



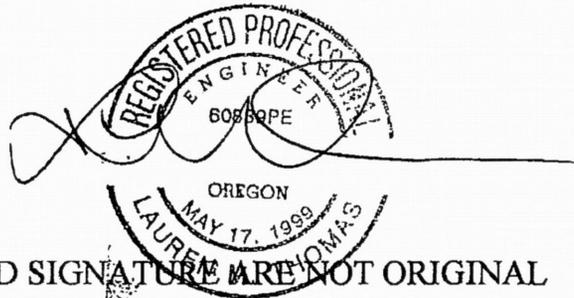
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Deck Dry Rot Investigation  
Victoria House  
3812 SW Kelly Ave.  
Portland, Oregon

Client: Noah & Associates  
LTC#: 13-62  
Date: 5/7/13  
By: Lauren Thomas, P.E.

THESE CALCULATIONS ARE VOID IF SEAL

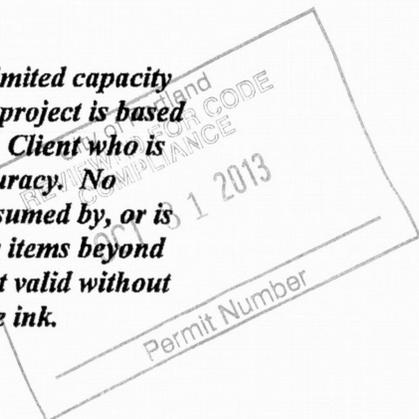


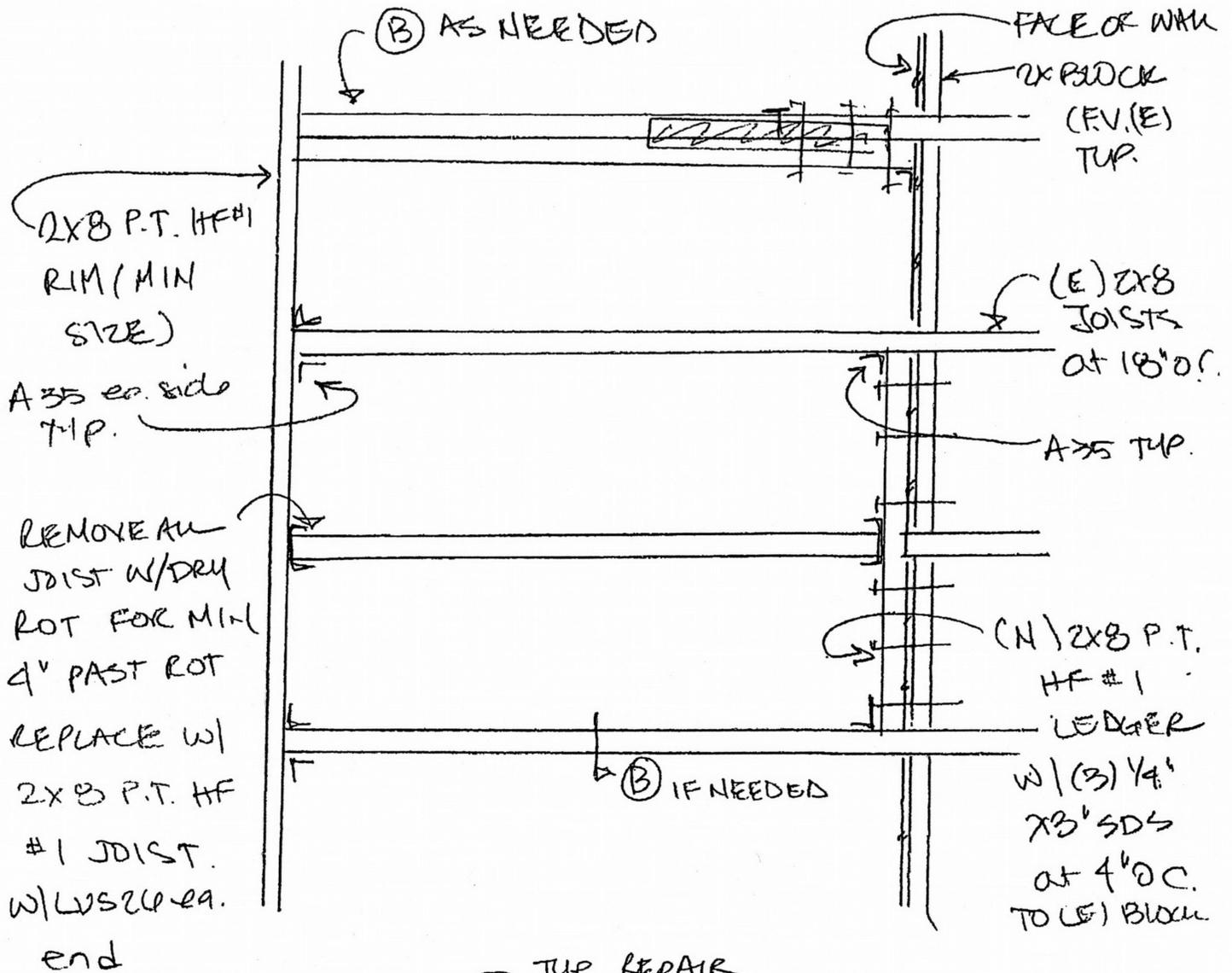
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EXPIRES: 6/30/2014

No. of Calculation pages included: D2 and 3 pages

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SEE NOTES CALC SHT ① AND ATTACHED GENERAL NOTES.

(E) JOIST ONLY TAKE UP OF (1) ADDITIONAL JOIST



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City of Portland  
 PERMIT FOR CODE  
 5/13/13

ⓑ DRY ROT NOT W/IN  
18" OF FACE OF WALL

FACE OF WALL

(N) LEDGER  
PER ⓐ

LPT & PL AT JOINT

\* REPLACE REMOVED WOOD W/ 2X8 P.T. HF #1

UNKNOWN  
BACK SPAN.

1/4" X 3" SDS AT 8"  
O.C. STAG

SPACER (N) 2X8 P.T. HF #1 TO (E)

18"  
MIN

60" MAX

2-2

PLAN

(E) 2X8 JOIST  
at 18" O.C.

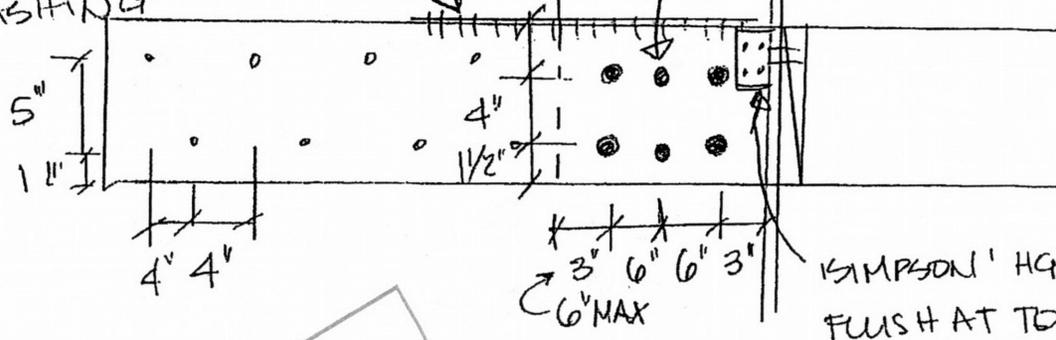
(E) SHTG

(E) BLOCKING  
FIELD VERIFY

CENTER AT JT;  
'SIMPSON'

STUBS  
STRAP - PROTECT  
FROM ELEMENTS  
W/ FLASHING

(6) 1/2" ⌀ THRU PROTS  
W/ PL WASHERS



SIMPSON' HQ10A  
FLUSH AT TOP  
OF (N) JOIST  
TO BLOCKING

2-2



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## STRUCTURAL NOTES

### GENERAL

1. ALL CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE (IBC) 2009 EDITION AS AMENDED BY THE STATE OF OREGON IN THE 2010 OSSC AS WELL AS LOCAL CODES AND REGULATIONS.
2. DESIGN CRITERIA:
  - A. WIND SPEED N/A
  - B. SEISMIC N/A
  - C. SNOW LOADS 25PSF
  - D. SOIL BEARING N/A
3. THIS STRUCTURE AND ALL OF ITS PARTS MUST BE ADEQUATELY BRACED AGAINST WIND, LATERAL, EARTH, AND SEISMIC FORCES UNTIL THE PERMANENT LATERAL-FORCE RESISTING SYSTEMS HAVE BEEN CONSTRUCTED AND ALL ATTACHMENTS AND CONNECTIONS NECESSARY FOR THE STABILITY OF THE STRUCTURE AND ITS PARTS HAVE BEEN MADE.
4. PRE-MANUFACTURED ITEMS (ROOF TRUSSES, ETC) IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL SPANS AND DIMENSIONS PRIOR TO ORDERING THE ITEMS.
5. ALL FEATURES OF THE CONSTRUCTION NOT FULLY SHOWN SHALL BE OF THE SAME TYPE AND CHARACTER AS SHOWN FOR SIMILAR CONDITIONS, SUBJECT TO REVIEW BY THE STRUCTURAL ENGINEER OF RECORD.
6. ALL PRODUCTS AND MATERIALS USED BY THE CONTRACTOR SHALL BE APPLIED, PLACED, ERECTED OR INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

### MISCELLANEOUS AND STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE ASTM A-36. DETAIL, FABRICATE, AND ERECT PER LATEST AISC.
2. WELDING SHALL BE DONE BY CERTIFIED WELDERS AND PER AISC AND AWS STANDARDS.
3. BOLTS, ANCHOR BOLTS AND OTHER THREADED FASTENERS PER ASTM A-325.
4. PIPE PER ASTM A-53
5. GALVANIZE ALL MISCELLANEOUS STEEL UNLESS NOTED OTHERWISE.

### WOOD

1. ALL SOLID SAWN LUMBER SHALL BE DOUGLAS FIR/LARCH (DF/L), NO. 2 OR BETTER. ALL P.T. WOOD TO BE HF#1.
2. WOOD WITHIN 6" OF FINISHED GRADE, IN CONTACT WITH GROUND OR CONCRETE OR TO BE LEFT EXPOSED AND UNPAINTED OR UNSEALED

SHALL BE PRESERVATIVE TREATED W/ CHROMATED COPPER ARSENATE (CCA) OR ALKALINE COPPER QUATERNARY (ACQ) TYPE B WITH INCISIONS IN ACCORDANCE WITH THE AMERICAN WOOD PRESERVER'S ASSOCIATION (AWPA).

3. ALL FRAME NAILING SHALL CONFORM TO THE REQUIREMENTS OF TABLE 2304.9.1 "FASTENING SCHEDULE" OF THE IBC, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
4. WOOD USED FOR LEDGERS WHICH ARE IN CONTACT WITH GALVANIZED FRAMING BRACKET SHALL NOT BE TREATED. PROVIDE A VAPOR BARRIER OR OTHER BARRIER BETWEEN THE CONCRETE OR MASONRY AND THE WOOD ELEMENT.
5. METAL FASTENERS AND ANCHORS SHALL BE AS MANUFACTURED BY "SIMPSON" COMPANY OF DUBLIN, CALIFORNIA. TYPE AS INDICATED ON THE PLAN OR APPROVED EQUAL. IF EXPOSED TO WEATHER MUST BE HAVE ADDITIONAL CORROSION PROTECTION PER "SIMPSON".
6. "SIMPSON" STRAP TIES INDICATED ON THE SHEARWALL PLANS ARE TO BE CENTERED OVER WALL TOP PLATE AND/OR HEADER, BLOCKING, OR BEAM.
7. PROVIDE SOLID BLOCKING OVER ALL SHEARWALLS AND BEARING WALLS, AT SHEARWALLS PARALLEL TO FRAMING, ALIGN JOIST OVER SHEARWALL. ADDITIONAL JOISTS MAY BE REQUIRED TO ACCOMMODATE BLOCKING.
8. ALL INTERIOR BEAMS SHALL BE SUPPORTED ON TRIPLE BUILT-UP STUDS (MIN) UNLESS OTHERWISE NOTED.
9. REPLACE "IN-KIND" ALL WOOD BEAMS, JOISTS, PURLINS, SUBPURLINS AND SHEATHING, WHICH SHOW SIGNS OF DRY ROT.





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## Project Design Criteria

Design per 2009 International Building Code as revised by the State of Oregon.

Provide vertical analysis of repair to existing deck joists that have dry rot.

- a) Floor live load: 60 psf
- b) Roof Live Load: N/A
- c) Roof Snow Load: N/A
- d) Wind Design: N/A
- e) Earthquake Design: N/A

\* CONTRACTOR TO FLASH AS REQ'D TO PROTECT INT STRUCTURE

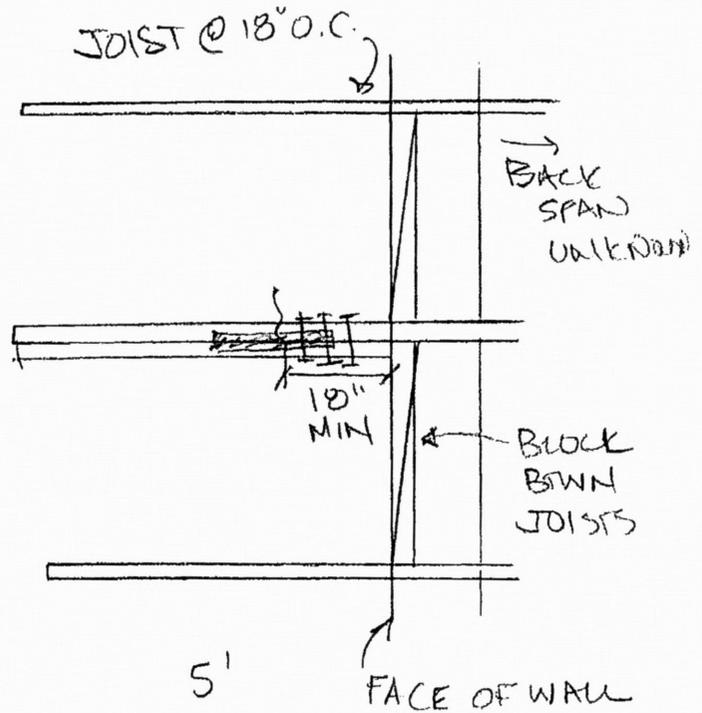
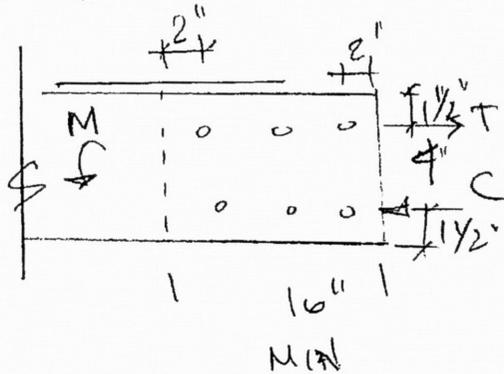
\* ALL CONNECTORS TO BE ALLOWED IN EXT. USE W/P.T. WOOD. FLASH/PROTECT AS NECESSARY IF NOT,

\* PROTECT ALL NON P.T. WOOD EXPOSED TO ELEMENTS



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OPTION 1 (1) - ROT @ end / NOT  
WITHIN 18" OF WALL



$$W = (70)(1.5) = 105 \text{ PLF}$$

$$M = \frac{105(5)^2}{2} = 1312 \text{ \#}$$

$$V = 105(5) = 525 \text{ \#}$$

$$f_b = \frac{1312(12)}{13.14} = 1.2 \text{ ksi} < 9.75(1.15)(1.2) = 1.35 \text{ ok}$$

$$f_v = \frac{525(1.5)}{10.88} = 72 < 150 \text{ ok}$$

PT. 2X8 HF#1

$$T = C = \frac{1.3(12)}{4} = 3.94 \text{ K}$$

$$V_{II} = 410 \text{ \#/BOLT}$$

$$V_I = 180 \text{ \#/BOLT}$$

$$\frac{3940}{X(410)} + \frac{525}{2X(180)} = 1.0 \quad X = 11 \text{ No good}$$



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STRAP TOP

$$T_{strap} = \frac{1312(12)}{7} = 2250\# < 3845$$

STRAP TOP

$$V = 525 + 180(4) = 720$$

(4) 1/2"  $\phi$  THRU  
BOULTS W/  
WASHER

OPTION (2) FULL ROT:

REPLACE 2X8

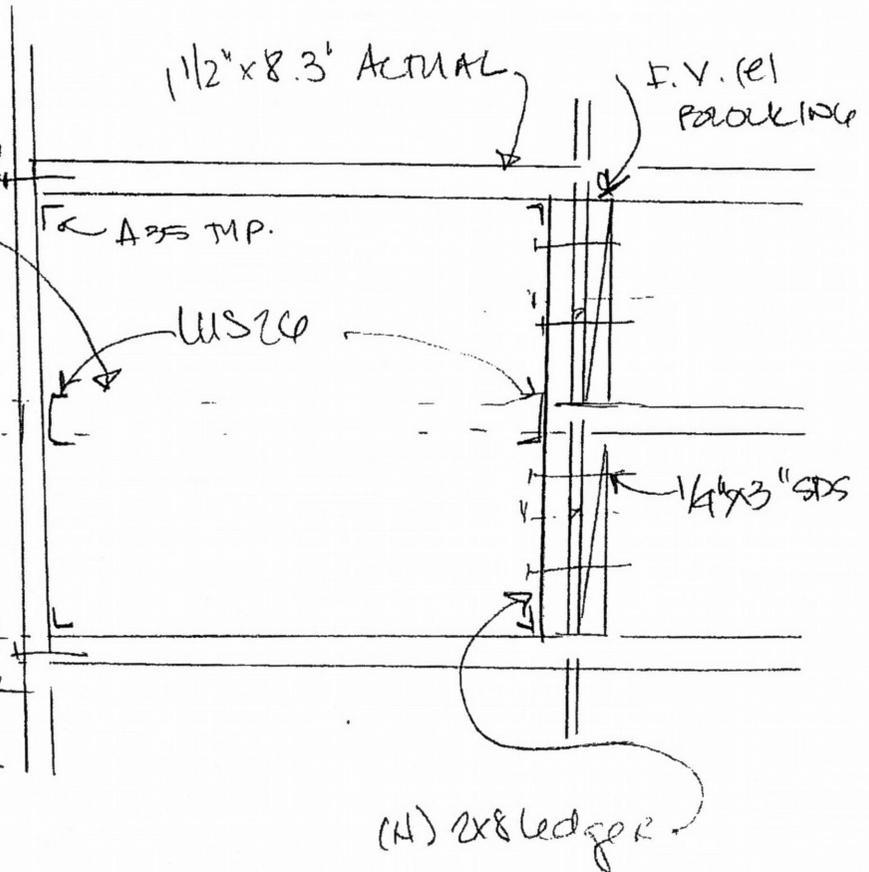
$$P_{DN} = 105(2.5) = 263\# < 830$$

$$C_{K(E)} M = 1312 + 132(5) = 1972\#$$

$$F_{b2} \frac{1972(12)}{17.2} = 1375\#$$

$$V = 525 + 131 = 656 \text{ OK}$$

$$\Delta E = .26" \ll \frac{1}{462} < \frac{1}{300} \text{ OK}$$



(H) 2x8 ledger



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## STRUCTURAL CALCULATIONS

**PROJECT:** VICTORIA HOUSE DECK RAILINGS

**LOCATION:** 3812 SW KELLY AVE., PORTLAND, OR 97239

**CLIENT:** WEST-MEYER FENCE

**DATE:** OCTOBER 29, 2013

**PROJECT NUMBER:** 13366

**DESCRIPTON:** DESIGN FOR REPLACING EXISTING WOOD FRAMED DECK RAILINGS WITH PRE-MANUFACTURED STEEL RAILINGS FOR SIX WOOD FRAMED ELEVATED DECKS.

### TABLE OF CONTENTS:

ITEM	SHEET NUMBER
RAILING DESIGN	R.1 - R.3
SKETCHES	SK.1 - SK.5

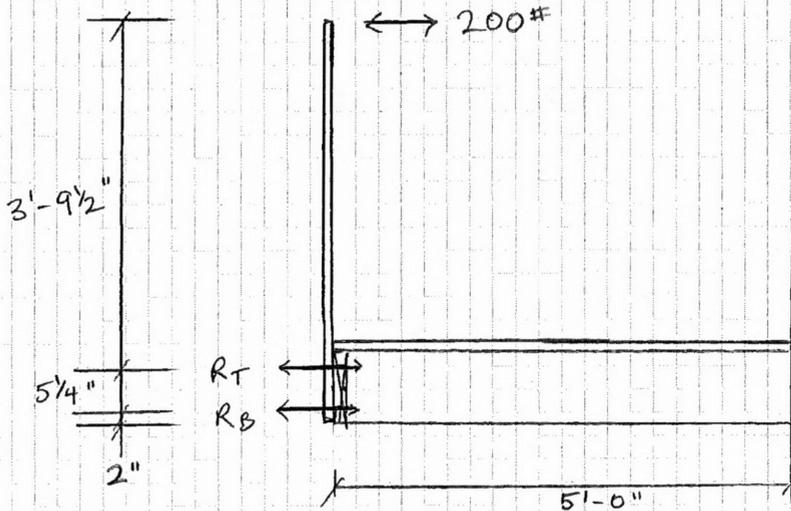


EXPIRES: 12-31-14

# RAILING DESIGN

RAILING HT. = 3.5'  
 POST SPACING = 3.75'

LL = 200# ← CONTROLS OVER DL



← 200# :  $200\# (4.23') / (0.44') = R_T = 1923\#$   
 → 200# :  $200\# (3.79') / (0.44') = R_B = 1723\#$

USE (2) SIMPSON "DTT2Z/DTT2SS" @ TOP & BOTTOM OF JOIST

↳ S.W.L. = 3600# > 1923# OK

@ CORNER, USE (1) DTT2Z & (1) 5/8" φ THRU-BOLT TOP & BOTTOM

↳ S.W.L. BOLT :  $Z' = 650\# (CD = 1.6) = 1040\# > \frac{1923\#}{2} OK$

WIND UPLIFT: EXPOSURE "B", I = 1.0, V = 95 MPH

$P_{net} = 25 K_z C_{net} (I K_{zt})$   $K_{zt} = 1.0$   
 $q_s = .00256 V^2 = 23.1 \text{ PSF}$   
 $K_z = 0.70 (Z \approx 20')$ ,  $C_{net} = 1.57$

$P_{net} = 25.4 \text{ PSF}$

UPLIFT =  $P_{net} - 0.6 (D = 8 \text{ PSF}) = \underline{\underline{20.6 \text{ PSF}}}$

# RAILING DESIGN

ADD JOIST IF POST IS NOT ALIGNED W/ (E) JOIST:

M @ EDGE OF DECK :  $M = \frac{200 \#(4')}{4} = 200 \# \cdot' = 2400 \# \cdot'$

R @ HOUSE :  $R = \frac{2400 \# \cdot'}{60"} = \underline{40 \#}$  UPLIFT (CONSERV.)

WIND UPLIFT:  
 (20.6 PSF)  
 x (1.33')(5')  
 = 137 # UP

GRAVITY LOADS : TRIB. WIDTH = 0.67', L = 5'

D = 8 PSF (0.67') = 5 PLF  
 L = 40 PSF (0.67') = 27 PLF } W = 32 PLF

R =  $\frac{WL}{2} = 80 \# + 40 \# = \underline{140 \#}$  DOWN

USE 4x10 JOIST, RIPPED TO 2 3/8" WIDE @ END  
 W/ SIMPSON 'MIU 2.56/9' & 'LUS 48' HANGERS OR ADD  
 FILLER TO (E) 2x10 W/ (18) 8d NAILS

↳ S.W.L. : UP = 1000# > 137# OK

DOWN = 1125# > 140# OK

FILLER = 18 (73#) (1.6) = 2102# > 1923# OK

WALL CONNECTION:

(NOT USED) → USE 18-GA. 2" x 1/2" x 1/2" STEEL ANGLE W/  
 (2) #8 x 1/2" SCREENS INTO WALL & (2) #8  
 SCREENS INTO RAILING

↳ S.W.L. = (2) (79#) (CD = 1.6) = 253# > 200# OK

RAILING WILL BE FABRICATED W/ FLAT  
 2" x 3/8" STEEL PLATE AGAINST (E) WALL:

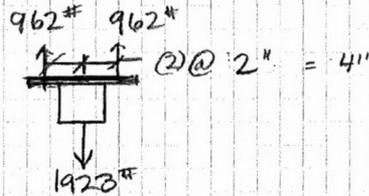
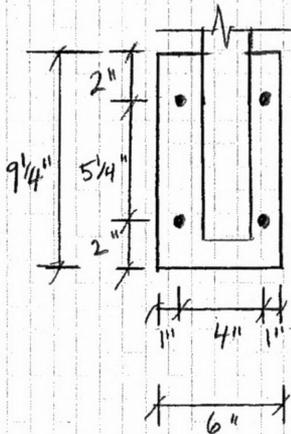
USE (3) 3/8" x 3" LAG SCREWS INTO (E) WALL

STUD

↳ S.W.L. @ TOP :  $Z_{11}' = 260 \# \left( \frac{P = 1.75"}{BD = 3"} \right)$   
 x (CD = 1.6) = 243# > 200# OK

# RAILING DESIGN

CHECK BASE PLATE ON POST:



TRY  $9\frac{1}{4}'' \times 4\frac{5}{8}'' \times \frac{3}{8}''$ :

$$d \geq \sqrt{\frac{6.68 M_a}{F_y b}}$$

$$M_a = \frac{1923 \#(4'')}{4} = 1923 \#''$$

$$F_y = 36,000 \text{ PSI}$$

$$b = 4''$$

$$d \geq 0.30''$$

USE  $9\frac{1}{4}'' \times 4\frac{5}{8}'' \times \frac{3}{8}''$  STEEL PLATE

CHECK POST:

3.5' CANT. W/ 200# PT. LD. @ TOP:

$$M_a = 200 \#(3.5')(12'') = 8400 \#''$$

$$M_n = M_p = F_y Z$$

$$F_y = 46,000 \text{ PSI}$$

$$M_a \leq \frac{M_n}{\Omega} = 1.67 \rightarrow 8400 \#'' \leq \frac{46,000 \text{ PSI } Z}{1.67}$$

$$Z \geq 0.305 \text{ IN}^3$$

$$Z_{2'' \times 2'' \times \frac{1}{8}''} = \frac{2''(2'')^2}{4} - \frac{1.75''(1.75'')^2}{4} = 0.660 \text{ IN}^3 > 0.305 \text{ IN}^3 \text{ OK}$$

USE  $2'' \times 2'' \times 0.120''$  TUBE

CHECK RAIL:

$$L = 3.75'$$

$$\text{LOADS: } D = 5 \text{ PBF } (3.25'/2) = 8 \text{ PLF}$$

$$\text{PT. LD. @ MIDPOINT: } L = 200 \# = P$$

$$M = \frac{WL^3}{8} + \frac{PL}{4} = 2419 \#''$$

$$2419 \#'' \leq \frac{46,000 \text{ PSI } Z}{1.67} \rightarrow Z \geq 0.088 \text{ IN}^3$$

$$Z_{2'' \times 2'' \times 0.095''} = \frac{2''(2'')^2}{4} - \frac{(1.81'')(1.81'')^2}{4} = 0.518 \text{ IN}^3 > 0.088 \text{ IN}^3 \text{ OK}$$

USE  $2'' \times 2'' \times 0.095''$  TUBE