

**Structural Calculations for:**

# **Zhang Residence Remodel and Addition**

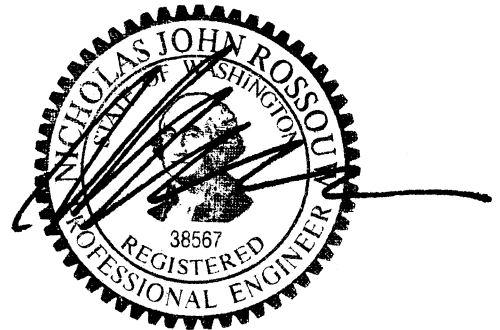
**6612 SE 24th Street  
Mercer Island Washington**

**Client: Martin Koenigs Architect**

**7 December 2020**

**Index:**

<b>DC-</b>	<b>Design Criteria</b>
<b>KP-</b>	<b>Key Plans</b>
<b>LT-</b>	<b>Lateral Analysis</b>
<b>RF-</b>	<b>Roof Framing</b>
<b>UF-</b>	<b>Upper Floor Framing</b>
<b>MF-</b>	<b>Main Floor Framing &amp; Foundations</b>



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LOCATION

6612 SE 24TH STREET  
MERCER ISLAND WASHINGTON

SEISMIC (SEAOC)

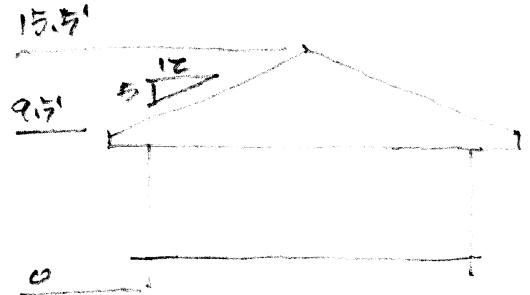
SEE DC-2

WIND (MERCER ISLAND WIND MAP)

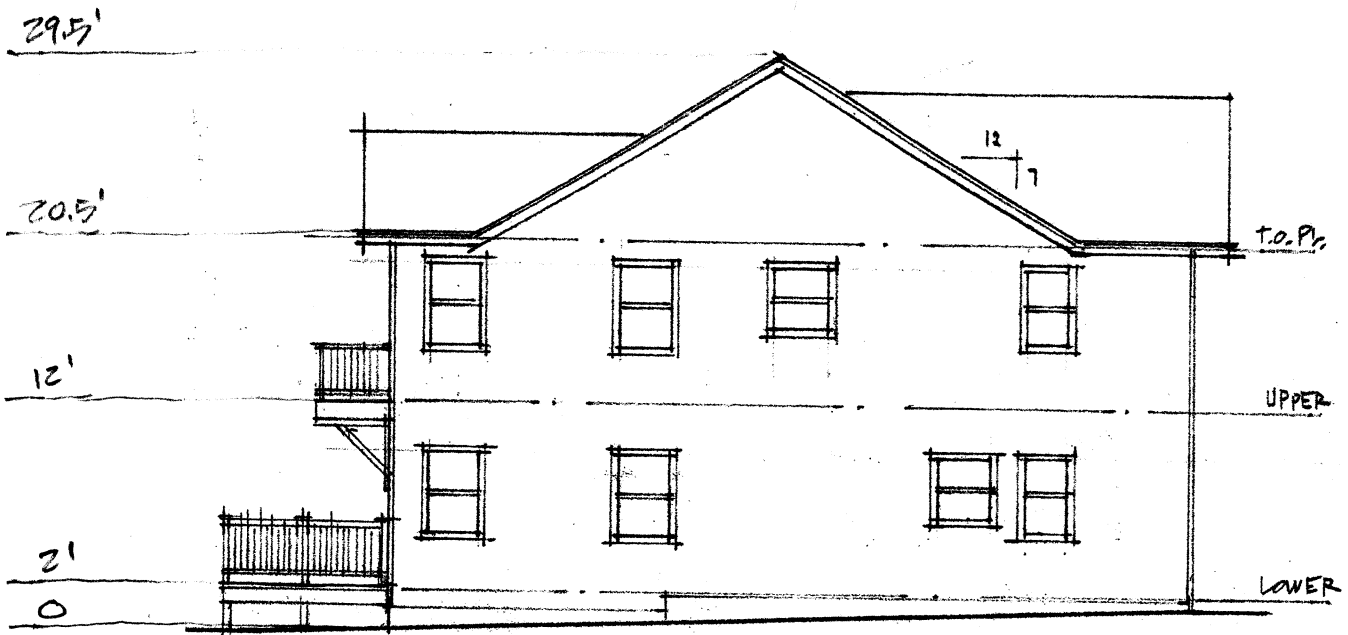
85 MPH (ASD LOADING)

EXPOSURE C

Kz = 1.60



GARAGE/KITCHEN WING



WEST ELEVATION

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project: ZARANG RESIDENCE

date: 11-28-20

client: MARTIN KOENIGS

proj #: 2019-108

sheet: DC-1

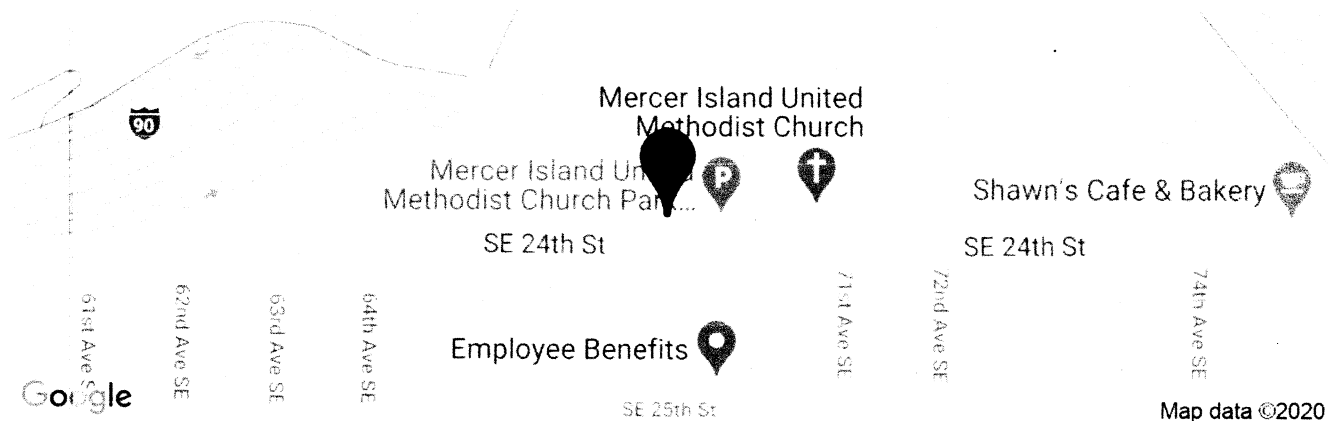


OSHPD

# Zhang Residence

6612 SE 24th St, Mercer Island, WA 98040, USA

Latitude, Longitude: 47.5893589999999, -122.245956



**Date** 11/28/2020, 12:53:56 PM  
**Design Code Reference Document** ASCE7-10  
**Risk Category** II  
**Site Class** D - Stiff Soil

Type	Value	Description
S <sub>S</sub>	1.372	MCE <sub>R</sub> ground motion. (for 0.2 second period)
S <sub>1</sub>	0.529	MCE <sub>R</sub> ground motion. (for 1.0s period)
S <sub>MS</sub>	1.372	Site-modified spectral acceleration value
S <sub>M1</sub>	0.793	Site-modified spectral acceleration value
S <sub>DS</sub>	0.915	Numeric seismic design value at 0.2 second SA
S <sub>D1</sub>	0.529	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F <sub>a</sub>	1	Site amplification factor at 0.2 second
F <sub>v</sub>	1.5	Site amplification factor at 1.0 second
PGA	0.564	MCE <sub>G</sub> peak ground acceleration
F <sub>PGA</sub>	1	Site amplification factor at PGA
PGA <sub>M</sub>	0.564	Site modified peak ground acceleration
T <sub>L</sub>	6	Long-period transition period in seconds
S <sub>sRT</sub>	1.372	Probabilistic risk-targeted ground motion. (0.2 second)
S <sub>sUH</sub>	1.424	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
S <sub>sD</sub>	2.438	Factored deterministic acceleration value. (0.2 second)
S <sub>1RT</sub>	0.529	Probabilistic risk-targeted ground motion. (1.0 second)
S <sub>1UH</sub>	0.564	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S <sub>1D</sub>	0.999	Factored deterministic acceleration value. (1.0 second)
PGAd	0.928	Factored deterministic acceleration value. (Peak Ground Acceleration)
C <sub>RS</sub>	0.964	Mapped value of the risk coefficient at short periods
C <sub>R1</sub>	0.937	Mapped value of the risk coefficient at a period of 1 s

PC-2

## seismic loads (asce 7-10)

equiv lateral force procedure

risk factor II 1.5-1  
I  
imp. factor 1 table 1.5-2  
site class D table 20.3-1  
R = 6.5 table 12.2-1

$S_s = 1.372$  usgs maps  
 $S_1 = 0.529$  usgs maps  
 $F_a = 1$  table 11.4-1  
 $F_v = 1.5$  table 11.4-2  
 $S_{DS} = 0.915$   
 $S_{D1} = 0.529$

$C_s = 0.14077$  eqn 12.8-2  
 $C_{sASD} = 0.09854$

## vertical design loads

criteria

asce 7-10

ibc 2015

### dead loads

roofing	3 psf	flooring	3 psf
1/2" plywood	1.5 psf	3/4" plywood	2.3 psf
trusses	6 psf	joists/beams	4 psf
insulation	1 psf	misc/mech	1 psf
misc/mech	1 psf		
5/8" gwb	3.1 psf		
	<hr/>		<hr/>
	15.6 psf		10.3 psf
use	20 psf	use	15 psf

### live loads

roof (snow)	25 psf		
floor (residential)	40 psf	deck (residential)	60 psf

### soil bearing

2000 psf assumed

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project:	zhang residence	date:	28/11/2020
	addition	project #:	2019-108
		design:	nic
	martin koenigs	sheet:	dc-3

# wind loads (asce 7-10)

MWFRS part 1

exposure C  
 V= 85 mph  
 $K_d = 0.85$  table 26.6-1  
 risk factor 1 table 1.5-1  
 $G = 0.85$  26.9.1

$K_{zt} = (1 + K_1 K_2 K_3)^2 =$	<b>1.60</b>
----------------------------------	-------------

**7:12 roof**  
 roof angle 30.26 degrees  
 ground to top of roof 29.5 ft  
 bottom of roof to top of roof 9 ft  
 (mean roof height) h= 25 ft

**5:12 roof**  
 roof angle 22.62 degrees  
 ground to top of roof 15.5 ft  
 bottom of roof to top of roof 6 ft  
 (mean roof height) h= 12.5 ft

pressure coefficients  
 from figure 6-6:

bldg. face	$C_p$
windward wall	0.8
leeward wall	-0.5
windward roof	0.3
leeward roof	-0.6

*5:12 & 7:12 roof* {

\*note:  $C_p$  values are conservative  
 worst case values

## pressures

Ht	$K_z$	$q_z$	$P_{ww\ walls}$	$P_{lw\ walls}$	$P_{walls\ (psf)}$
0-15	0.85	21.38	14.54	10.48	<b>25.02</b>
15-20	0.9	22.64	15.39	10.48	<b>25.87</b>
20-25	0.94	23.65	16.08	10.48	<b>26.56</b>
25-30	0.98	24.65	16.76	10.48	<b>27.24</b>
30-40	1.04	26.16	17.79	10.48	<b>28.27</b>

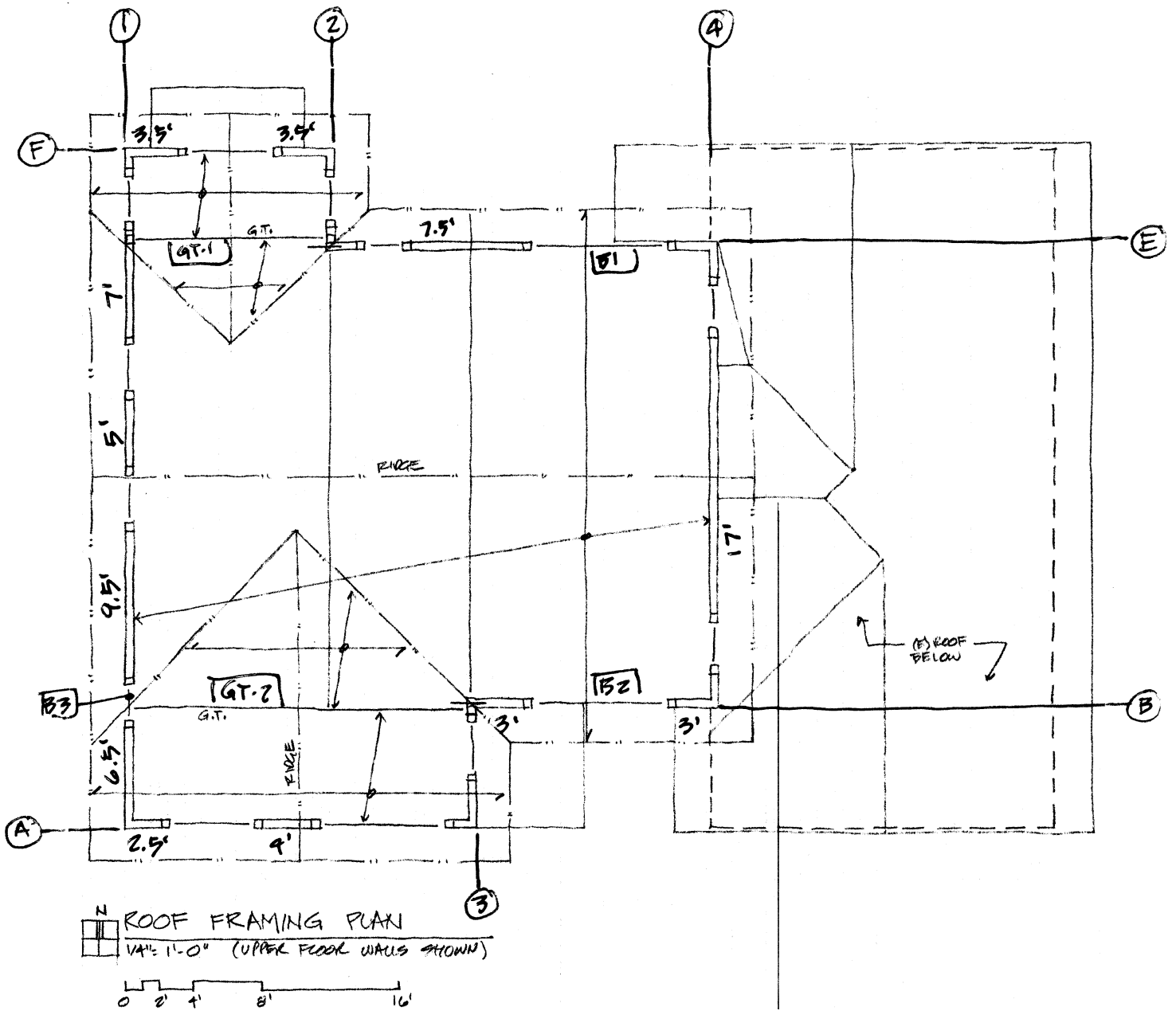
$P_{roof\ (psf)}$	
<b>18.86</b>	7:12 roof

$P_{roof\ (psf)}$	
<b>16.36</b>	5:12 roof

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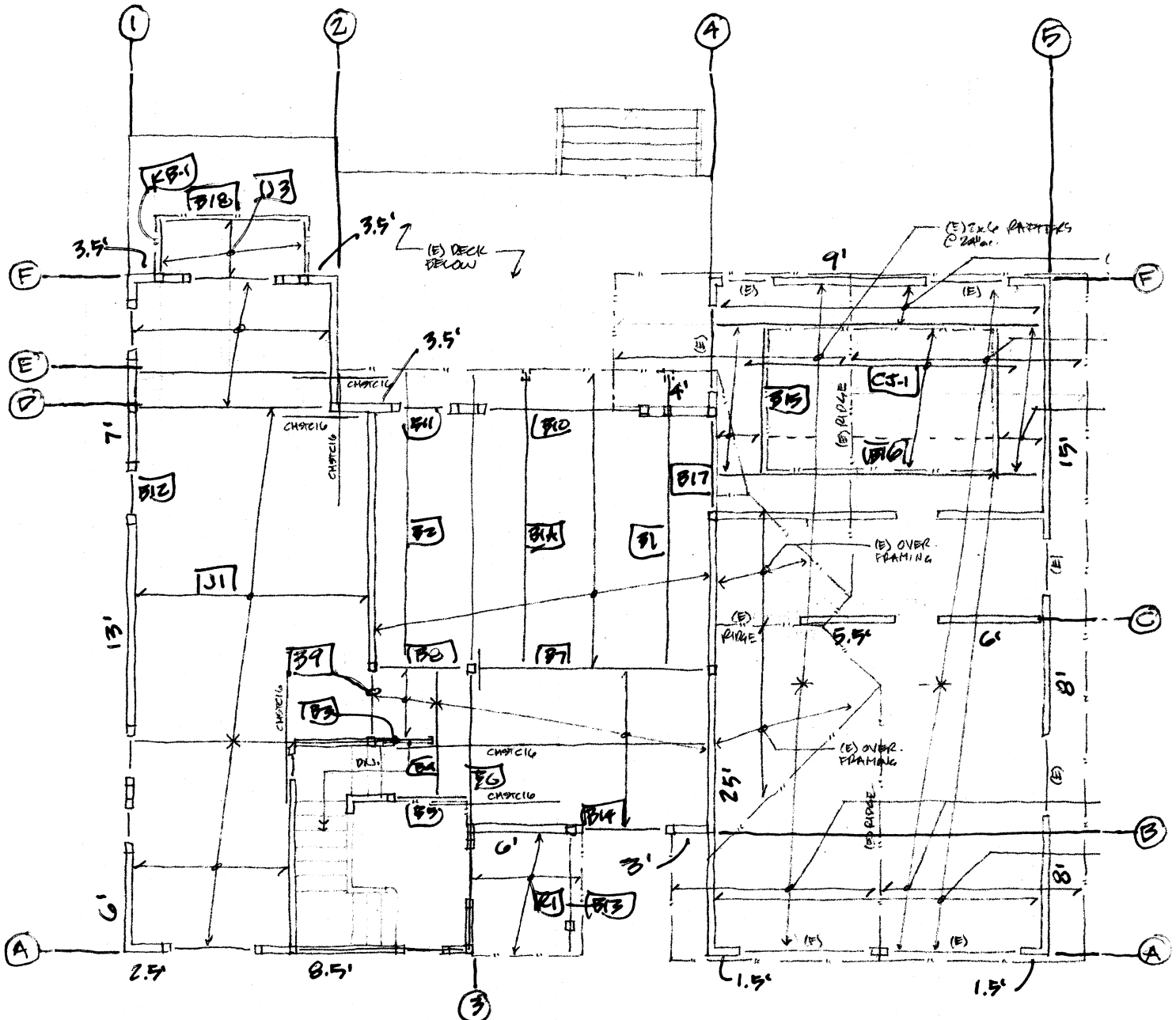
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 project #: 2019-108  
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 sheet: **dc-4**


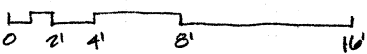


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 client: MARTIN KJENIGS

date: 12-2-20  
 proj #: 2019-108  
 sheet: KP-1

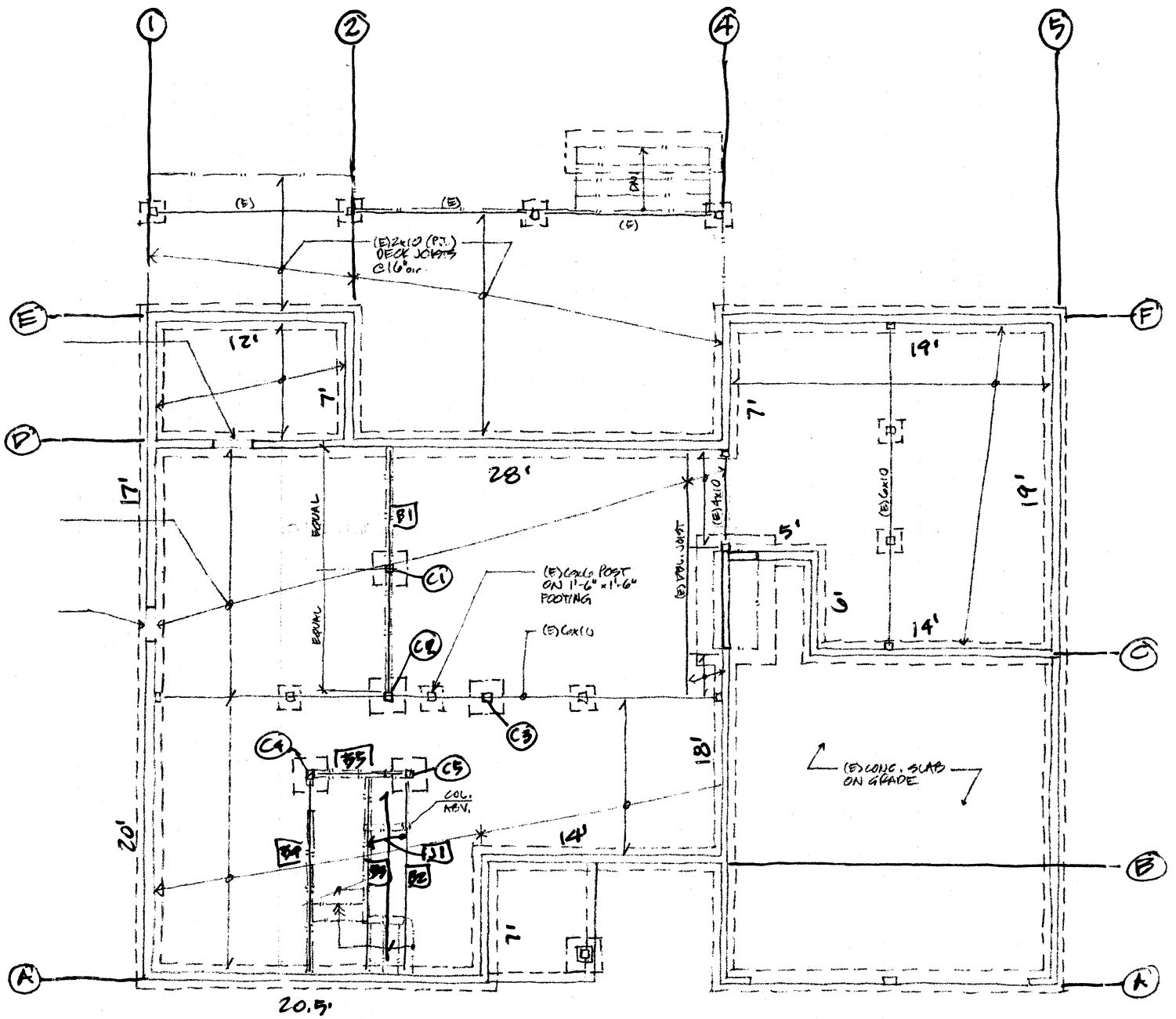



 UPPER FLOOR & LOW ROOF FRAMING PLAN  
 1/4" = 1'-0"  
 (MAIN FLOOR WALLS SHOWN)  


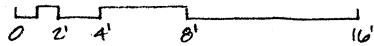
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 sheet: KP-2




**MAIN FLOOR FRAMING & FOUNDATION PLAN**  
 1/4" = 1'-0"



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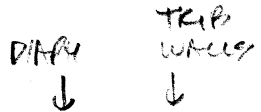


**LATERAL**

SEE DC - FOR  
 STATIC LOAD CRITERIA  
 SEE KP - FOR  
 KEY PLANS

**SEISMIC**

UPPER ROOF



$A = 1462 \text{ } \phi$      $DL = 20 + 8 = 28 \text{ PSF}$   
 $\therefore W_{UR} = 40.9 \rightarrow \underline{41k}$

UPPER FLOOR /  
 LOW ROOF

$A_{ROOF} = 976 \text{ } \phi$      $DL = 20 + 8 = 28 \text{ PSF}$   
 $A_{FLOOR} = 1144 \text{ } \phi$      $DL = 15 + 16 = 31 \text{ PSF}$   
 $A_{DECK} = 32 \text{ } \phi$      $DL = 10 \text{ PSF}$   
 $\therefore W_{UF} = 63.1 \rightarrow \underline{64k}$

MAIN FLOOR

$A_{FLOOR} = 1464 \text{ } \phi$      $DL = 15 + 12 = 27 \text{ PSF}$   
 $A_{DECK} = 435 \text{ } \phi$      $DL = 10 \text{ PSF}$   
 $\therefore W_{MF} = 43.8 \rightarrow \underline{44k}$

$\Sigma W = 149k$   
 $\therefore E (ASD) = \underline{14.68k}$

REDISTRIBUTION

LEV (X)	Hx (FT.)	Wx (K)	Hx.Wx (FT.K)	Vx (ASD) (K)
R	25	41	1025	8.0
U	12	64	768	5.99
M	2	44	88	0.69
$\Sigma$		149	1881	14.68

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**WIND (ASD LOADS)**

NORTH-SOUTH

EAST-WEST

UPPER  
 ROOF

$\bar{W}_{0HG} = 183 \text{ plf}$   
 $\bar{W}_{1-3} = 318 \text{ plf}$   
 $\bar{W}_{3-4} = 230 \text{ plf}$

$\bar{W}_{N0HG} = 145 \text{ plf}$   
 $\bar{W}_{A-B} = 242 \text{ plf}$   
 $\bar{W}_{B-E} = 267 \text{ plf}$   
 $\bar{W}_{E-F} = 204 \text{ plf}$   
 $\bar{W}_{F0HG} = 108 \text{ plf}$

$W_{ROOF} = \underline{11.17k}$

$W_{ROOF} = \underline{11.07k}$

UPPER  
 FLOOR

$\bar{W}_{1-4} = 252 \text{ plf}$   
 $\bar{W}_{4-5} = 206 \text{ plf}$   
 $\bar{W}_{0HG} = 25 \text{ plf}$

$\bar{W}_{A-B} = 252 \text{ plf}$  } D1  
 $\bar{W}_{B-D} = 155 \text{ plf}$  }  
 $\bar{W}_{F0HG} = 63 \text{ plf}$  }  
 $\bar{W}_{A-B} = 167 \text{ plf}$  } D2  
 $\bar{W}_{B-E} = 90 \text{ plf}$  }  
 $\bar{W}_{E-F} = 192 \text{ plf}$  }

$W_{UF} = \underline{12.80k}$

$W_{UF} = 7.34k$   
 $W_{UR} = 4.66k$   
 $\Sigma W_{UF} = \underline{12.0k}$

MAIN  
 FLOOR

$\bar{W}_{1-4} = 150 \text{ plf}$   
 $\bar{W}_{A-B} = 81 \text{ plf}$

$\bar{W}_{A-B} = 150 \text{ plf}$  } D1  
 $\bar{W}_{B-D} = 92 \text{ plf}$  }  
 $\bar{W}_{C-D} = 81 \text{ plf}$  } D2  
 $\bar{W}_{D-E} = 131 \text{ plf}$  }

$\Sigma W_{MF} = \underline{6.80k}$

$\Sigma W_{MF} = 4.48k$  D1  
 $\Sigma W_{MF} = 2.0k$  D2  
 $\Sigma W_{MF} = \underline{6.48k}$

$\Sigma W_{N-S} = \underline{30.83k}$

$\Sigma W_{E-W} = \underline{29.55k}$

project: ZHANG RESIDENCE

date: 11-28-20

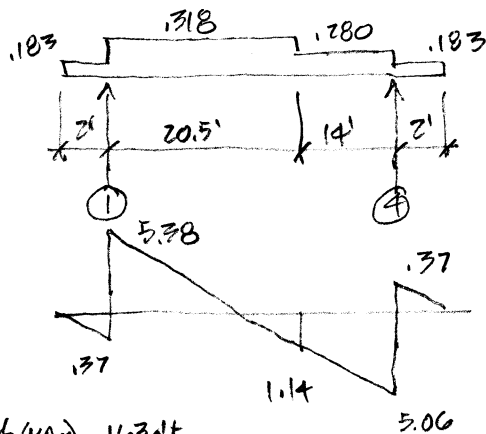
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sheet: LT-1

# DIAPHRAGMS

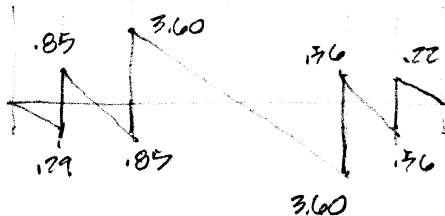
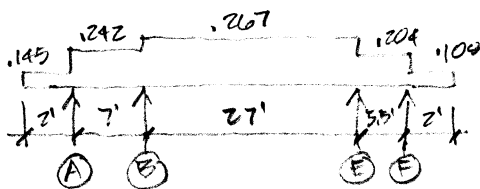
## UPPER ROOF



$v_{diaph}(MAX) = 163 \text{ plf}$

$M_{DIAPH} = 45.48 \text{ FT.K}$

$T=C(B-E) = 1.68 \text{ K}$  AT & TOP PLATES ✓



$v_{diaph}(MAX) = 100 \text{ plf}$

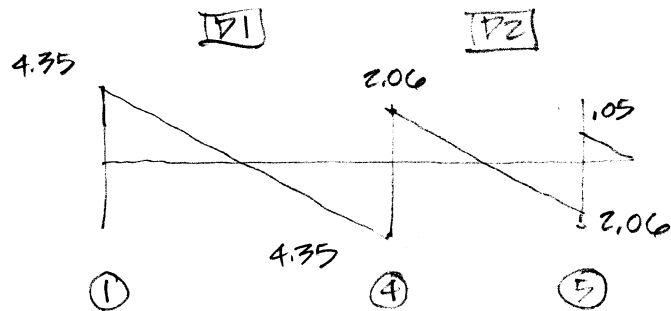
$M_{DIAPH} = 24.3 \text{ FT.K}$

$T=C(1-a) = .70 \text{ K}$  TOP PLATES ✓

ROOF 1/2" CDX W/ 8' @ 6" o.c.  
UNBLOCKED ON HEM FIVE  
CAPACITY =  $253 \times .93 = 235 \text{ plf}$

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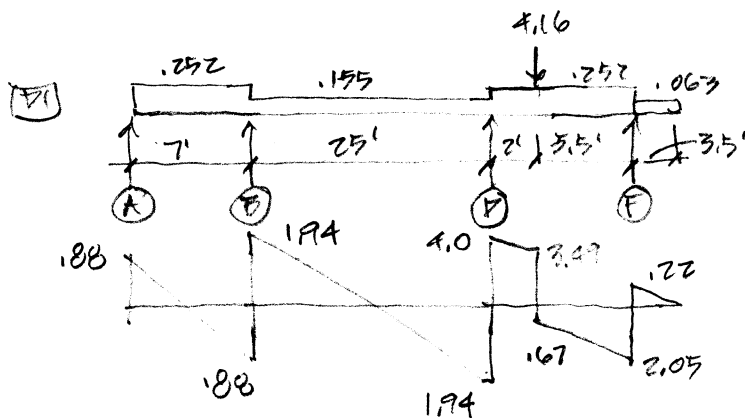
## UPPER FLOOR / LOW ROOF



$v_{diaph} = 161 \text{ plf}$   
(MAX)

$M_{DIAPH} = 37.5 \text{ FT.K}$

$T=C(E-B) = 1.71 \text{ K}$  ✓



$v_{diaph} @ A = 88 \text{ plf}$

$v_{diaph} @ B = 178 \text{ plf}$

$v_{diaph} @ D = 116 \text{ plf}$

$M_{DIAPH} B-D = 12.13 \text{ FT.K}$

$T=C(1-a) = .35 \text{ K}$  ✓

$M_{DIAPH} D-F = 7.48 \text{ FT.K}$

$T=C(1-b) = .62 \text{ K}$  ✓

$v_{diaph} @ F = 164 \text{ plf}$

### FLOOR

3/4" CDX W/ 8' @ 6" o.c.  
UNBLOCKED ON DE/L  
CAPACITY = 253 plf

CONT  
→

project: ZHANG RESIDENCE

date: 11-29-20

proj #: 2019-108

client: MARTIN KOENIGS

sheet: UT-2

# SHEAR WALLS

- ①  $V_{ROOF} = 5.75 k$   $Elw = 28'$   
 $v = 205 plf$  USE SW2  
 $F_{HD} = 2.15 - DL$  CS14
- $V_{UPPER} = 10.10 k$   $Elw = 26'$   
 $v = 388 plf$  SW3  
 $F_{HD} = 6.03 - DL$  HDU5-SFS2.5
- $V_{MAIN} = 12.69 k$   $Elw = 37'$   
 $v = 343 plf$  (E) 6" CONC  
 $\tau_c < 5 psi$  ✓  
2x-SIL PLATE W/URFP @ 48" o.c.

- ④  $V_{ROOF} = 5.43 k$   $Elw = 17'$   
 $v = 319 plf$  SW2  
 $F_{HD} = 3.5 - DL$  HDU4-SFS2.5 /  
MSTCAB B3
- $V_{UPPER} = 11.84 k$   $Elw = 25'$   
 $v = 474 plf$  SW4  
 $F_{HD} = 8.24 - DL$  HDU8-SFS2.5
- $V_{MAIN} = 15.24 k$   $Elw = 25'$   
 $- 3.32$  DIRECT TO CONC  
 $= 11.92 k$   
 $v = 477 plf$  (E) 6" CONC  
 $\tau_c = 6.6 psi$  ✓  
2x-SIL PLATE W/URFP @ 6'-0" o.c.  
2'-0" @ D1 CP2

- ⑤ C P2  $V_{LOW ROOF} = 1.92 k$   $Elw = 3'$   
(2)WSW 12x7  
 $F_{HD} = 3.55 k$   
 $WSW - AB78$   $9" EMBER$   
 $W = 27"$

- ⑤  $V_{LOW ROOF} = 2.11 k$   $Elw = 31'$   
 $v = 68 plf$  SW1  
 $F_{HD} = .54 - DL$  NO NET UPLIFT
- $V_{MAIN} = 3.22 k$   $Elw = 19'$   
 $- 1.02$  DIRECT TO CONC  
 $= 2.20 k$   
 $v = 116 plf$  (E) 6" CONC  
 $\tau_c = 1.6 psi$  ✓  
2x-SIL PLATE W/URFP @ 6'-0" o.c.

- ⑥  $V_{ROOF} = 1.14 k$   $Elw = 6.5'$   
 $v = 175 plf$  SW1  
 $F_{HD} = 1.93 - DL$  CS14
- $V_{UPPER} = 2.02 k$   $Elw = 11'$   
 $v = 189 plf$  USE SW2  
 $F_{HD} = 3.77 - DL$  HDU4-SFS2.5
- $V_{MAIN} = 2.55 k$   $Elw = 20.5'$   
 $v = 124 plf$  (E) 6" CONC  
 $\tau_c = 1.7 psi$  ✓  
2x-SIL PLATE W/URFP @ 6'-0" o.c.

- ⑦  $V_{ROOF} = 4.45 k$   $Elw = 6'$   
 $v = 742 plf$  SW5  
 $F_{HD} = 6.3 - DL$  CHST14
- $V_{UPPER} = 7.27 k$   $Elw = 9'$   
 $v = 808 plf$  SW5  
 $F_{HD} = 14.38 - DL$  HDU14-SFS2.5
- $V_{MAIN} = 8.95 k$   $Elw = 14'$   
 $v = 639 plf$  (E) 6" CONC  
 $\tau_c = 8.9 psi$  ✓  
2x-SIL PLATE W/URFP @ 24" o.c.

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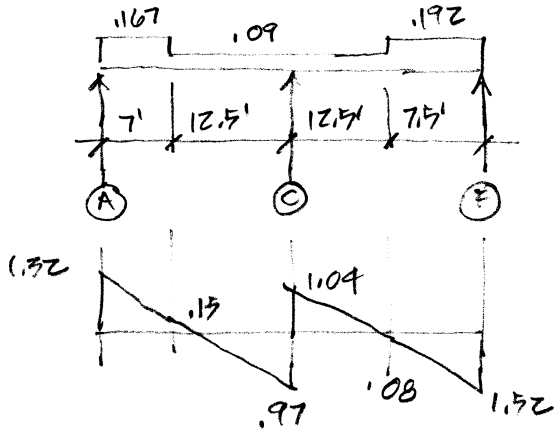
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sheet: LT-4

LOW FOOT

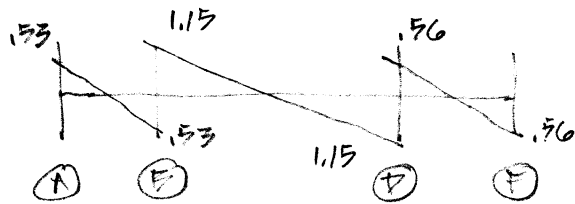
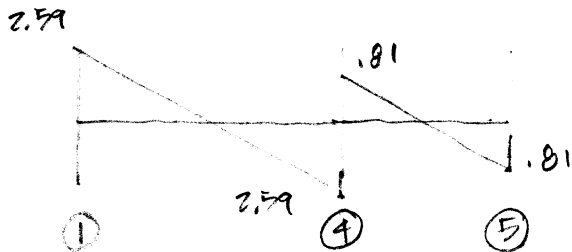
D2



$M_{MAX} = 6.03k$

$T = C(9-5) = .30k$  ✓

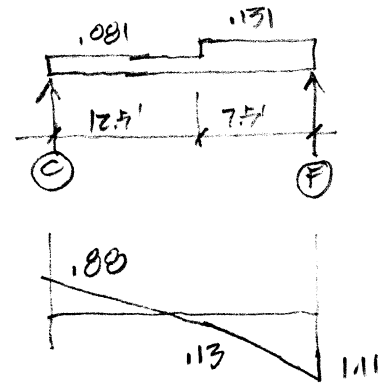
MAIN FLOOR



D1

MAIN FLOOR

D2



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SHEAR WALLS (CONT)

ⓐ V<sub>LOW ROOF</sub> = 2.01k. Elev = 11.5'  
v = 1.75 pft SW1  
F<sub>HD</sub> = 1.75 - DL HDU4-9092.5

V<sub>MAIN</sub> = 2.89k. Elev = 14'  
v = 2.06 pft (E) 6" CONC  
vc = 2.9 psi ✓  
2x - SILL PLATE W/ URPFC 6" Ø conc.

ⓑ V<sub>UPPER</sub> = 5.94k. Elev = 7.5'  
v = 7.92 pft SW5  
F<sub>HD</sub> = 7.92 - DL HDU8-9097.5

V<sub>MAIN</sub> = 9.34k. Elev = 28'  
v = 3.34 pft (E) 6" CONC.  
vc = 4.6 psi ✓  
2x - SILL PLATE W/ URPFC 48" Ø.

ⓒ V<sub>ROOF</sub> = 4.16k. Elev = 7.5'  
v = 5.55 pft SW4  
F<sub>HD</sub> = 4.99 - DL HDU5-9092.5  
TO BEAM.

ⓓ V<sub>ROOF</sub> = 1.78k. Elev = 7'  
v = 1.11 pft SW1  
F<sub>HD</sub> = 1.72 - DL CS14

V<sub>UPPER</sub> = 3.05k. Elev = 7'  
v = 4.35 pft SW3  
F<sub>HD</sub> = 5.58 - DL HDU5-9092.5

V<sub>MAIN</sub> = 3.61k. Elev = 12'  
v = 3.00 pft (E) 6" CONC  
vc = 4.2 psi ✓  
2x - SILL PLATE W/ URPFC 48" Ø.

ⓔ C D2

V<sub>LOW ROOF</sub> = 1.52k. Elev = 9'  
v = 1.69 pft SW1  
F<sub>HD</sub> = 1.86 - DL HDU4-9097.5

V<sub>MAIN</sub> = 2.63k. Elev = 19'  
v = 1.38 pft (E) 6" CONC  
vc = 1.9 psi ✓  
2x - SILL PLATE W/ URPFC 6" Ø.

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proj #: 2019-108

sheet: UT-5

**ROOF FRAMING**

(SEE KP-1)

**TRUSSES**

DESIGN BY SUPPLIER

**GIRDER TRUSSES  
(FOR PEAKS)**

**GT-1**  $l = 12'$   
 $w = 161 \text{ kft}$   
 $R = 3.66 \text{ k}$   
(2) 2X6 COL

**GT-2**  $l = 20'$   
 $w = 161$   
 $R = 6.1 \text{ k}$   
(4) 2X4 COL.

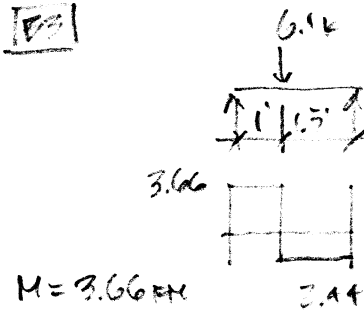
**PEAKS**

**E1**  $l = 8.5'$   $M = 6.32 \text{ kft}$   
 $w = .70 \text{ kft}$   $V = 2.98 \text{ k}$

3 1/2 X 9 1/2 PSL

AMC 4/680

**E2**  $l = 8.5'$   
 $w = .70$   
3 1/2 X 9 1/2 PSL



$M = 3.66 \text{ kft}$   
 $V = 3.6 \text{ k}$   
4X10

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date: 12-3-20

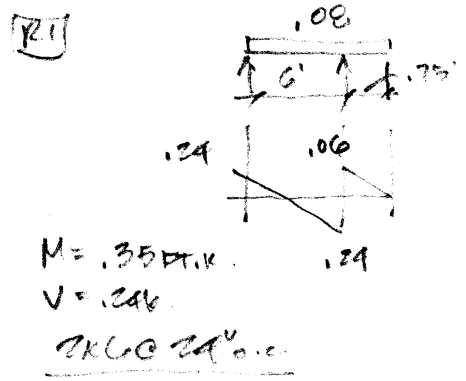
proj #: 2019-108

client: MARTIN KOENIGS

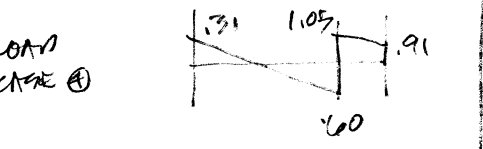
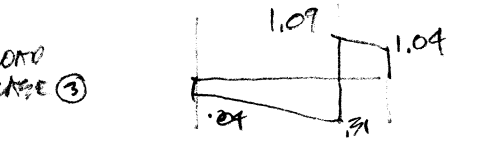
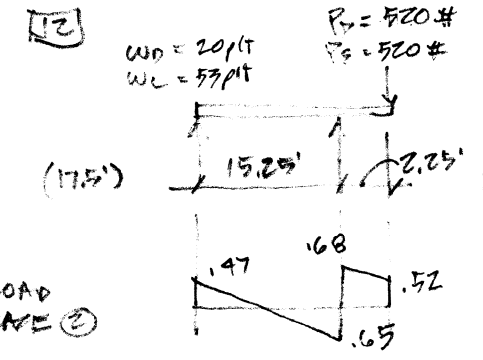
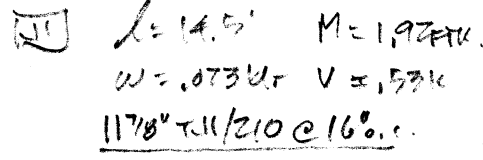
sheet: RF-1

**UPPER FLOOR / LOW ROOF FRAMING**  
(SEE KP. 2)

**RAFTERS 24" o.c.**



**JOISTS 16" o.c.**



- J2 CONT**
- ②  $M+ = 1.51 \text{ FT.K}$   $M- = 1.35 \text{ FT.K}$   
 $V = 1.68 \text{ K}$
  - ③  $M+ = \phi$   $M- = 2.40 \text{ FT.K}$   
 $V = 1.09 \text{ K}$
  - ④  $M+ = 2.81 \text{ FT.K}$   $M- = 2.21 \text{ FT.K}$   
 $V = 1.05 \text{ K}$

11 7/8" TJI 210 OK FOR STRUTTING  
ADD 1'-0" STIFFENERS @ JOINT PER TRUSS JOINT

- J3**  $l = 3.5'$   $V = .15 \text{ FT.K}$   
 $w = 100 \text{ P/L}$   $V =$
- 2x - MP TO SCOPE  
9/4" MIN. DEPTH

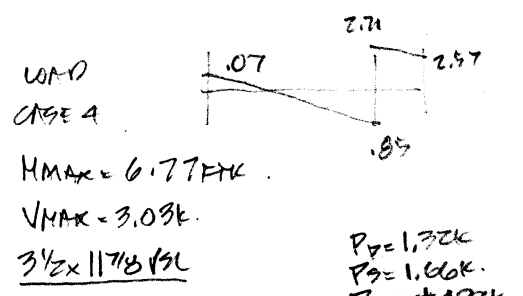
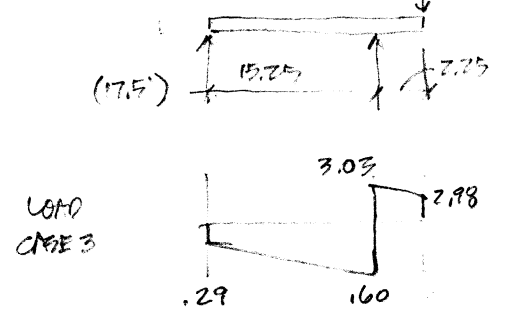
- CJ-1**  $l = 15'$   
2x 10 @ 24" o.c.
- COMPAR 718
- $l = 19.5'$   $M = 3.8 \text{ FT.K}$   
 $w = 80 \text{ P/L}$   $h = 4.5'$   
 $T-C = 845 \#$
- (5) 16d FA ENP.

**BEAMS**

**B1**

$w_D = 20 \text{ P/L}$   
 $w_L = 53 \text{ P/L}$

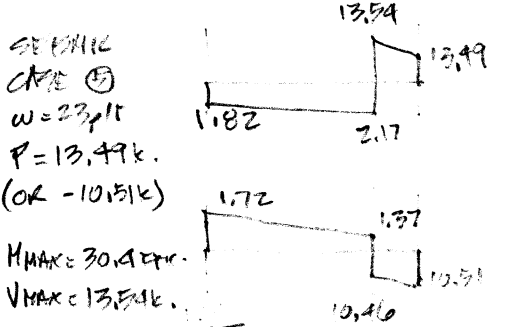
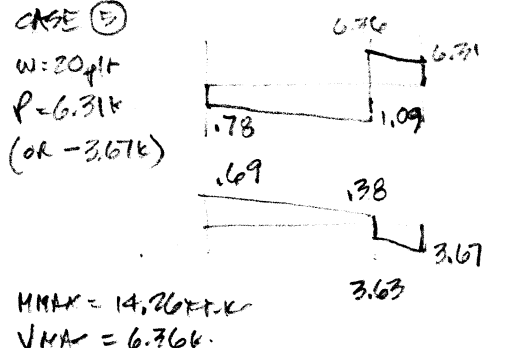
$P_D = 1.32 \text{ K}$   
 $P_S = 1.66 \text{ K}$



**B1A**

$w_D = 20 \text{ P/L}$   
 $w_L = 53 \text{ P/L}$

$P_D = 1.32 \text{ K}$   
 $P_S = 1.66 \text{ K}$



CONT

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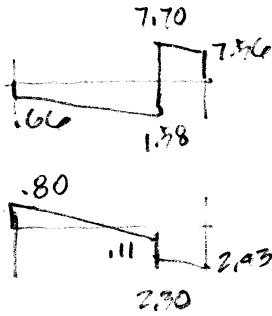
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date: 12-3-20  
proj #: 2019-108  
sheet: UF-1

**B1A** CONT.

WIND  
CASE 6b  
w = 60 pft

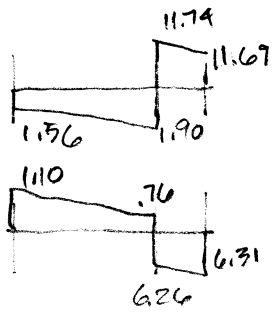
P = 7.56k  
(OR - 2.43k)



M<sub>MAX</sub> = 17.2 k-ft  
V<sub>MAX</sub> = 7.70 k

SEISMIC  
CASE 6b  
w = 22 pft

P = 11.69k  
(OR - 6.31k)

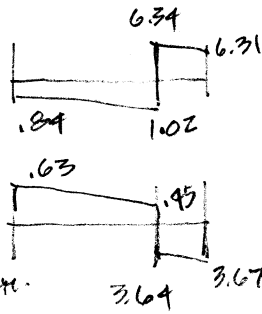


M<sub>MAX</sub> = 26.36 k-ft  
V<sub>MAX</sub> = 11.74 k

WIND

CASE 7

w = 12 pft  
P = 6.31k  
(- 3.67k)

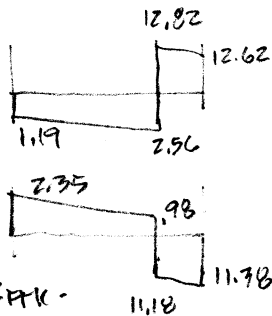


M<sub>MAX</sub> = 14.23 k-ft  
V<sub>MAX</sub> = 6.34 k

SEISMIC

CASE 8

w = 9 pft  
P = 12.62k  
(OR - 11.78)



M<sub>MAX</sub> = 28.62 k-ft  
V<sub>MAX</sub> = 12.82 k

**B1A** CONT

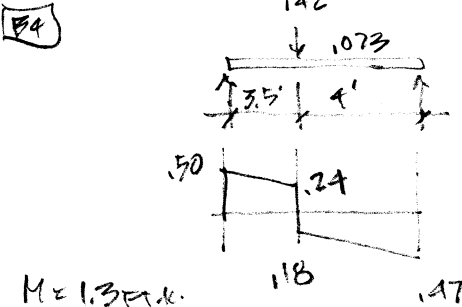
M<sub>MAX</sub> = 30.4 k-ft  
V<sub>MAX</sub> = 13.54 k

USE 7x11 7/8 PSL

**B2** MATCH B1A  
(LESS REACTION @ 0ft.)

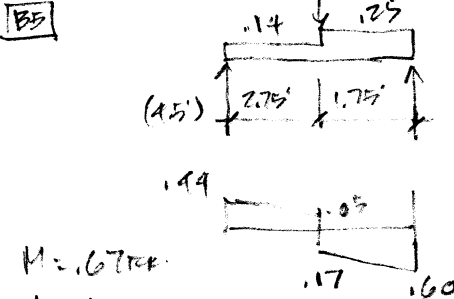
**B3** L = 4' M = .42 k-ft  
w = .31 k/ft V = .42 k

3 1/2 x 11 7/8 LSL



M = 1.3 k-ft  
V = .50 k

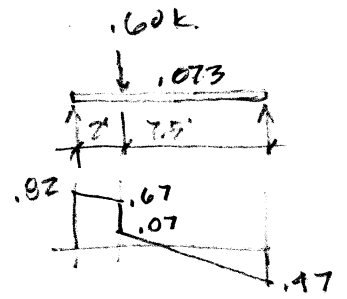
3 1/2 x 11 7/8 LSL



M = .67 k-ft  
V = .60

3 1/2 x 11 7/8 LSL

**B6**

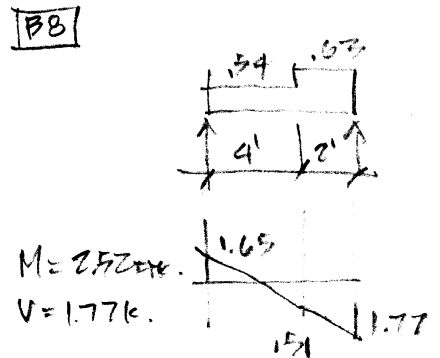


M = 1.51 k-ft  
V = .82 k

3 1/2 x 11 7/8 LSL

**B7** L = 14.25' M = 17.51 k-ft  
w = .69 k/ft V = 4.97 k

5 1/2 x 11 7/8 PSL  
AFC = 1/170



M = 2.52 k-ft  
V = 1.77 k

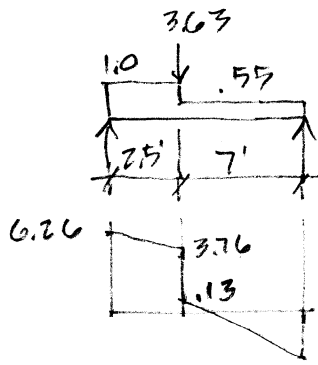
5 1/2 x 11 7/8 PSL TO MATCH B7

**B9** L = 4.5' M = 1.01 k-ft  
w = .40 k/ft V = .90 k  
3 1/2 x 11 7/8 PSL

CONT  
→



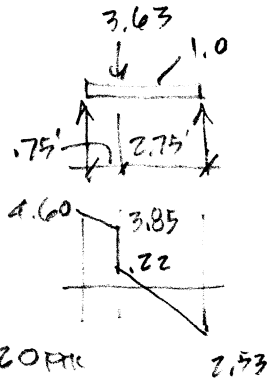
B10



$M = 12.58 \text{ ft-k}$        $3.72$   
 $V = 6.26 \text{ k}$

USE 5/4 x 11/8 PSL  
 FOR HD

B11



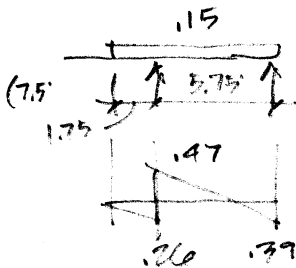
$M = 3.20 \text{ ft-k}$        $2.53$   
 $V = 4.60 \text{ k}$

USE 5/4 x 11/8 PSL  
 FOR HD.

B12

$l = 3'$        $M = .54$   
 $w = .48 \text{ k/ft}$        $V =$   
(2) 2x8

B13



$M =$   
 $V = .47 \text{ k}$

CR2

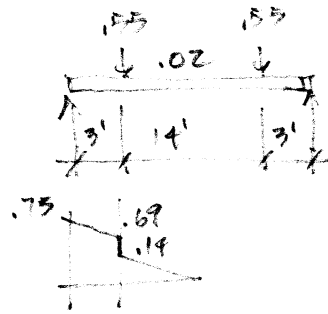
B14

$l = 5.25'$        $M = 1.03 \text{ ft-k}$   
 $w = .30 \text{ k/ft}$        $V = .79 \text{ k}$   
(2) 2x8

B15

$l = 8.5'$        $M = 1.17 \text{ ft-k}$   
 $w = .13 \text{ k/ft}$        $V = .55 \text{ k}$   
(2) 2x8       $DTC < 4/800$

B16



$M = 2.65 \text{ ft-k}$   
 $V = .75 \text{ k}$

USE (2) 2x12  
DTC < 4/600

B17

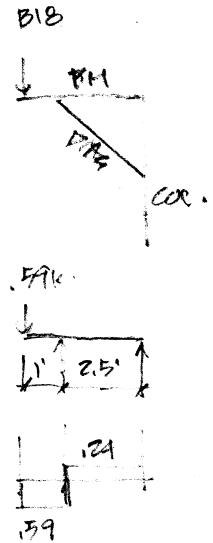
$l = 6'$        $M = 1.22 \text{ ft-k}$   
 HEADER       $w = .27$        $V = .81 \text{ k}$   
4x8

B18

$l = 9'$        $M = 1.31 \text{ ft-k}$   
 $w = .13 \text{ k/ft}$        $V = .57 \text{ k}$   
4x10

KNEE BRACES

KB-1



$M = .59 \text{ ft-k}$   
 $V = .59 \text{ k}$   
 4x12 UP TO SLOPE

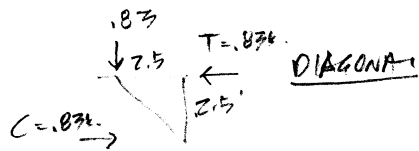
CONT  
 →

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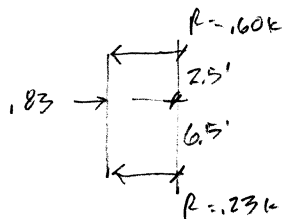
**KNEE BRACES (CONT)**



$L = 3.53'$      $C = 1.17k$

4x4  $f_c = 95 \text{ psi}$

COLUMN



$M = 1.57k$

CRG (PF/L#1)

(2) A36 TOP & BOTTOM

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sheet: UF-4

# MAIN FLOOR FRAMING AND FOUNDATIONS

(SEE KP-3)

## EXISTING FLOOR FRAMING

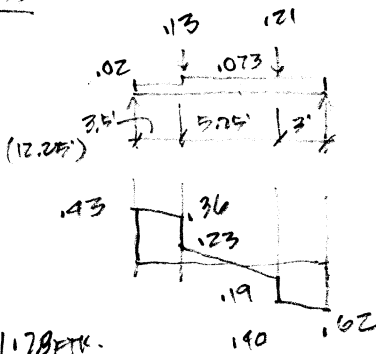
UNALTERED (EXCEPT AS SHOWN)

FLOOR IS LEVEL & LOADS NOT INCREASED

ACCEPT AS-IS.

## JOISTS

J1



M = 1.178 FT-K

V = .62k

(E) 2X10 @ 16" c/c

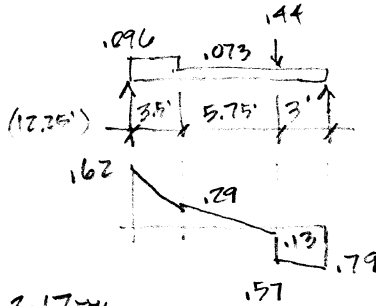
## BEAMS

B1  $l = 7.5'$   $M = 3.8$  FT-K  
 $w = .54k/ft$   $V = 2.03k$

(2) 1 7/8 X 9 1/4 LVL

$\Delta u < 4/800$

B2

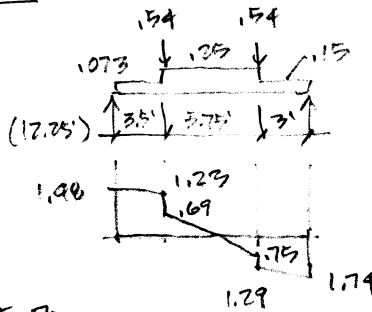


M = 2.117 FT-K

V = .79k

4X10

B3



M = 5.17 FT-K

V = 1.74k

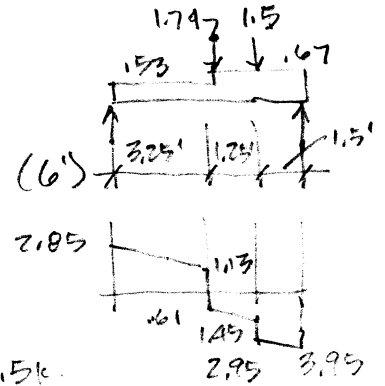
(2) 1 7/8 X 9 1/4 LVL

B4  $l = 12.25'$   $M = 8.25$  FT-K  
 $w = .44k/ft$   $V = 2.7k$

(3) 1 7/8 X 9 1/4 LVL

$\Delta u < 4/360$

B5



M = 6.5k

V = 3.95k

5/8 X 9 1/2 PSL

## COLUMNS / FOOTINGS

C1

P = 4.06k

6x6  $f_c = 134$  psi  
 20" x 20" x 12" FTG

C2

P = 6.92k

6x6  $f_c = 228$  psi  
 30" x 30" x 12" FTG

C3

P = 10.3k

6x6  $f_c = 340$  psi  
 30" x 30" x 12" FTG

C4

P = 5.55k

6x6  $f_c = 197$  psi  
 20" x 20" x 12" FTG

C5

P = 4.74k

6x6  $f_c = 157$  psi  
 20" x 20" x 12" FTG

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