

**structural calculations for:**

# **carnation farmer's market building**

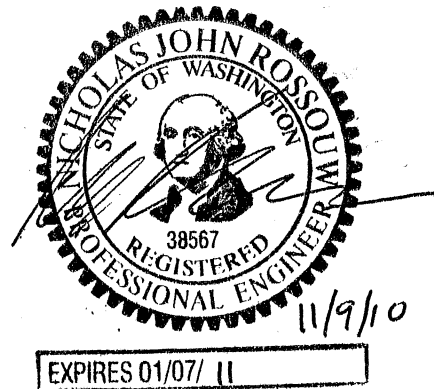
**bird street & stossel avenue  
carnation washington**

**client: carnation farmer's market/ jon  
romanelli**

**9 november 2010**

**index:**

**dc- design criteria  
rf- roof framing  
lt- lateral analysis**



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LOCATION (GOOGLE EARTH)

47.6483° N  
121.9126° W

SEISMIC (U.S.G.S)

$S_s = 1.174$   
 $S_1 = .390$  } SITE CLASS B

$S_{ps} = .806$   
 $S_{D1} = .421$   
 $S_{D0} = 1.209$   
 $S_{M1} = .632$   
 $F_a = 1.03$   
 $F_v = 1.619$  } SITE CLASS D

ROOF A = 2298 lb

DL = 15 PSF + 2 PSF = 17 PSF  
DIAPH TRIB WALLS

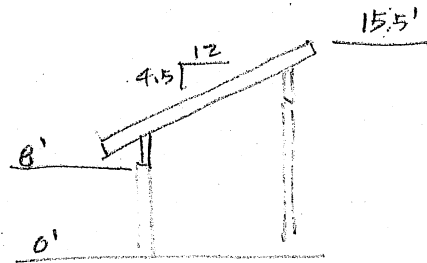
W = 39.1k

∴ E = 3.46k

C = 1.5 PSF

WIND

85 MPH  
EXPOSURE B  
 $K_z = 1.0$



W @ OPEN AREA = (7.5 x 6.09) = 46 plf

W @ WALED AREA = (4 x 9.90) + (3.75 x (6.09 + 4.57))  
= 80 plf

∴ W N-S = (32 x 46) + (21 x 80) = 3.15k

∴ W E-W = (52 x 46) + (21 x 80) = 4.07k

WIND CRITICAL E-W  
SEISMIC CRITICAL N-S

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project: CARNATION  
FARMERS MARKET

client: JON ROMANELLI

date: 10-14-10

proj #: 2010-033

sheet: DC-1



# wind loads (asce 7-05)

method 2 - analytical procedure

Exposure B

V = 85 mph

$K_d = 0.85$  table 6-4

I = 1 table 6-1

G = 0.85 6.5.8.1

high roof

Roof Angle = 20.56 degrees

Ground to top of roof 15.5 ft

Bottom of roof to top of roof 7.5 ft

(mean roof height) h = 11.75 ft

$$K_{zt} = (1 + K_1 K_2 K_3)^2 = 1.00$$

Pressure Coefficients  
from Figure 6-6:

Bldg Face	$C_p$
Windward Wall	0.8
Leeward Wall	-0.5
Windward Roof	0.2
Leeward Roof	-0.6

\*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	0.57	8.96	6.09	3.81	9.90
15-20	0.62	9.75	6.63	3.81	10.44
20-25	0.66	10.38	7.06	3.81	10.86
25-30	0.7	11.01	7.48	3.81	11.29
30-40	0.76	11.95	8.12	3.81	11.93

$P_{roof\ (psf)}$	high roof
6.09	

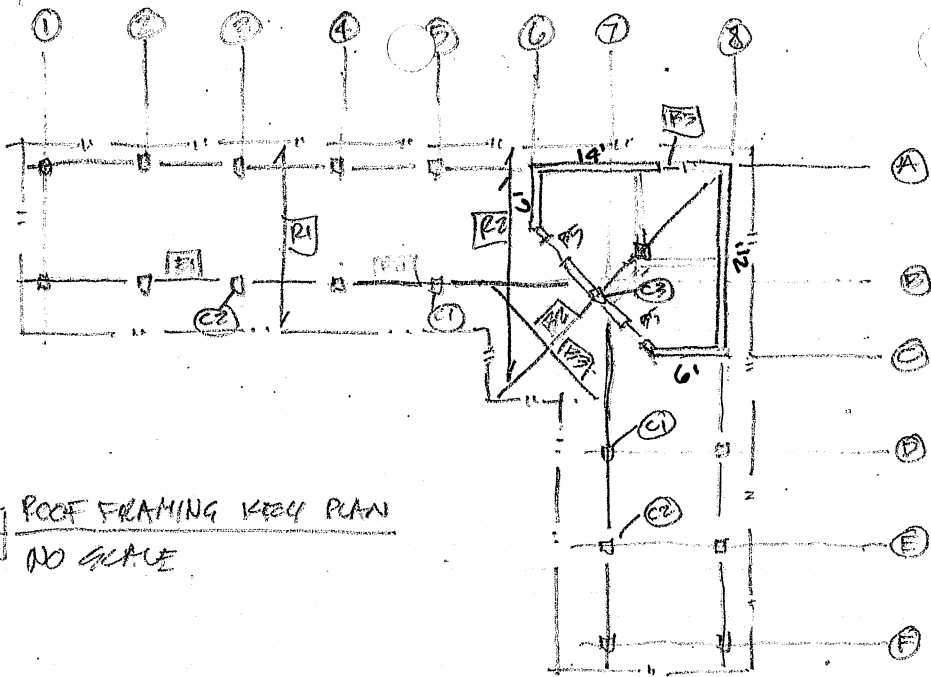
$P_{WIND} = 1.52$

$P_{LEE} = 4.57$

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project: carnation farmers  
market  
jon romanelli

date: 10/14/2010  
project #: 2010-033  
design: nic  
sheet: dc-3

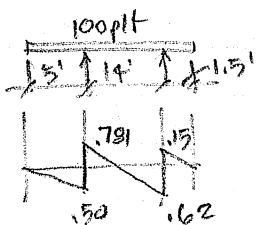


- 25 PSF (SNOW)  
LIVE LOAD  
- 15 PSF

ROOF FRAMING KEY PLAN  
NO GIRDS

**RAFTERS** 2'-6" o.c.

**R1**



M = 1.25 FT.K.  
H = 1.80 FT.K.

**R2** L = 15' MAX  
W = .1 k/ft

M = 2.81 FT.K.

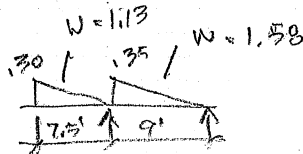
6x6 DTL = 4/240

**BEAMS**

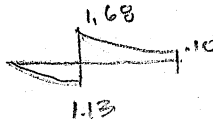
**B1** L = 10' M = 6.4 FT.K.

W = .51 k/ft V = 2.6 k.

8x8 ✓ DTL = 4/441



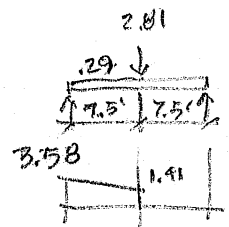
M = 5.65 FT.K.  
V = 1.68 k.



8x8

B2 CONT 8x8 OK BY INSPECTOR

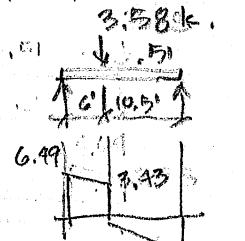
**B3**



M = 18.7 FT.K.  
V = 3.58 k

8x12 DTL = 4/407

**B4**



M = 29.7 FT.K.

V = 6.49 k

10x16

DTL = 4/580 MR w/1 1/2" HOUSING = 30.24 FT

**B5**

L = 3.5' M = .98 FT.K.

W MAX = .25 k/ft V = .94 k

(2) 2x8

**COLUMNS**

**C1** P MAX = 19.09 k.  
8x8 f<sub>c</sub> = 218 psi ✓

FOOTINGS AB = 6.63 ft  
30x30x12'

**C2** P = 5.2 k. 8x8

FOOTING AB = 2.81 ft  
20x20x12'

**C3** P = 12.98 **(8) 2x6**

CONT FTG.

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client: JON BOMMELI

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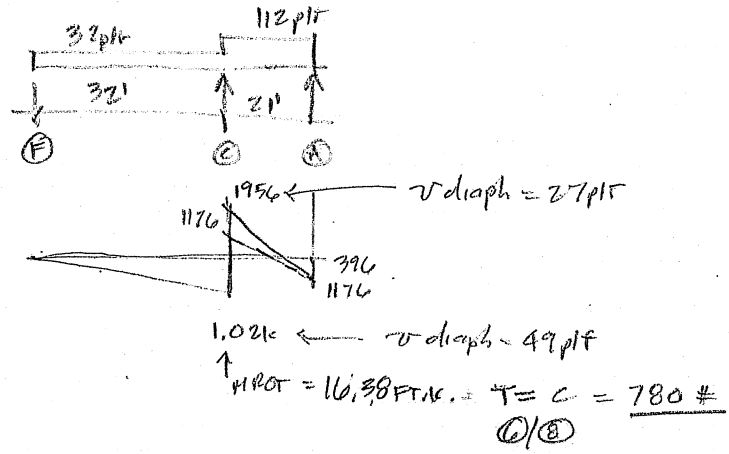
proj #: 2010-033

sheet: RF-1

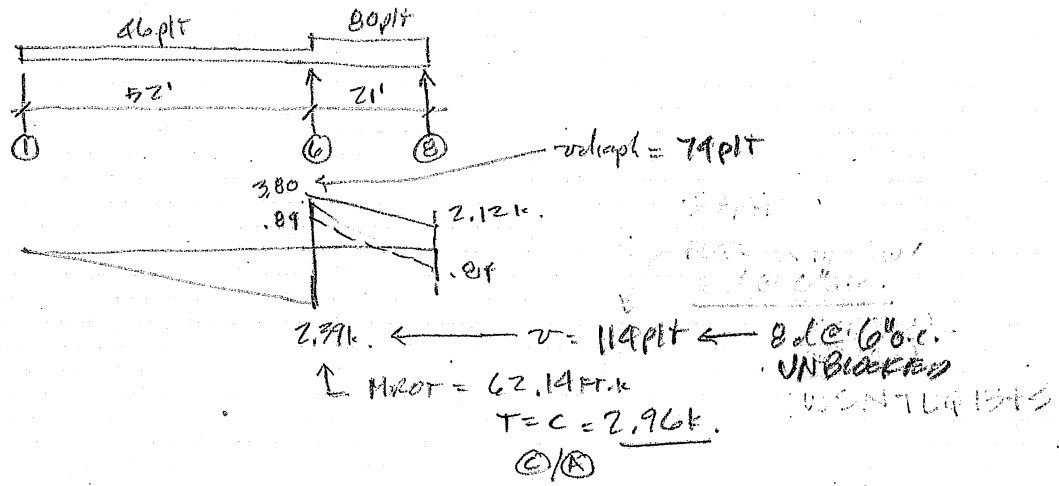
**ROOF DIAGRAM**

**E RF.1 FOR KEY PLAN**

NORTH - SOUTH



EAST - WEST



**SHEAR WALLS**

- Ⓒ,  $V_{MAX} = 6.19k$ . (DRAG IN OVER 21')  
 $v = 1032 plf$  SW6  $F_{HD} = 10.3 - DL$  HTT4
- Ⓓ  $V_{MAX} = 2.12k$ .  $v = 101 plf$  SW1  $F_{HD} = 300 - DL$  NONE REQ'D.
- Ⓔ  $V_{MAX} = 2.98k$ .  $v = 496 plf$  USE SW6 & MATCH WALL ON GRID Ⓒ
- Ⓕ  $V_{MAX} = 2.96k$ .  $v = 211 plf$  USE SW2  $F_{HD} = 1.7 - DL$  HTT4

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