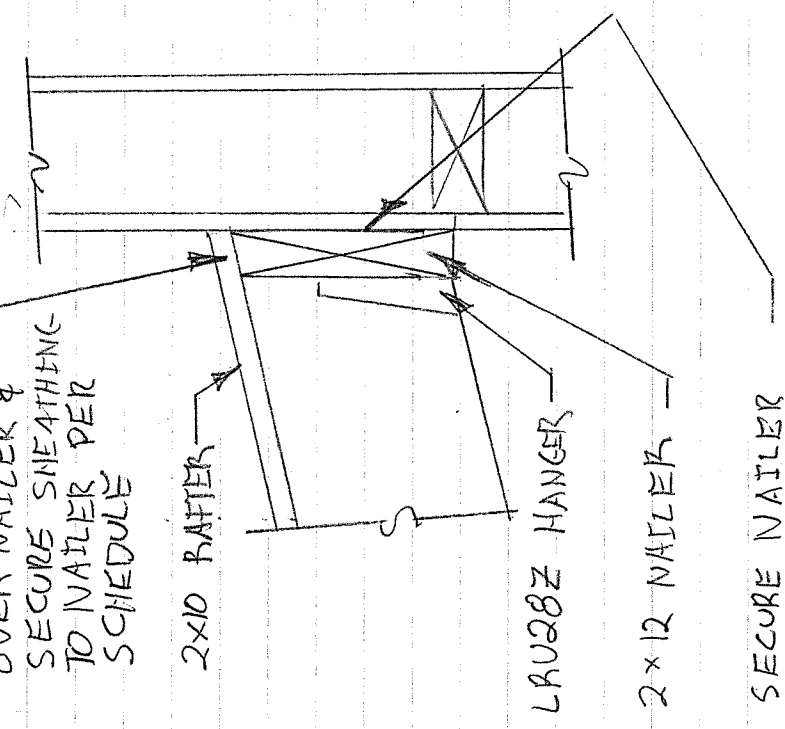
6x8 POST UP, 6x6 DN.
 HDU5-SDS2.5 & 5/8" Ø 5 BOLT 7" EMBED
 (15F LEVEL POST TO FOUNDATION WALL,
 TYP. BOTH ENDS OF WALL)

SEC. A-A
 DETAIL #4

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BJ-S-1 SHEAR WALL

RIP NAILER AS
 REQ'D TO RUN
 ROOF SHEATHING
 OVER NAILER &
 SECURE SHEATHING
 TO NAILER PER
 SCHEDULE



2x10 BATTER

LRU28Z HANGER

2x12 NAILER

SECURE NAILER
 TO STUDS OR HDR
 WITH (3) SDS 1/4-4 1/2
 SCREWS @ 16" O.C.

(SCREW SPACING IN A ROW = 3"
 1 1/2" MIN. EDGE DISTANCE)

DETAIL 3

SHEAR WALL BS-S-2

- PERFORATED SHEAR WALL

$H = 16'$

$L.O.A. = 16'$

LENGTH OF PERF. = 2'-6"

HEIGHT OF PERF. = 7'-6"

$\% \text{ FULL HEIGHT SHEATHING} = (16' - 2'-6") / 16' = 84\%$

MAX. UNRES. REDUCTN $\approx H/2$

ADJUSTMENT FACTOR = .91

- DBL SIDED 5/8" CWB Cd COOLER @ 4" O.C.

$145 \times .91 \times 9.2 \times 2 = 243 \text{ \#/Ft, O.K.}$

$R = \frac{Vh}{C_o \Sigma L_i}$

$V = 175 \text{ \#} \times 16' = 2,800 \text{ \#}$

$h = 16'$

$C_o = .91$

$\Sigma L_i = 16' - 2'-6" = 13'-6"$

$R = \frac{2,800 \text{ k} \cdot \text{p} \times 16}{.91 \times 13'-6"} = 3.6 \text{ KIP (DUE TO MOMENT)}$

REV. 1, ADD 2.5 KIP FROM D3 TO RELEASE LOAD ON BF

$V = 2.8 \text{ KIP} + 2.5 \text{ KIP} = 5.3 \text{ KIP}$
 $\frac{5.3 \text{ KIP}}{16} = 340 \text{ PLF}$

- USE 7/16" STR. 1 w/ 8d NAILS @ 4" O.C.

$CAP = 480 \text{ \#} \times .91 = 437 \text{ \#}$
 $437 \text{ \#} > 340 \text{ PLF O.K.}$

$V = 340 \text{ \#} \times 16 = 5,300 \text{ \#}$

$R = \frac{5.3 \times 16}{.91 \times 13.5} = 6.9 \text{ KIP}$

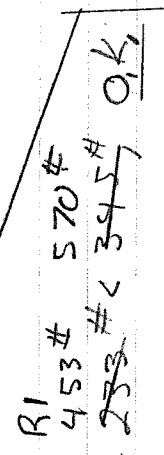
SHEAR WALL B5-S-2 CONT'D

UPLIFT FROM ROOF;
~~HZ7 STRAP~~ H10S R1

$P_{up} = (43.8 \text{ PSF} - 15 \text{ PSF} \times 1.6) \times 6' \times \frac{16}{12} = 278 \#$

845# > 278# O.K., $\frac{340\#}{175} \times \frac{16}{12} = 253\# < 345\#$ O.K.

REV. 1 UPLIFT AT B5-S-1
 DESIGN CON. FOR LAT. LOAD
 ONLY



UPLIFT AT BOTTOM OF WALL, TO ADD TO ANCHORS (MWFRS)

$(21.1 - 15 \times 1.6) - (16' \times 10 \text{ PSF} \times 1.6) = 83\#$
 UPLIFT AT B5-S-1 R1 $86\#$ R1

UPLIFT REQ'D AT BOTTOM OF WALL BY PERF. SHEAR WALL METHOD:

$V = 175\# - 340\# = 92\# / Ft$
 $V_{net} = 175\# - 96\# = 244\# / Ft$

INCREASE SOLE PLATE TO SOFT NAILING

FROM 3 @ 16" O.C. TO 3 @ 6" O.C.

ADD. NAILS = $3 \times 2 - 3 \times \frac{12}{16} = 307\# > 244\#$ O.K.

ANCHORS, FTA7

6.9 ~~3.6~~ KIP, USE ~~ASTF48~~ CAP. = ~~3640~~ > 3600, O.K.

USE 17' 16d NAILS OR 21' 10d NAILS

USE 7' 7/8" THROUGH BOLTS

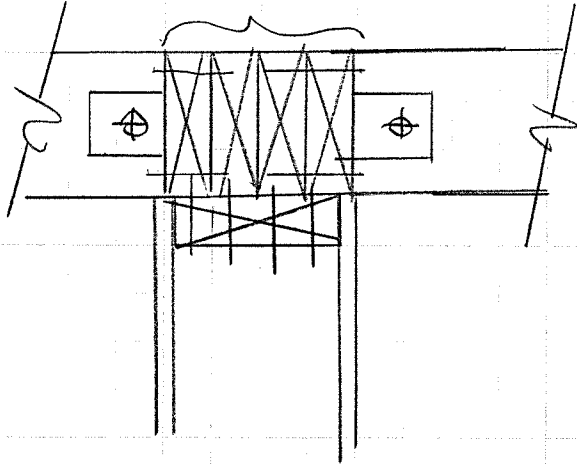
R1

R1

SHEAR WALL BJ-S-2 CONT'D REV.1

THERE IS A WINDOW UNDER BJ-S-2, THEREFORE UPLIFT PATH MUST BE REDESIGNED,

PA = 6.9 KEP



1) LAST STUD TO BI WALL

USE SDS SCREWS 1/4" x 3 1/2"
 CAP. = 245# / SCREW,
 6900# / 245# ≈ 28 SCREWS
 CEILING HEIGHT ≈ 10'
 2 SCREWS @ 8" O.C. = 2 x 10 x 12/8 = 30

2) STUD PAIRS IN BI

P = 6.9 KEP / 2 = 3450#
 N = 3450# / 245# = 15 SCREWS
 USE 2 ROWS @ 16" O.C., 2 x 10 x 12/16 = 15. O.K.

3) HOLD DOWNS (2)

MIN. CAP. = 3450#, USE HDUS-JDS25
 CAP. = 4100#, > 3450#, O.K.

4) CHECK HEADER SIZE PER B.C. CALC.

L = 11' 6.9 KEP



- PER SHEET, (3) 1 3/4" x 1 1/4" LVL - O.K.

5) HDR TO JACK STUD, 3450#
 MISC 4883, CAP. = 3420# ≈ 3450#, O.K.

6) ANCHOR TO FOUND., 5/8" 5 BOLT CAP. = 3800, > 3450# O.K.

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SHEAR WALL B5-S-2 REV. 2

REV. 1, INCLUDED 2 KIP OF SHEAR FROM ROOF DIAGRAM D3, THIS IS NO LONGER REQUIRED AS D3 IS NOW INTEGRAL WITH D1 DUE TO REMOVAL OF THE 4' KNEEWALL AT COL. LINE B2. THE 2KIP LOAD CAN NO BE RE-DISTRIBUTED TO SHEAR WALLS BA, BG, B5, BM & BN. THESE WALLS HAVE EXCESS CAPACITY & CHANGE IN LOAD WILL BE SMALL.

ADDITIONAL LOAD REDUCTION ON ROOF DIAGRAM D4 CAN BE CONSIDERED BECAUSE THE BALCONY DIAGRAM WILL ABSORB SOME LOAD WHICH WOULD OTHERWISE HAVE BEEN CARRIED BY D4.

WALL HEIGHT CONTRIBUTING TO LOAD ON NEW BALCONY DIAGRAM:

$$5' + 3\frac{1}{4}' = 8'$$

$$P = 24.3 \text{ PSF}$$

$$W_{\text{BAL}} = 8' \times 24.3 \text{ PSF} = 194 \text{ PLF}$$

$$P = \frac{2}{3} \times 194 \text{ PLF} \times 6.3' = 78 \text{ KIP}$$

$$P_{\text{net}} = 2.6 \text{ KIP} - .8 \text{ KIP} = 1.8 \text{ KIP}$$

USE 4' LONG WALL ABOVE CLOSET

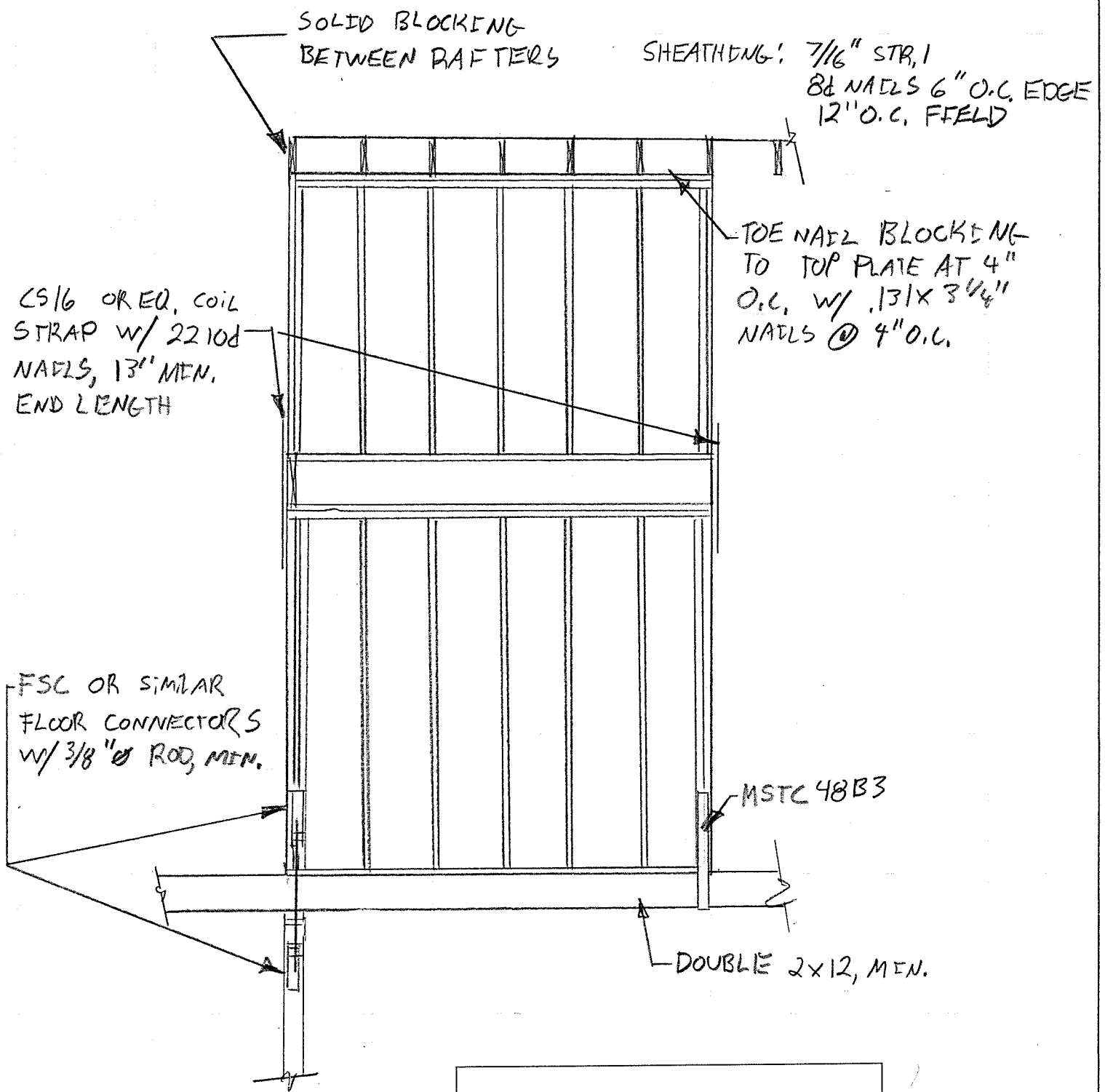
$$V = \frac{1.8 \text{ KIP}}{4'} = 450 \text{ \#/FE}$$

USE $\frac{7}{16}$ " STR. 1 RATED PLYWOOD
NAILED w/ 8D NAILS @ 4" o.c. EDGE
12" o.c. FIELD

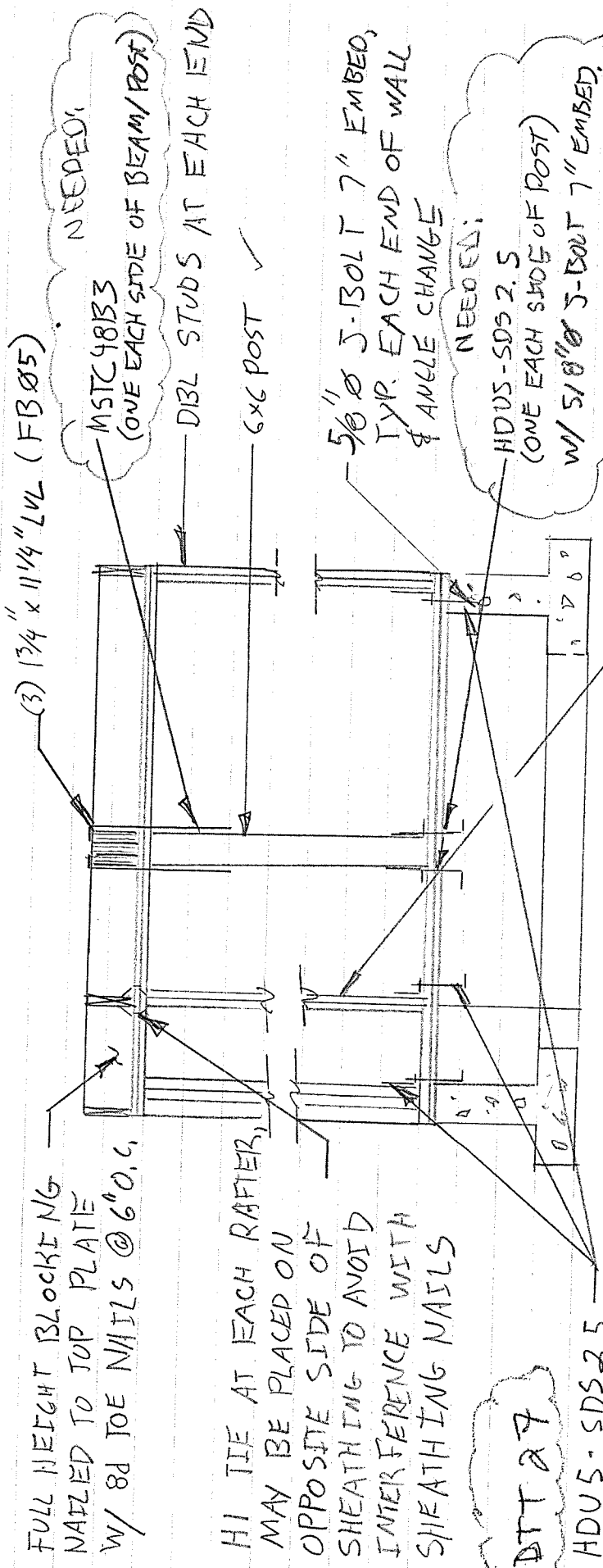
$$T/C = 1.8 \text{ KIP} \times 8' \div 4' = 3.6 \text{ KIP}$$

USE HDUS-SDS25, CAP, = 3.8 KIP

BS SOUTH #2 SHEAR WALL REV. 1
 (NOW LOCATED 2'-3" WEST OF COL. LINE BH)



SHEAR WALL BL
 (EAST WALL OWNERS TAG ROOM/OFFICE)
 LOOKING WEST



FULL HEIGHT BLOCKING
 NAILED TO TOP PLATE
 W/ 8d JOE NAILS @ 6" O.C.

HI TIE AT EACH RAFTER,
 MAY BE PLACED ON
 OPPOSITE SIDE OF
 SHEATHING TO AVOID
 INTERFERENCE WITH
 SHEATHING NAILS

DTT 27

HDU5-SDS 2,5
 TYP. EACH END & AT ANGLE CHANGE

SHEATHING: 7/16" STR, 1 RATED, 8d NAILS
 @ 4" O.C., 12" FIELD, 2x6 FRAMING

NOTE: RAFTERS & STUDS @ 16" O.C.
 (NOT ALL SHOWN)

is
 DENSE
 GLASS?
 OK?

BACK TO BACK STUDS AT
 22° CORNER RIP 1 AS
 REQ'D TO PROVIDE NAILING
 SURFACE FOR SHEATHING
 NAILS STUDS TOGETHER
 W/ (3) 16d NAILS @ 12" O.C.
 (TYP. END & ANGLE DBL STUDS)

NEEDED:
 HDU5-SDS 2,5
 (ONE EACH SIDE OF POST)
 W/ 5/8" J-BOLT 7" EMBED.

NEEDED:
 MSTC 48B3
 (ONE EACH SIDE OF BEAM/POST)
 DBL STUDS AT EACH END
 6x6 POST ✓

BL SOUTH (REV. 1)
 1ST FLOOR SHEAR WALL
 (LOOKING WEST)
 (EAST WALL OF OWNERS TAG ROOM/OFFICE)

NEW (3) 3/4" x 9 1/4" LVL FOR
 2ND FLOOR SHEAR WALL
 NEAR BL

FULL HEIGHT BLOCKING-
 NATED TO TOP PLATE
 W/ 8D TOE NAILS @ 6" O.C.

H1 TIE AT EACH RAFTER
 MAY BE PLACED ON
 OPPOSITE SIDE OF SHEATHING
 TO AVOID INTERFERENCE W/
 SHEATHING NAILS

HDUS-SDS2.5
 TYP. EACH END &
 AT ANGLE CHANGE

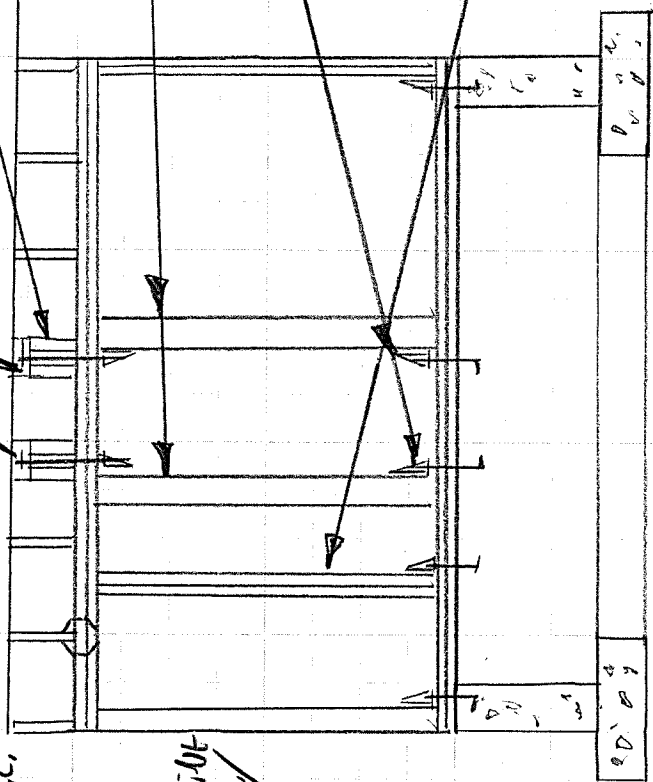
SHEATHING: 7/16" STR. 1 PLY, 8D
 NAILS @ 4" O.C. EDGE, 12" O.C. FIELD
 2x6 FRAMING

HDUS-SDS2.5 HOLD DOWN
 (SEE DETAIL)

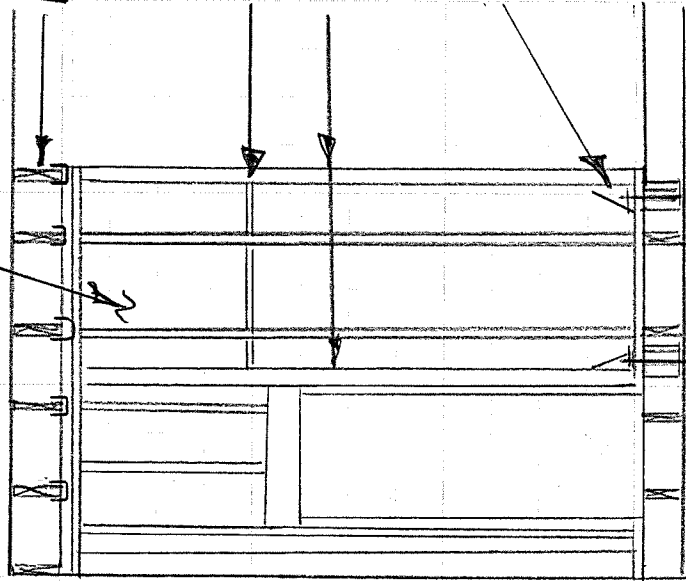
4x4 POST (MIN.)

HDUS-SDS2.5 HOLD DOWN
 W/ 5/8" Ø FISSY GR. 36
 SET-XP W/ 9" EMBEDMENT

BACK TO BACK STUDS
 AT 22° CORNER RIP
 AS REQ'D TO PROVIDE
 MILLING SURFACE FOR
 SHEATHING, NAILS STUDS
 TOGETHER W/ (3) 16D NAILS
 @ 12" O.C. (TYP. END & ANGLE
 DOUBLE STUDS



7/16" STR. 1 SHEATHING
NAILS W/ 8d NAILS 4" O.C. EDGE
12" O.C. FIELD BLOCKED AT ALL EDGES



H10A HURICANE TEE, RAFTER
TO TOP PLATE

BLOCKING AT PANEL EDGES

4x4 (MIN. POST)

HD7B HOLD DOWN TO FLOOR BEAMS
W/ 7/8" ROD & 5/8" X 5/8" X 1/4" PLATE
WASHER, SEE DETAIL

NEW 2ND FLOOR SHEAR WALL
NEAR BL (LOOKING WEST)

4x4 POST (MIN.)

HD TB HOLD DOWN

SLEEPER

(3) 1 3/4" x 9 1/4" LVL

5 1/4" x 5 1/4" x 1/4" PLATE WASHER

2ND FLOOR SHEAR WALL NEAR BL TO FLOOR BEAM CONN.

OMIT SLEEPER IN THIS AREA TO LEAVE GAP FOR BOLT/WASHER

SUB FLOOR

5 1/4" x 5 1/4" x 1/4" PLATE WAS.

(3) 1 3/4" x 9 1/4" LVL

FLOOR BEAM CON. TO 1ST FLOOR SHEAR WALL BM

VPopp Inc.
 75 Gardner St. Hingham MA 02043
 Project: WildStar Farm
 Date: 09/30/18
 Rev. 1
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SHEAR WALL BL NOTES

UPLIFT OF 5.3 KIP FROM FBOS,

USE (2) MSTC48B35, CAP. = $3875 \times 2 = 7,750 > 5300$ O.K.

(2) HDU5-2.5, CAP. = $4065 \times 2 = 8130 > 5300$ O.K.