City of
PORTLAND, OREGON
Bureau of Development Services

1900 SW 4th Avenue, Suite 5000
Portland, Oregon 97201
FAX: 503-823-7300
TTY: 503-823-6983
www.portlandonline.com/bds

BDS Checksheet Response

Permit #: 06-164263-REV-01-CO **Date:** 1/10/11

Customer name and phone number: FRED PANTHER 503-358-8660
AHKRON MOSAH ARCHITECTS

Note: Check which review you are responding to. Please provide specific information concerning the changes you have made in response to the checksheet. Note the checksheet item number. Describe the change, revision, or correction. Identify the location on the plans (i.e. page number and/or detail number). Use as many lines as needed. *If the item is not in response to a checksheet, write **"Applicant"** in the column labeled "Checksheet item number."*

☐ **Planning** ☒ **Structural** ☐ **PDOT** ☐ **Fire** ☐ **Plumbing**
☐ **Life Safety** ☐ **BES Source Control** ☐ **BES** ☐ **Water** ☐ **Site Dev.**

Please use this sheet to submit your response to only one of the above review groups. If you need to respond to more than one review group, you will need a separate Checksheet Response Form for each group.

Checksheet item number	Description of changes, corrections, additions, etc.	Location on plans
	REPLACE STRUCTURAL SHEET	S 1.1
	PER CHANGES REQ'D FROM	S 1.2
	CHECK SHEET.	S 2.1

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Incorporated

principals
chris c. van vleet, p.e.
gary j. lewis, p.e.

06-164263-REV-01-CO

Hayden Harbor II

Structural Calculations

October 14, 2011

Structural Calculations

consulting engineers
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Job HOFFMAN II
Client
Job No. By C.J.
Date 9/06 Sheet No. B1

ROOF FRAME -

LOAD:

LIVE - 25 PSF
DEAD - 15 "
TOTAL - 40 PSF

DEAD LOAD:

BUR - 3.5 PSF
INSUL. - 1.0 "
PLY - 2.8 "
FRAME - 2.5 "
CEIL. - 2.8 "
MECH. - 2.0 "
MISC. - 2.4 "

TOTAL 15 PSF

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Job Harbor II
Client
Job No. By C.V.
Date 9/06 Sheet No 22

DRIFTING SNOW:

$P_g = 15$ PSF $P_f = 10.5$

$D = 15.95$ PCF $h_b = 1.5'$

PARAPETS:

$W_b = 116'$: $h_d = 2.0$

DRIFT = 32 PSF
$W_d = 9.1'$

$W_b = 60'$: $h_d = 1.4$

DRIFT = 23 PSF
$W_d = 5.0'$

$W_b = 24'$ $h_d = .6'$

DRIFT = 9 PSF
$W_d = 2.3'$

$W_b = 80'$ $h_d = 1.7'$

DRIFT = 27 PSF
$W_d = 6.7'$

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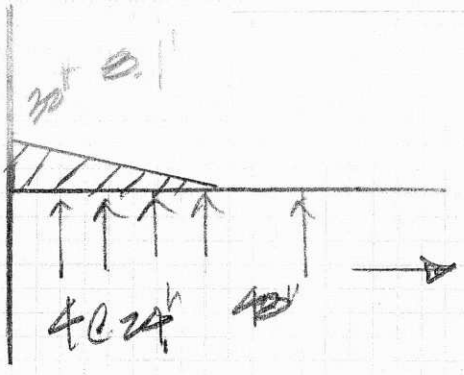
Job HAYDEN II
Client
Job No. By JV
Date 9/06 Sheet No. R3

33' JOIST -

W_1 = 40 PSF
W_2 = 23 PSF 5.8'
P = 12 PSF + 8 (HEAT)

USE: 36" RDWL @ 48" oc.
(SEE R-3a)

PARALLEL DRIFT -



24" OUT - W = (40 + 24) 2 = 130 PLF

96" OUT = (40)(4+2)(1/2)+8 = 128 PLF

USE: 36" RDD-W
(SEE R-3a)

Rw 32

Type: Type

RedSpec™ by RedBuilt™
v7.0.13

Project: Project
Location: Hayden HArbor II
Folder: Folder
Date: 10/11/11 11:42 AM
Designer:
Comment:

36" Red-W™ @ 48" O/C

This product meets or exceeds the set design controls for the application and loads listed

This truss design is feasible. The finished design shall be produced by RedBuilt Engineering. All open-web trusses are custom designed to carry the specific design loads for each project. Actual truss capacity when fabricated is limited to that required to resist the specific loads. Do not use this analysis to verify the capacity of existing trusses.

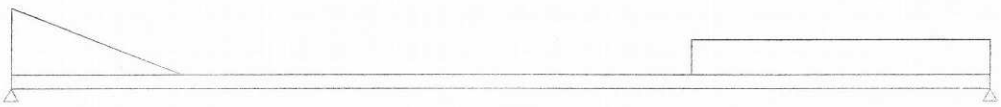
DEFLECTIONS (in)	% Allow.	Design	Allow.	Design	Allow.	Pass/Fail
Span Live	29%	0.479	1.650	L / 827	L / 240	PASS
Span Total	33%	0.737	2.200	L / 538	L / 180	PASS

SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	2003 (115)	2102 (115)
Dead Reaction (lb)	1007	1008
Total Reaction (lb) (DOL%)	3010 (115)	3110 (115)
Bearing	Top Chord	Top Chord
Support	Ledger	Beam
Bearing Clip	6" No-Notch Clip	6" No-Notch Clip
Approx. Clip Height	1.5"	1.5"
Approx. Clip Width	8.4375"	8.4375"
Assumed Bearing Width	3.5"	3.5"

SPANS AND LOADS

Dimensions represent horizontal clear span.

Member Slope: 0.25/12



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	25	15	0	48"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Uniform	psf	Snow(115%)	12	0	23'-0.0" to 33'-0.0"	Adds To	
Tapered	psf	Snow(115%)	23 to 0	0 to 0	0'-0.0" to 5'-9.6"	Adds To	

NOTES

- Building code: IBC. Methodology: Allowable Stress Design
- Truss design includes consideration for partial span application live load.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Pricing Load (plf) = 182
- Pricing Index (plf) = 182

C:\Documents and Settings\Chris V\My Documents\Misc\RedSpec\Sample.red

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Job HAYDEN II
Client
Job No. By C.V.
Date 9/06 Sheet No. R4

24' JOIST -

W_1 = 40 PSF

W_2 = 23 PSF × 5.8'

W_3 = 12 PSF × 8' (TRIB.)

USE: 10" RBDI 65 @ 32" o.c.

(SEE R-4a)

JOIST BELOW TOWER

W_1 = 40 PSF

W_2 = 10 + 15 = 25 PSF

W_3 = 9 PSF × 2.3'

W_4 = 12 PSF × 8'

P = 40(12/2) + 25(8) + 10(10) = 740 PLF (225 L, 515 DL)

USE: 36" RBD W @ 24" o.c.

(SEE R-4b)

24' JOIST @ TOWER

SEE CALC. ABOVE FOR LOADS

USE: 20" RBDI 65 @ 16" o.c.

(SEE R-4c)

R-12

RedSpec™ by RedBuilt™
v7.0.13

Project: Project
Location: Hayden HArbor II
Folder: Folder
Date: 10/11/11 11:45 AM
Designer:
Comment:

Type: Type

16" Red-I65™ @ 32" O/C

This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	% Allow.	Design	Allow.	DOL - Control		Pass/Fail
Shear (lb)	47%	-1507	3232	115% - All Loads		PASS
Positive Moment (ft-lb)	79%	8368	10592	115% - All Loads		PASS
DEFLECTIONS (in)	**% Allow.**	**Design**	**Allow.**	**Design**	**Allow.**	**Pass/Fail**
Span Live	58%	0.693	1.200	L / 416	L / 240	PASS
Span Total	66%	1.053	1.600	L / 274	L / 180	PASS

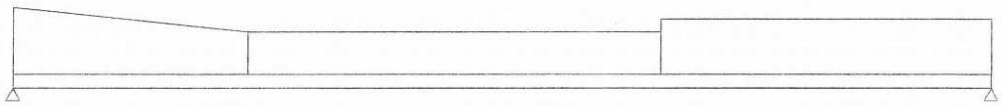
SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	1006 (115)	1028 (115)
Dead Reaction (lb)	480	480
Total Reaction (lb) (DOL%)	1486 (115)	1508 (115)
Bearing	Flush	Flush
Support	Ledger	Beam

HANGERS	Model	Top	Face	Member	Header	Size
Left	None Selected					
Right	None Selected					

SPANS AND LOADS

Dimensions represent horizontal design spans.

Member Slope: 0.25/12



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	25	15	0	32"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Uniform	psf	Snow(115%)	12	0	16'-0.0" to 24'-0.0"	Adds To	
Tapered	psf	Snow(115%)	23 to 0	0 to 0	0'-0.0" to 5'-9.6"	Adds To	

NOTES

- Building code: IBC. Methodology: Allowable Stress Design
- Min end bearing = 1.75 inches, web stiffeners not required.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.

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RAD

RedSpec™ by RedBuilt™
v7.0.13

Project: Project
Location: Hayden HArbor II
Folder: Folder
Date: 10/11/11 1:30 PM
Designer:
Comment:

Type: Type

20" Red-I65™ @ 16" O/C

This product meets or exceeds the set design controls for the application and loads listed

DESIGN CONTROLS	% Allow.	Design	Allow.	DOL - Control		Pass/Fail
Shear (lb)	30%	-1172	3847	115% - All Loads		PASS
Positive Moment (ft-lb)	63%	8378	13271	115% - All Loads		PASS
DEFLECTIONS (in)	**% Allow.**	**Design**	**Allow.**	**Design**	**Allow.**	**Pass/Fail**
Span Live	18%	0.212	1.200	L / 999+	L / 240	PASS
Span Total	34%	0.552	1.600	L / 522	L / 180	PASS

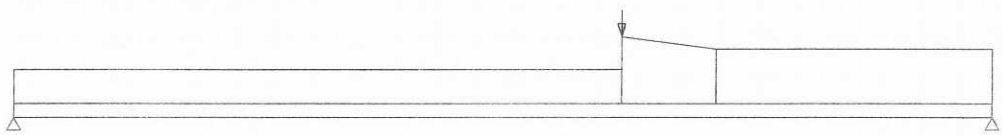
SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	311 (115)	503 (115)
Dead Reaction (lb)	498	669
Total Reaction (lb) (DOL%)	809 (115)	1172 (115)
Bearing	Flush	Flush
Support	Ledger	Beam

HANGERS	Model	Top	Face	Member	Header	Size
Left	None Selected					
Right	None Selected					

SPANS AND LOADS

Dimensions represent horizontal design spans.

Member Slope: 0.25/12



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	25	15	0	16"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Tapered	psf	Snow(115%)	9 to 0	0 to 0	15'-0.0" to 17'-3.6"	Adds To	
Point	plf	Snow(115%)	225	515	15'-0.0"	Adds To	
Uniform	psf	Floor(100%)	10	15	0'-0.0" to 15'-0.0"	Replaces	

NOTES

- Building code: IBC. Methodology: Allowable Stress Design
- Min end bearing = 1.75 inches, web stiffeners required.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.

C:\Documents and Settings\Chris V\My Documents\Misc\RedSpec\Sample.red

RedSpec™ by RedBuilt™
v7.0.13

Project: Project
Location: Hayden HArbor II
Folder: Folder
Date: 10/11/11 1:32 PM
Designer:
Comment:

RAC
Type: Type

36" Red-W™ @ 24" O/C

This product meets or exceeds the set design controls for the application and loads listed

This truss design is feasible. The finished design shall be produced by RedBuilt Engineering. All open-web trusses are custom designed to carry the specific design loads for each project. Actual truss capacity when fabricated is limited to that required to resist the specific loads. Do not use this analysis to verify the capacity of existing trusses.

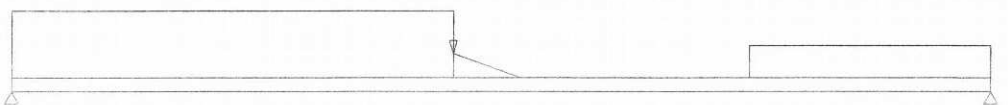
DEFLECTIONS (in)	% Allow.	Design	Allow.	Design	Allow.	Pass/Fail
Span Live	18%	0.293	1.650	L / 999+	L / 240	PASS
Span Total	30%	0.667	2.200	L / 594	L / 180	PASS

SUPPORTS	Support 1	Support 2
Live Reaction, Critical (lb) (DOL%)	750 (115)	1141 (115)
Dead Reaction (lb)	1019	1019
Total Reaction (lb) (DOL%)	1769 (115)	2160 (115)
Bearing	Top Chord	Top Chord
Support	Ledger	Beam
Bearing Clip	6" No-Notch Clip	6" No-Notch Clip
Approx. Clip Height	1.5"	1.5"
Approx. Clip Width	8.4375"	8.4375"
Assumed Bearing Width	3.5"	3.5"

SPANS AND LOADS

Dimensions represent horizontal clear span.

Member Slope: 0.25/12



APPLICATION LOADS

Type	Units	DOL	Live	Dead	Partition	Tributary	Member Type
Uniform	psf	Snow(115%)	25	15	0	24"	Snow Roof Joist

ADDITIONAL LOADS

Type	Units	DOL	Live	Dead	Location from left	Application	Comment
Tapered	psf	Snow(115%)	9 to 0	0 to 0	15'-0.0" to 17'-3.6"	Adds To	
Point	plf	Snow(115%)	225	515	15'-0.0"	Adds To	
Uniform	psf	Floor(100%)	10	15	0'-0.0" to 15'-0.0"	Replaces	
Uniform	psf	Snow(115%)	12	0	25'-0.0" to 33'-0.0"	Adds To	

NOTES

- Building code: IBC. Methodology: Allowable Stress Design
- Applied point loads require special hardware. Please contact your local RedBuilt™ representative for more information or call (866) 859-6757.
- Truss design includes consideration for partial span application live load.
- Continuous lateral support required at top edge. Lateral support at bottom edge shall be per RedBuilt recommendations.
- Pricing Load (plf) = 117
- Pricing Index (plf) = 161

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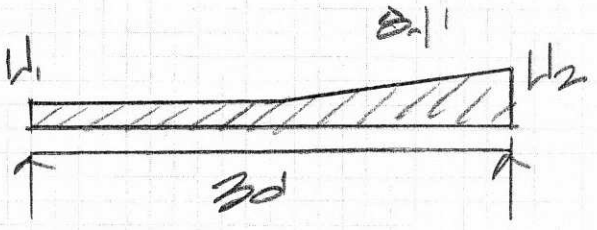
Job Harbor II
Client
Job No. By C.V.
Date 9/00 Sheet No. B5

30' BM. - (2)

$W_1 = (40+32)(6.8/2) = 2.5$ KLF

$W_2 = 40(6.8/2) = 1.4$ KLF



$R_1 = 24.4^k$

$R_2 = 25.1^k$

$+M = 164^k$

$S_x = 711$ IN^3 — GL E5/8x30

$A_{RC} = 136$ IN^2 < 154 IN^2 OK

$f_{TD} = 1.20'' = L/301$

USE: GL E5/8x30 c=3/4"

28' BM - (2)

$W = 1.4$ KLF

$M = 1.4(28^2/8) = 137^k$

$R = 1.4(28/2) = 19^k$

$S_x = 597$ IN^3 — E5/8x28 1/2

$A_{RC} = 107$ IN^2 < 146 IN^2 OK

$f_{TD} = 1.09'' = L/309$

USE: GL E5/8x28 1/2c = 3/4"

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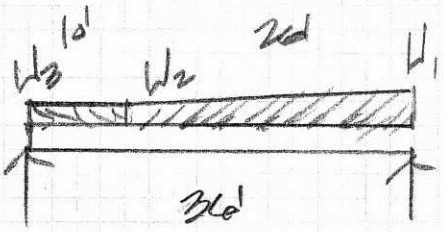
Job HAYDEN II
Client
Job No. By E.J.
Date 9/06 Sheet No. B6

36' BM. - (3)

$W_1 = 40(33+20)(1/2) = 1.1$ KLF
$W_2 = 40(33+5)(1/2) = .76$ KLF
$W_3 = 40(33+15)(1/2) + 740(15/33) + 10 =$
= 1.1 KLF



$R_L = 17.7^k$
$R_R = 17.5^k$
$M = 151^k$

54

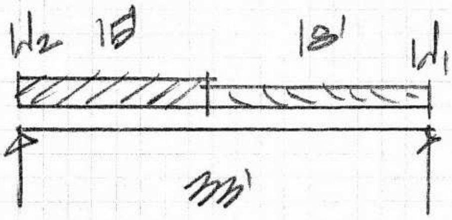
$S_R < 658$ IN³ — 5 1/8 × 30

$A_R < 96$ IN² < 154 IN² ok
TLA = 1.70" = L/254

USE: GL 5 1/8 × 30 C=4"

33' BM, BELOW TOWER

$W_1 = 40(2.67) = .107$ KLF
$W_2 = 40(8 1/2)(1/6) + 35(8) + 10(10) = .60$ KLF



$R_L = 7.5^k$
$R_R = 3.4^k$
$M = 47^k$

$S_R = 203$ IN³ — 5 1/8 × 16 1/2

A_R . 41 IN² < IN² ok

TLD = 2.7" H.G

USE: GL 5 1/8 × 27 C=0"

TLA = .61" = L/605

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Job HARPER II
Client
Job No. By CJ
Date 9/06 Sheet No. P-7

CANOPIES:

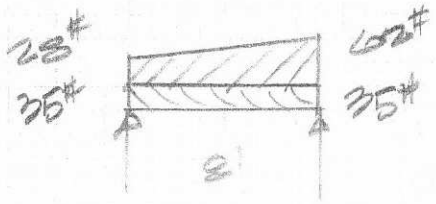
DRIFT: $W_b = 11.6'$ $h_d = 3.6'$

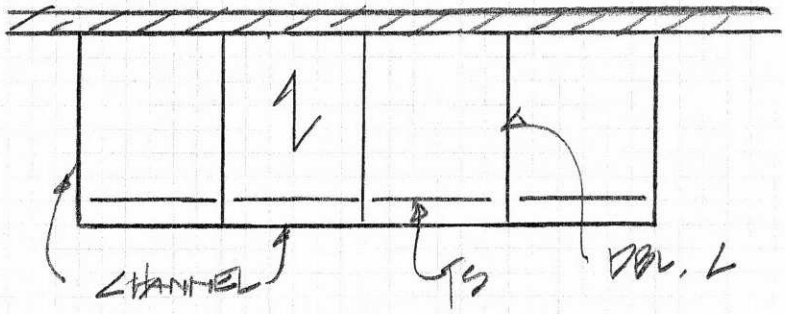
DRIFT = 602 PLF
$W_d = 14.4'$

45

$R_1 = 297$ PLF

$R_2 = 343$ PLF





TS BM.

W = 297 PLF
l = 6'

M = 1336#
R = 891#

$S_x = .53$ IN^3

USE: TS 7x7x3/16

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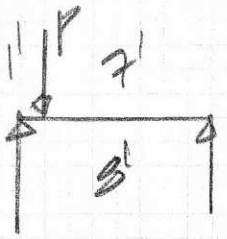
Job HAFFEN II
Client
Job No. By C.V.
Date 9/06 Sheet No. R-3

RR. L

P = 891 (2) = 1782#

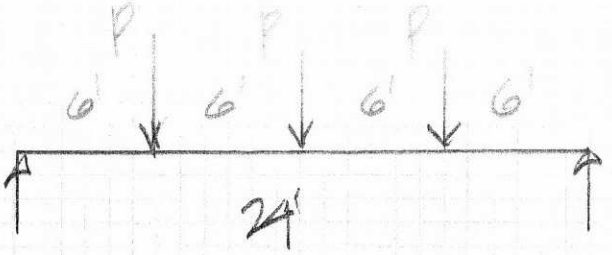


R_1 = 1559#
R_2 = 223#
+M = 15665#

S_2 = .78 IN³ — (2) - L3x3x1/4

CANTILEVER

P = 1559#



R = 2339#
M = 18,708#

S_x = 9.3 IN³

USE, C10x15.3

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Job HAYDEN
Client
Job No. By C.V.
Date 10/11 Sheet No. P-9

6'-6" BM. @ WINDOW -

W = 40 (35/2) + 67 = .80 K/LF

M = 4.2k

V = 2.6k

B2 = 2.1 — HSS 8x4x1/4

TL = .05"

B3 : HSS 8x4x1/4

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Job HAYDEN II

Client

Job No. By C.V.

Date 9/06 Sheet No. L-1

LATERAL ANALYSIS:

SEISMIC: PORTLAND, OR

$S_{DS} = 2/3(1.124) = .75$

$S_{D1} = 2/3(.509) = .39$

SOILS REPORT

$S_{DS} = .67(.91) = .61$

$S_{D1} = .67(.88) < .59$

BY

DESIGN CAT. = D

USE GROUP = I

R = 5

I = 1.0

$V = .75/(5/1) \times W = .15W$ - LRFD

$V = .15/1.4 \times W = .107W$ - ASD

Hayden Harbor II

Conterminous 48 States
2009 International Building Code
Latitude = 45.6139
Longitude = -122.67170999999999
Spectral Response Accelerations SMs and SM1
SMs = Fa x Ss and SM1 = Fv x S1
Site Class D - Fa = 1.127 ,Fv = 1.743

Period (sec)	Sa (g)
0.2	1.050 (SMs, Site Class D)
1.0	0.572 (SM1, Site Class D)

Period (sec)	Sa (g)
0.2	0.700 (SDs, Site Class D)
1.0	0.382 (SD1, Site Class D)

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Job HAYDEN HARBOR

Client

Job No. _____ By E.V.

Date 10/11 Sheet No. L-2

WIND: 95 MPH - EXP. B

$V = 95$ MPH

$K_d = .85$

$I = 1.0$

$K_z = .76$

$K_{zt} = 1.0$

$q_z = .00256(.85)(.76)(1.0)(95^2)(1) = 15$ PSF

$G = .85$

$C_p = .80$ (WIND WARD WALL)

$= -.50$ (LEEWARD WALL)

$= .40$ (WINDWARD ROOF)

$= .60$ (LEEWARD ROOF)

$P_{WALL} = 15(.80)(.85) + 15(.5)(.85) = 17$ PSF - WALL

$P_{ROOF} = 15(.40)(.85) + 15(.60)(.85) = 17$ PSF - ROOF

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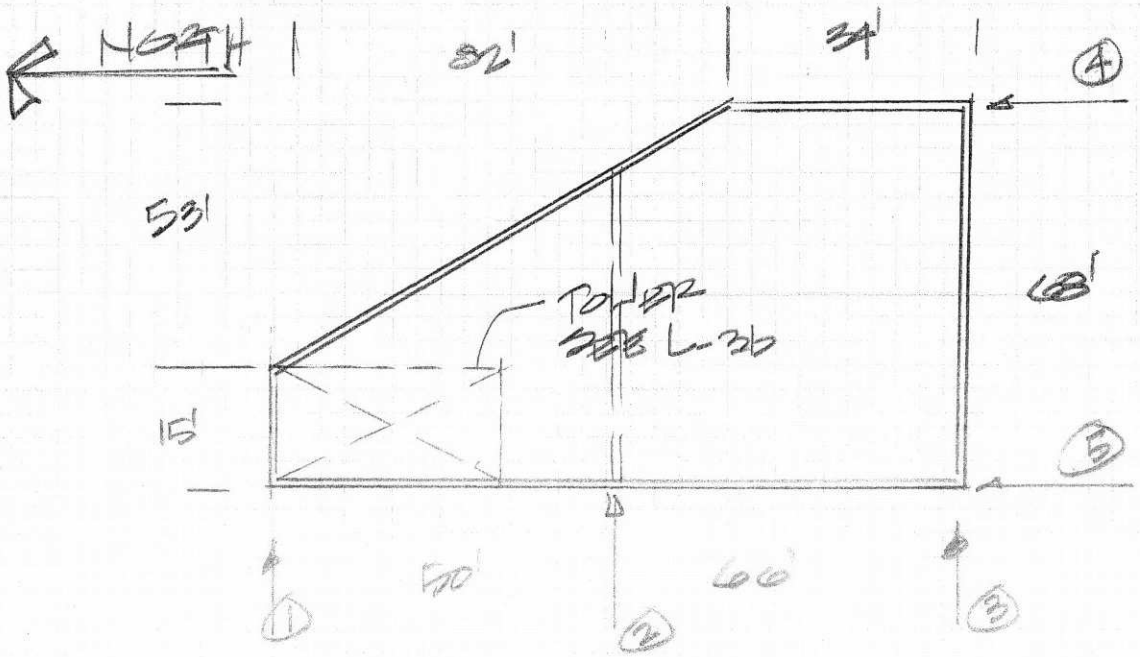
Job HAYDEN II
Client
Job No. By C.V.
Date 9/00 Sheet No. L-3

ROOF DIAPHRAGM:



E/W -

$v_{SEISMIC} = .107[(68)(15) + 80(21.5/2)(2)] = 293$ PLF

$v_{WIND} = 14(21.5/2)(1/8) = 30$ PLF

$V_{@1} = 6401^{\#}$

$v = 6401/14 = 462$ PLF ——— 10d @ 4" o.c.
$v_{ALL} = 480$ PLF

v @ 8' $= 4833/4 = 230$ PLF ——— 10d @ 6" UNBLKD
$v_A = 320/240$ PLF

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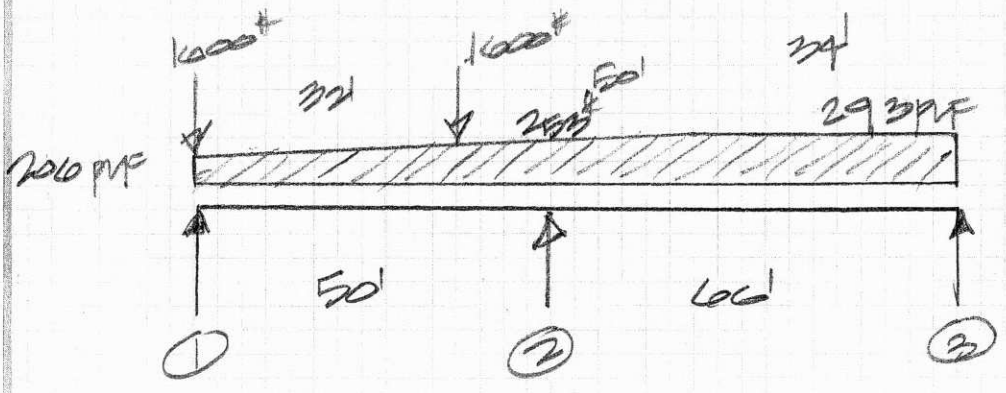
Job HAFB21 II
Client
Job No. By C.V.
Date 10/11 Sheet No. L-32



① = 6481# + 2603# = 9084#

② = 16,977#

③ = 9643#

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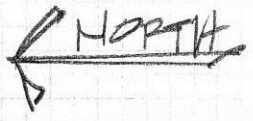
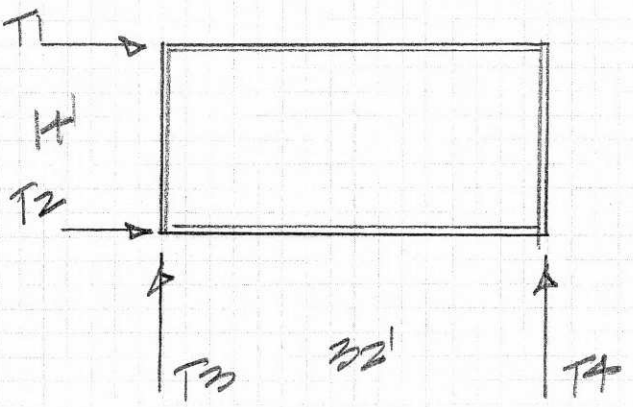
Job HALDEN HARBOR
Client
Job No. By
Date 10/11 Sheet No. L-36

TOWER





NORTH SOUTH

SOUTH = 2.67 [32(15) + 46(10/2)/2] = 100 PLF

WIND = 17(10/2) + 6(12) = 163 PLF

$\sum$ CT = T-2 = 163 (14/2) = 1141 #

V = 1141 / 32 = 36 PLF

EAST - WEST

$\sum$ T3 = T4 = 163 (32/2) = 2608 #

V = 2608 / 14 = 186 PLF

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Job HASPEN
Client
Job No. By L.V.
Date 10/11 Sheet No. L-36

TOWER WALLS –

T1

$v = 114/32 = 36$ plf – (A) 15/32" – #8 @ 6", #8 @ 12"

$M_{OT} = 11.4^k$

$M_R = 212^k$ ok.

T2

$v = 114/4(4) = 71$ plf – (A) – STRAP W/ SIMPSON CS16

T3

$v = 2608/14 = 186$ plf – (A)

$M_{OT} = 26.1^k$

$M_R = [64 + 10(10)] 14^2/2 = 16.1^k$

$P = 1.1^k$ – CLIP TO MASONRY WALL

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Job HAYDEN II

Client

Job No. _____ By C.J.

Date 9/06 Sheet No. L-4

(2) = 16,977# $V_n = 7000/40 = 158$ PLF
$V_s = 9420/48 = 196$ PLF

(3) = 9693# $V = 146$ PLF

N/S -

$30 \times 110 \times .107 \left[110(15) + 30(21.5/2)(2) \right] = 370$ PLF

WIND = 180 PLF

VC (4) = 370(68/2) = 12580#

$V = 12580/116 = 108$ PLF

VC (5) = 12580# $V = 108$ PLF

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Job HAFFEN II
Client
Job No. By C.J.
Date 9/06 Sheet No. L-5

SHEAR WALLS:

(1)
V=9089# — (2) - 4' PIERS

V=9089 /2 = 4545# EA.

M = 4545 (11.333/2) = 25.7k
b = 8" d = 36"

M/bd² = 24.1

ρ ≠ .0156 ∴ ρ = .017 ρ ≈ .0013

As = .0013(8)(44) = .39 IN² — (2) - #5

M/Vd = 1.9 ∴ Fv = √1500 = 51 PSI

fv = 1.5(4545)/8(36) = 24 PSI OK

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Job HAYDEN II
Client
Job No. By C.N.
Date 9/00 Sheet No. L-6

① CONT....

FTG.

GLOBAL OT — $M_{OT} = 225.6^k$

TRY $4' \times 18' \times 16''$

$M_R = 4(18)(1.33)(150) = 14.4 \times 9 = 130$
$4(18)(125)(1) = 9 \times 9 = 81$
$60(243) = 14.6 \times 9 = 131$
$45(15)(6.5) = 4.6 \times 9 = 41$

42.6 — 383^{1k} OK

$a = \frac{383 - 226}{42.6} = 3.7'$

$V = 1919$ PSF

$M_U = 1.4(1.1)(1.9)(2^2/2) = 5.9^{1k}$

$b = 12''$ $d = 16''$ $F = .256$

$K_U = 23$ ∴ $\rho = .0013$ $A_S = 1.0$ IN²

(4)-#5 LONGIT.

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Job HAYDEN II
Client
Job No. By C.V.
Date 9/06 Sheet No. L-7

② $V = 16977/48 = 354$ PLF — USE: (A)

$M_{OT} = 16977(19) = 322.6^{IK}$

$M_R = [15(2) + 101(19)] 48^2/2 = 253^{IK}$

$P = 2.0^K$ — 'S/HDU2'

---

③ $V = 9643^{\#}$ — 25' MASONRY WALL

$M_{OT} = 196^{IK}$

$M_R = 577^{IK}$ OK

$f_V = 11$ PSI OK.

---

④ $V = 12{,}580^{\#}$ — MASONRY WALL OK. BY OBSERVATION

L-7a

SHEAR WALL SCHEDULE

MK	SHEATHING AND NAILING	BASE ANCHORAGE	NOTES
A	15/32" APA RATED SHEATHING, ONE SIDE ALL EDGES BLOCKED, WITH #8 SCREWS AT 6" O.C. ALL PANEL EDGES AND #8 SCREWS AT 12" O.C. FIELD.	3/4" DIA. ANCHOR BOLTS AT 48" O.C. OR Ø.145" DIA. POWER DRIVEN ANCHORS AT 12" O.C.	WIND = 537 PLF SEISMIC = 256 PLF
B	15/32" APA RATED SHEATHING, ONE SIDE ALL EDGES BLOCKED, WITH #8 SCREWS AT 4" O.C. ALL PANEL EDGES AND #8 SCREWS AT 12" O.C. FIELD.	3/4" DIA. ANCHOR BOLTS AT 48" O.C. OR Ø.145" DIA. POWER DRIVEN ANCHORS AT 8" O.C.	
C	15/32" APA RATED SHEATHING, ONE SIDE ALL EDGES BLOCKED, WITH #8 SCREWS AT 3" O.C. ALL PANEL EDGES AND #8 SCREWS AT 12" O.C. FIELD.	3/4" DIA. ANCHOR BOLTS AT 48" O.C. OR Ø.145" DIA. POWER DRIVEN ANCHORS AT 6" O.C.	
D	15/32" APA RATED SHEATHING, ONE SIDE ALL EDGES BLOCKED, WITH #8 SCREWS AT 2" O.C. ALL PANEL EDGES AND #8 SCREWS AT 12" O.C. FIELD.	3/4" DIA. ANCHOR BOLTS AT 48" O.C. OR Ø.145" DIA. POWER DRIVEN ANCHORS AT 6" O.C.	

SHEAR WALL NOTES:

1.) ALL SCREWS TO BE #8 X 1" FLAT HEAD SELF DRILLING SCREWS WITH A MINIMUM HEAD DIAMETER OF Ø.292".

2.) BLOCK ALL UNSUPPORTED PANEL EDGES ALL WALLS WITH CONT. 2" X 18 GA. METAL STRAPPING. SPLICE STRAPPING BY LAPPING 16" AND SCREWING WITH (8) #8 SCREWS.

3.) ALL STUDS TO HAVE A MINIMUM FLANGE WIDTH OF 1 5/8". ALL TRACKS TO HAVE A MINIMUM WIDTH OF 1 1/4".

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Job HAYDEN II
Client
Job No. By L.V.
Date 9/06 Sheet No. L-8

(4) 12580# -OK
V = 12,210# - (5) - 4' CMU PIERS

V = 12,210/5 = 2442# EA - USE (2)-#5 EA END. (SEE LD. 1)

FTG -

$M_O = 2442(11.33/2) = 13.8^k$

TRY 3' × 6' × 20"

$M_R = 3(6)(1.67)(150) = 4.5^k \times 3 = 13.5^k$

3(6)(125)(1) = 2.2 × 3 = 6.6k

30(21.5)(4) = 6.9k × 3 = 20.7k

42.0 30(11.5)(24/2) = 11.0k × 3 = 33.0k

24.6k 74.0k

a = 2.4' ∴ BRG = P/A ∓ M/S

BRG. = 24.6/18 ∓ 13.8/18 = 2133 PSF NG.

4' × 8' × 20"

BRG. = 29.9/32 + 13.8/42.7 = 1260 PSF

USE 4' × 8' × 20" W/ (4)-#5 LONGIT.

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Job Hatfield II
Client
Job No. By C.V.
Date 9/00 Sheet No. M1

MASONRY -

f'_m = 1500 psi n = 12.4

GROUT 60 PSI INF.

WIND = 17 PSF

SEISMIC = .40 (.75) (1) / 1.4 × W = .21W

= .21 (80) = 17 PSF

(24 PSF LRFD)

TYPICAL WALL

W_e = 25 (33'/2) + 24 (8'/2) = 549 PLF (3569#)

W_a = 15 (33'/2) = 248 PLF (1612#)

e = 6½"

q = 17 PSF

e = 17 PSF

l = 8'0"

USE: #5 @ 48" o.c.

(SEE M-12 TO M10)

Project:

Number: M12

Date: October 14, 2011

T: By:

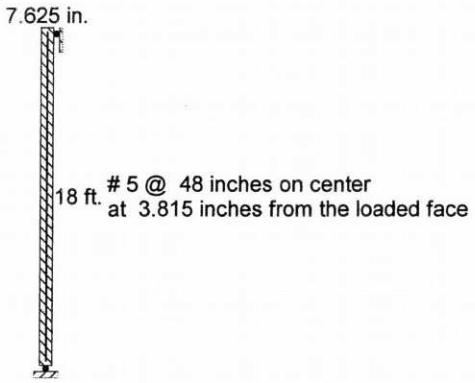
F: Sheet of

CMD09.00.02 Filename: Hayden II Typical Wall.dat

Reinforced Clay Masonry Out-Of-Plane Loaded Wall per 2010 CBC Section 2108 (2008 MSJC Section 3.3.5)

- Ultimate Strength Design -

Input:



Support Condition: Pinned Top and Bottom

Wall Section

Wall Geometry:

18.00' high, 8" nominal thickness CMU wall

Cells Grouted at 48" o.c.

Wall Material Properties:

f'_m = 2,600 psi

f_y = 60,000 psi

E_m = 1,820 ksi

E_s = 29,000 ksi

n = 15.93

Applied Loads:	P plf	M plf-in	Wall Weight psf
Dead Load	248	1,612	80
Floor Live Load	0	0	
Roof Live Load	0	0	
Snow Load	549	3,569	
Horizontal Seismic Load	0	0	
Vertical Seismic Load	0	0	0
Vertical Wind Load	0	0	

Lateral Loading:

#	Load Condition E,W,H[1]	Load Type P,T,M[2]	Load Start Location ft	Load Start Value plf,psf,plf-in	Load End Location ft	Load End Value psf
1	E	T	0.0	24	18.0	24
2	W	T	0.0	17	18.0	17

Seismic Performance Category: E

Output:

Input Reinforcing:

5 @ 48 inches o.c., A_s = 0.08 in²/ft, ρ = 0.0017

maximum ρ = 0.0017 ≤ 0.0118 = ρ_{max} - OK

Wall Design Geometry, Gross Moment of Inertia and Section Modulus:

Positive Moments: b = 48.00 in b´ = 8.56 in d = 3.82 in

Negative Moments: b = 48.00 in b´ = 8.56 in d = 3.81 in

Gross Section: b = 48.00 in b´ = 8.56 in

$I_g = 2[b*t_f^3/12+b*t_f(t/2-t_f/2)^3]+b'(t-2*t_f)^3/12$ = 1,331 in⁴ = 333 in⁴/ft

$S_g = I_g/(t/2)$ = 349 in³ = 87 in³/ft

Allowable Stresses and Cracking Moment:

h´/t = 28.33 ≤ 30 - $F_{a\,max} = 0.2f'_m$

Maximum Axial Stress for h´/t > 30 = $0.05f'_m$ = 130 psi

Maximum Axial Stress for h´/t ≤ 30 = $0.2f'_m$ = 520 psi

f_r (per MSJC Table 3.1.7.2.1) = 79.7 psi

$M_{cr} = S_g*f_r/1000$ = 7.0 kip-in/ft

1. E = Earthquake Force, W = Wind Force, H = Soil Pressure Load
2. P = Point Load, T = Trapezoidal or Uniform Load, M = Concentrated Moment

Project:

MB

Number:
Date: October 14, 2011
T: By:
F: Sheet of

CMD09.00.02 Filename: Hayden II Typical Wall.dat

Reinforced Clay Masonry Out-Of-Plane Loaded Wall per 2010 CBC Section 2108 (2008 MSJC Section 3.3.5)
- Ultimate Strength Design -

Factored Input Out-Of-Plane Loads and Moments:

	Load Type	Load Factor	P_u klf	M_u klf-in	$w_{u\ start}$ ksf	h_{start} ft	$w_{u\ end}$ ksf	h_{end} ft
Load 1	E	1.0			0.024	0.00	0.024	18.00
Load 2	W	1.6			0.027	0.00	0.027	18.00
	W	0.8			0.014	0.00	0.014	18.00

Ultimate Axial Loads and Stress Checks:

Load Case	$P_{u0} + P_{uw}$ lbs	@ h ft	$P_{u0} + P_{uw}/A_g$ psi	Stress Ratio	
1.2D+1.6L+0.5S	1,297.9	10.44	31.68	0.061	OK
1.2D+1.6S+0.8W	1,970.9	9.72	48.10	0.093	OK
1.2D+1.6W+0.5L+0.5S	1,401.5	9.36	34.21	0.066	OK
1.2D+1.0E+0.5L+0.2S	1,271.4	9.00	31.03	0.060	OK
1.2D-1.0E+0.5L+0.2S	1,320.4	8.49	32.23	0.062	OK

Service Load Moments and Maximum Deflections:

- Maximum Allowable Deflection, $\Delta_{s\ max}$ = 0.007h = 1.512 in

Equivalent Unfactored Load Case	P_s kips	$M_{s\ 0}$ kip-in	$M_{s\ P\Delta}$ kip-in	@ h ft	Δ_s in	@ h ft	
D+0.75[S+W]	1.26	8.53	8.94	10.56	0.3313	10.56	$\leq \Delta_{max}$ - OK
D+W	0.93	9.09	9.48	9.44	0.4249	9.44	$\leq \Delta_{max}$ - OK
0.6D+W	0.57	8.75	8.96	9.26	0.3644	9.26	$\leq \Delta_{max}$ - OK
D+0.7E	0.93	8.99	9.37	9.44	0.4087	9.44	$\leq \Delta_{max}$ - OK
0.6D+0.7E	0.57	8.66	8.85	9.27	0.3481	9.27	$\leq \Delta_{max}$ - OK

Ultimate and Nominal Shear:

ϕ = 0.80

Load Case	Governing Location	V_u kips	ϕV_n kips	Strength Ratio	
1.2D+1.6W+0.5L+0.5Lr	Top	0.24	1.55	0.15	OK
1.2D+1.6W	Top	0.24	1.55	0.15	OK
0.9D+1.6W	Top	0.24	1.53	0.16	OK
1.2D-1.0E	Top	0.22	1.55	0.15	OK
0.9D-1.0E	Top	0.22	1.53	0.15	OK

Project:

M1c

Number:
Date: October 14, 2011
T: By:
F: Sheet of

CMD09.00.02 Filename: Hayden II Typical Wall.dat

Reinforced Clay Masonry Out-Of-Plane Loaded Wall per 2010 CBC Section 2108 (2008 MSJC Section 3.3.5)
- Ultimate Strength Design -

Ultimate Axial Load and Data for Ultimate Positive Moment Calculations:

Load Case	P_u	@ h	A_{se}	c	I_{cr}
	kips	ft	in²	in	in⁴
1.2D+1.6W+0.5L+0.5Lr	1.13	9.33	0.10	0.29	19.2
1.2D+1.6W+0.5L+0.5S	1.38	9.63	0.10	0.30	19.9
1.2D+1.6W	1.13	9.33	0.10	0.29	19.2
0.9D+1.6W	0.85	9.25	0.09	0.28	18.4
1.2D+1.0E+0.5L+0.2S	1.22	9.51	0.10	0.29	19.4

Ultimate Positive Moment and Deflection: $\phi = 0.90$

Load Case	M_n	ϕM_n	$M_{u\,0}$	$M_{u\,P\Delta}$	Strength	Δ_u	
	kip-in	kip-in	kip-in	kip-in	Ratio	in	
1.2D+1.6W+0.5L+0.5Lr	21.4	19.2	14.20	15.65	0.81	1.282	OK
1.2D+1.6W+0.5L+0.5S	22.3	20.0	15.14	17.14	0.86	1.451	OK
1.2D+1.6W	21.4	19.2	14.20	15.65	0.81	1.282	OK
0.9D+1.6W	20.4	18.3	13.95	15.01	0.82	1.237	OK
1.2D+1.0E+0.5L+0.2S	21.7	19.5	13.03	14.36	0.73	1.090	OK

Ultimate Axial Load and Data for Ultimate Negative Moment Calculations:

Load Case	P_u	@ h	A_{se}	c	I_{cr}
	kips	ft	in²	in	in⁴
1.2D+1.0E+0.5L+0.2S	2.14	0.00	0.11	0.34	21.9
1.2D-1.0E+0.5L+0.2S	1.32	8.64	0.10	0.30	19.6
1.2D+1.0E	2.03	0.00	0.11	0.33	21.6
1.2D-1.0E	1.20	9.00	0.10	0.29	19.2
0.9D-1.0E	0.89	9.00	0.09	0.28	18.4

Ultimate Negative Moment and Deflection: $\phi = 0.90$

Load Case	M_n	ϕM_n	$M_{u\,0}$	$M_{u\,P\Delta}$	Strength	Δ_u	
	kip-in	kip-in	kip-in	kip-in	Ratio	in	
1.2D+1.0E+0.5L+0.2S	-24.9	-22.4	0.00	0.00	0.00	0.000	OK
1.2D-1.0E+0.5L+0.2S	-22.0	-19.8	-10.38	-11.17	0.56	-0.612	OK
1.2D+1.0E	-24.5	-22.1	0.00	0.00	0.00	0.000	OK
1.2D-1.0E	-21.5	-19.3	-10.72	-11.48	0.59	-0.672	OK
0.9D-1.0E	-20.4	-18.4	-10.95	-11.56	0.63	-0.715	OK

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Job HAYDEN II
Client
Job No. By C.V.
Date 9/00 Sheet No. H-2

24' LINTEL - (7)

L-1

$W_v = 40(23/2) + 34(8/2) + 90(4) + 60(7.5) + 343 = 1.95$ KLF

$M = 140.4^k$
$R = 23.4^k$

TRY 72" LINTEL

$b = 8"$ $d = 68"$

$2/jk = 19.04$

$n\rho j = .0235$ $n\rho = .025$ $\rho = .0020$

$A_s = 1.10$ IN² — (4)-#5

$W_H = 17(18/2) = 153$ PLF OR $17(8/2) = 68$ PLF

BRACE
HAYDEN
$\ell < 12'$

$M_H = 2754^\#$
$R_H = 918^\#$

$b = 72"$ $d = 3.81"$

$2/jk = 20.6$

$\therefore n\rho = .031$ $\rho = .0014$

$n\rho j = .028$

$A_s = 1.24$ IN²
$n\rho = .0972$
$j = .876$
$k = .373$

$A_s = .41$ IN² — (2)-#5 EA. FACE

$f_m = 194$ PSI UNITY = .64
$f_s = 7985$ UNITY = 1.25 OK.

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Job HAYDEN II

Client

Job No. By C.J.

Date 9/06 Sheet No. K1-3

10' LINTEL -

W = 40 + 34 + 4(90) + 7.5(60) + 34 = 1.2K/F

M = 15'K

R = 60K TRY 4Ø" LINTEL

b = 8" d = 44"

2/3K = 79.6

$n\ell_t$ = .006 ∴ $n\ell_s$ = .009 C = 2000

A_s = .20 in²

(2) - #5

f_v = 17 psi

$F_v = \sqrt{2000}$ = 51 psi

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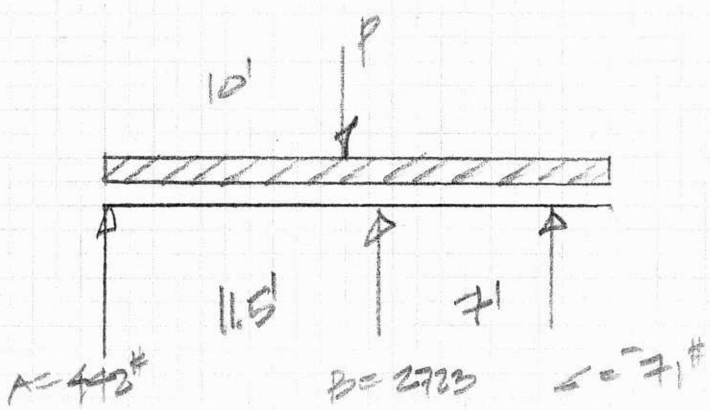
Job HAYDEN II
Client
Job No. By C.J.
Date 9/06 Sheet No. M-4

JAMB @ FRONT HALL

BRACE @ 11'-6"

$W = 17(4) = 68$ PLF

$P = 918(2) = 1836^{\#}$



$+M = 1420^{\#}$

$-M = 2165^{\#}$

$b = 48"$ $d = 3.81"$

$M/bd^2 = 23.3$ ∴ $n\rho = .024$ $\rho = .0017$

$\rho bd = .019$

$A_s = .31$ IN² — (2)-#5 @ CL MIN.

USE (5)-#5
$n\rho = .106$
$j = .871$
$k = .386$

$P_v = 23.4(2) + 1.95(4) = 54.6^k$

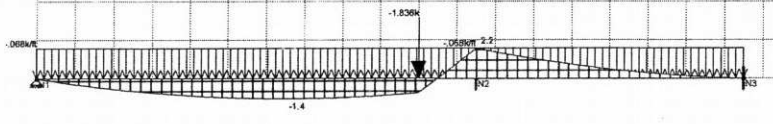
$f_a = 142$ PSI

$h/r = 63$ ∴ $P_a = 134^k$ ∴ $F_a = 350$ PSI

$f_b = 222$ PSI

$222/866 + 142/350 = .66 < 1.0$ OK.

M5



Loads: LC 1, vert
Results for LC 1, vert
Member Bending Moments (k-ft)

Oct 5, 2011 at 10:28 AM

Haydenn II Jamb.r2d

Joint Reactions (By Combination)

	LC	Joint Label	X [k]	Y [k]	MZ [k-ft]
1	1	N1	0	.442	0
2	1	N2	0	2.723	0
3	1	N3	0	-.071	0
4	1	Totals:	0	3.094	
5	1	COG (ft):	X: 9.695	Y: 0	

Member Section Forces (By Combination)

	LC	Member Label	Sec	Axial[k]	Shear[k]	Moment[k-ft]
1	1	M1	1	0	.442	0
2			2	0	.247	-.99
3			3	0	.051	-1.419
4			4	0	-.144	-1.285
5			5	0	-2.176	2.165
6	1	m2	1	0	.547	2.165
7			2	0	.428	1.311
8			3	0	.309	.666
9			4	0	.19	.229
10			5	0	.071	0

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Job HAYDEN #

Client

Job No. By C.V.

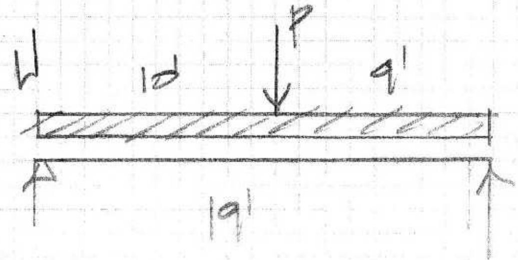
Date 10/11 Sheet No. H-7

JAMB @ 10° OPNG. (H) -(1)

$P_L = [80(4) + 60(7.5) + 40(2)]\ 10/2 = 3125^{\#}$

$W = 17(2.67) = 45$ PLF

$P_{M} = 17(18/2)(10/2) = 765^{\#}$



$R_L = 505^{\#}$

$R_R = 545^{\#}$

$P = 2800^{\#}$

b=24 d=7.81

$M/bd^2 = 9.0$

$n\rho = .039$ $\rho = .0031$

$n\rho j = .0064$

$A_s = .23\ IN^2$ — (2)-#5 @ ¢

$n\rho = .025$
$j = .882$
$k = .354$

$f_b = 248$ psi

$f_a = 16$ psi $F_a = 207$ psi

UNITY = .77 OK

USE: (2) #5 @ ¢.

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Job HAYDEN II
Client
Job No. By CJ
Date 9/06 Sheet No. FT 1

FOOTINGS:

$f'_c = 3000$ PSI

GRADE 60 REINF.

DESIGN SOIL PRES. = 1500 PSF

FOOT #1

$P = 24 + 19.6 = 41.0^K$

$\sqrt{41.0/1.5} = 5.2'$ — 5'-4" x 5'-4" x 16"

$M_U = 1.6(1.5)(2.5^2/2) = 7.5^{IK}$

$b = 12"$ $d = 12"$ $F = .144$

$K_U = 52$ $\therefore \ell = .0013$ $A_S = 1.00 \cdot IN^2$

USE: (4) - #5 EA. WAY

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Job Hayden II
Client
Job No. By CVL
Date 9/06 Sheet No. FG2

FG.#2

$p = 25.1 + .08(23')(4) = 32.5^k$

$\sqrt{32.5/1.6} = 4.7'$ — USE: 5'-0" x 5'-0" x 16" Ht
(5) - #5 EA. WAY

FG 2 REV

$P = 54.6^k$

$54.6/3'(6') = 3033$ PSF NG.

$54.6/4.5'(8') = 1516$ PSF USE: 4'-6" x 8'-0" x 16"

$F_u = 1.6(1.5)(.20 \times 2/2) = 4.8^k$

$b = 12"$ $d = 12"$ $F = .144$

$k_u = 33$ $\therefore \ell = .0013$ $A_s = .19$ IN²

#4 @ 12" o.c. E.W.

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Job HAGGEN #4

Client

Job No. _____ By CVL

Date 9/22 Sheet No. FT-3

FTG C CORNER

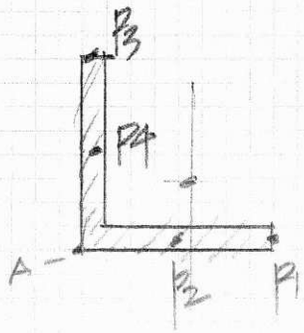
$P_1 = 23.4^k$

$P_2 = 20(4)(12") = 7.4^k$

$P_3 = 0.8^k$

$P_4 = 7.4^k$

$P_T = 44^k$



$\sqrt{49/1.5} = 5'-$

$7' \times 7' \times 1'$

$d = 14"$

$x = 2.33$

OR

$\frac{23.4 + 7.4}{1.5(4)} = 5'-$

$4' \times 6'$ EA WAY

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Job Hafdell II
Client
Job No. By
Date 9/20 Sheet No. F.4

Cont. FG. -

$W = 40(33/2) + 34(8/2) + 80(23) = 2070$ PLF

$2070/1500 = 1.8'$ — USE 2'-0" x 12" FG

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Job HAYDEN II
Client
Job No. By C.V.
Date 9/06 Sheet No. MS-1

OUT OF PLANE -

$Fp = .80(.75)(1)/_{1.4} \times W = .43W =$

$= .43(60) = 26$ PSF

W @ ROOF = 26(21.5²/21)(1/18) = 334 PLF

4' oc @ JOIST - P = 1335# - LTT20B

4' oc PERP - P = 1335# - LTT20B & 0916'

SUBDIAPHRAGM -

V = 334(33/2) = 5511#

ℓ = 5511/480 = 11.5 - BLOCK & NAIL @ 4" oc. FOR 12'-0" MIN.

10d @ 4" oc

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Job Harper
Client
Job No. By E.J.
Date 9/00 Sheet No. 15-2

$V_{CBM.} = 33^{k}(33) = 11.0^{k}$

3/4" ϕ BOLT IN 5/8" BM. $V = 2400^{\#}$

$11.0/2.4(1.33) = 3.5$ – USE: 4 BOLTS

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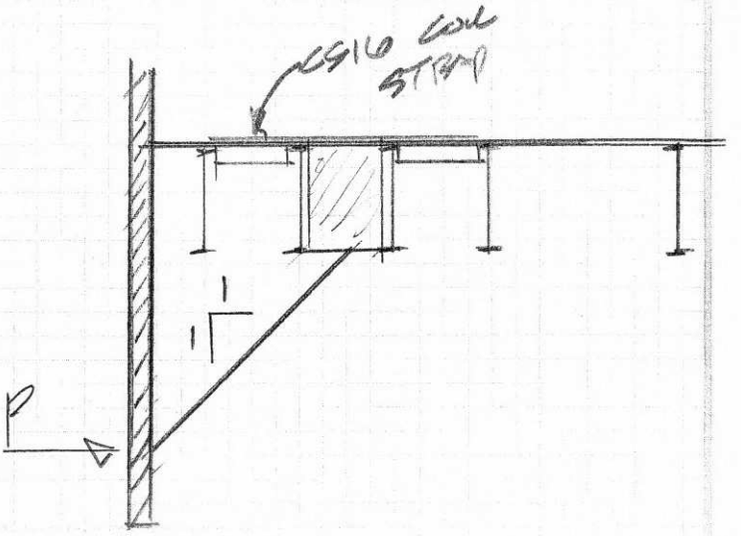
Job HATTON II
Client
Job No. By C.J.
Date 9/06 Sheet No. FB-3

LINTEL BRACE

$P = 126(24/2) = 1512^{\#}$



BRACE -

AXIAL = 2138#

$l = 9 \cdot 12'$ TRY TS 3x2x3/16

$Kl/r = 104$

$F_b = 1.64(13.6) = 22^K$ OK.

STRAP - 1 G90 1 $T_A = 1705^{\#}$

LENGTH = 1512/400 = 3.1' - STRAP 6' MIN.

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Job Hatfield II
Client
Job No. By L.V.
Date 9/00 Sheet No. F54

BOLTS

V = 2138# @ 45°

3/4" @ 45° - 2 1/2" - DBL. V.

3340
1370

$$V_A = \frac{3340\ (1370)}{3340(\sin 45)^2 + 1370(\cos 45)^2} = 1943^{\#}$$

(2) - BOLTS - $V_A = 1943(2)(.333) = 5168^{\#}$ OK

EPOXY - (2) - 5/8 ANCHORS

V = 1512# V = 756# T_A = 1810#
T = 1512# t = 756# V_A = 4495#

756/1810 + 756/4495 = .59 OK

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Job Hayden

Client

Job No. _____ By C.J.

Date 6/11 Sheet No. M55

eb=4.25

ANCHOR BOLTS -

$A_{pt} = 20.7\ in^2$

$A_{pv} = 28.4\ in^2$

TENSION: $3/4\phi \times 5''$ EMBED $= 3604^{\#}$

$= 1402^{\#}$ ←

$= 6330^{\#}$

$1''\phi \times 5''$ EMBED $= 3614^{\#}$

$= 2274^{\#}$ ←

$= 3840^{\#}$

SHEAR: $3/4''\phi \times 5''$ EMBED $= 1810^{\#}$ ←

$= 2036^{\#}$

$= 7728^{\#}$

$= 3302^{\#}$

$1''\phi \times 5''$ EMBED $= 1810^{\#}$ ←

$= 2205^{\#}$

$= 7728^{\#}$

$= 5184^{\#}$