CHRIS OLIVEIRA AND ASSOC.

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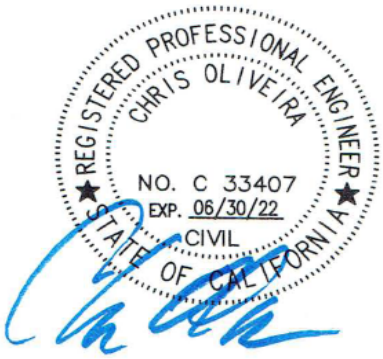
STRUCTURAL CALCULATIONS

RENOVATION 43RD AVE



7-Jul-20

2019 IBC 2019 CBC
ASCE 7 - 16
WIND EXPOSURE B
110 MPH
SDC - D
SITE CLASS D

CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no. 1
	date	7/7/20	

RENOVATION

Roof Load

Roofing……	5.3	
Sheathing……	1.6	
Framing……	2.1	
Miscellaneous……	1.1	
(DL has been factored for roof slope)		
DL	**10.1**	psf
LIVE	**20.0**	psf (4:12)

Ceiling Load

gyp……	5.0	
Framing……	2.0	
Insulation……	1.5	
Miscellaneous……	1.5	
DL	**10.0**	psf
LL	**10.0**	psf

RAFTER $L =$ 15.0 ft $C(D) =$ 1.25 $C(F) =$ 1.20

$w =$ (10.1D + 20L)(1.33') + 3 = **43** plf

$V = wL/2 =$ 323 lb $M = \frac{wL^2}{8} =$ 1209 ft-lb

$A_{req} = \frac{1.5V}{F'_v} =$ 4.1 in^2

$S_{req} = \frac{M(12"/')}{F'_b} =$ 11.0 in^3

$I_{req} = \frac{5\ wL^4}{384\ E\Delta} =$ 40.8 in^4

DF No. 2

F_v	95	F'_v	119
F_b	875	F'_b	1313
E	1600000		Δ: L / 240

2x8 DF No. 2
A = 10.9, S = 13.1, I = 47.6

CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	2

RENOVATION

HIP/VALLEY

L = 10.0 ft

C(D) = 1.00

C(F) = 1.10

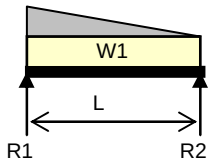
(0'-10') w_1 = + 4 = **4** plf

(Left) W_T = 1/2[(10.1D + 20L)(8')](10') = **1204** lb

R(L) = 823 lb

R(R) = 421 lb

M(Max) = 1594 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 823 lb M = 1594 ft-lb w_{eq} = 128 plf

$$A_{req} = \frac{1.5V}{F'_v} = 13.0 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 19.9 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 54 \text{ in}^4$$

DF No. 2

F_v =	95	F'_v =	95
F_b =	875	F'_b =	963
E =	1600000	Δ: L /	360

2x10 DF No. 2
A = 13.9, S = 21.4, I = 98.9

MAX SPAN 10'

CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	3

RENOVATION

RB1 $L = 20.0$ ft $C(D) = 1.00$ $C(F) = 0.98$

$w = (10.1D + 20L)(15') + (10D)(15') + 23 =$ **625** plf

$V = wL/2 = 6250$ lb $M = \frac{wL^2}{8} = 31250$ ft-lb

$A_{req} = \frac{1.5V}{F'_v} = 32.3$ in^2

$S_{req} = \frac{M(12"/')}{F'_b} = 131.5$ in^3

$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 1125$ in^4

OR LVL

$F_v = 290$ $F'_v = 290$

$F_b = 2900$ $F'_b = 2851$

$E = 2000000$ Δ: L / 240

5 1/4" x 14" PSL OR LVL
A = 73.5, S = 171.5, I = 1201

Spread Footing

$P = [](') =$ 6250 lb

$A_{REQ} = \frac{6250\ lb}{1500\ psf} = 4.17$ ft^2

2'-6" square x 18" deep
w / 3 - #4 Bars Each Way

CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	4

RENOVATION

RB2 L = 11.0 ft C(D) = 1.00 C(F) = 1.00

w = (10.1D + 20L)(9')+(10D)(9') + 13 = **374** plf

V= wL/2 = 2057 lb M= $\frac{wL^2}{8}$ = 5657 ft-lb

$A_{req} = \frac{1.5V}{F'_v}$ = 10.6 in^2

$S_{req} = \frac{M(12"/')}{F'_b}$ = 23.4 in^3

$I_{req} = \frac{5\ wL^4}{384\ E\Delta}$ = 168 in^4

F_v	= 290	F'_v	= 290
F_b	= 2900	F'_b	= 2903
E	= 2000000		Δ: L / 360

3 1/2" x 11 7/8" PSL
A = 41.6, S = 82.3, I = 488

RB 3 L = 16.0 ft C(D) = 1.00 C(F) = 1.00

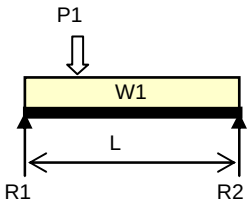
(0'-16') w_1 = (10.1D + 20L)(2') + 20 = **80** plf

(@ 4') P_1 = RB4 **3458** lb

R(L) = 3234 lb

R(R) = 1505 lb

M(Max) = 12294 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 3234 lb M = 12294 ft-lb w_{eq} = 384 plf

$A_{req} = \frac{1.5V}{F'_v}$ = 16.7 in^2

$S_{req} = \frac{M(12"/')}{F'_b}$ = 50.8 in^3

$I_{req} = \frac{5\ wL^4}{384\ E\Delta}$ = 531 in^4

Parallam

F_v	= 290	F'_v	= 290
F_b	= 2900	F'_b	= 2903
E	= 2000000		Δ: L / 360

5 1/4" x 11 7/8" PSL Parallam
A = 62.3, S = 123.4, I = 733

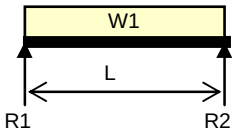
CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	5

RENOVATION

RB 4 L = 14.0 ft C(D) = 1.00 C(F) = 1.00

(0'-14') w_1 = (10.1D + 20L)(12')+(10D)(12') + 13 = **494** plf

R(L) = 3458 lb
R(R) = 3458 lb
M(Max) = 12103 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 3458 lb M = 12103 ft-lb w_{eq} = 494 plf

$$A_{req} = \frac{1.5V}{F'_v} = 17.9 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 50.0 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 457 \text{ in}^4$$

Parallam

F_v	= 290	F'_v	= 290
F_b	= 2900	F'_b	= 2903
E	= 2000000	Δ : L / 360	

3 1/2" x 11 7/8" PSL Parallam
A = 41.6, S = 82.3, I = 488

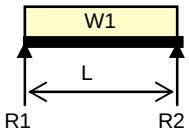
CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	6

RENOVATION

RB 5 L = 7.0 ft C(D) = 1.00 C(F) = 1.10

(0'-7') w_1 = (10.1D + 20L)(6')+(10D)(6') + 10 = **251** plf

R(L) = 879 lb
R(R) = 879 lb
M(Max) = 1537 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 879 lb M = 1537 ft-lb w_{eq} = 251 plf

$$A_{req} = \frac{1.5V}{F'_v} = 13.9 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 19.2 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 36 \text{ in}^4$$

DF No. 2

F_v	= 95	F'_v	= 95
F_b	= 875	F'_b	= 963
E	= 1600000	Δ: L / 360	

4x12 DF No. 2
A = 39.4, S = 73.8, I = 415

CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	7

RENOVATION

RB 6,7,8,9 $L =$ 8.0 ft $C(D) =$ 1.00 $C(F) =$ 1.10

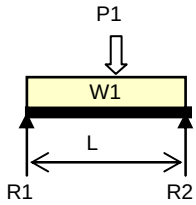
(0'-8') $w_1 =$ (10.1D + 20L)(2')+(10D)(2') + 10 = **90** plf

(@ 4.5') $P_1 =$ [(10.1D + 20L)(2')](5') = **301** lb

R(L) = 492 lb

R(R) = 529 lb

M(Max) = 1301 ft-lb



Support Conditions: (Pinned - Pinned)

Check: $V =$ 529 lb $M =$ 1301 ft-lb $w_{eq} =$ 163 plf

$$A_{req} = \frac{1.5V}{F'_v} = 8.4 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 16.2 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 35 \text{ in}^4$$

DF No. 2

F_v	=	95	F'_v	=	95
F_b	=	875	F'_b	=	963
E	=	1600000	Δ: L / 360		

4x12 DF No. 2
A = 39.4, S = 73.8, I = 415

CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	8

RENOVATION

RB 10 $L =$ 5.0 ft $C(D) =$ 1.00 $C(F) =$ 1.00

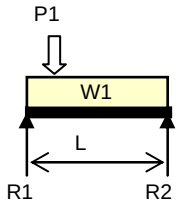
(0'-5') $w_1 = +13 =$ **13** plf

(@ 1') $P_1 =$ RB2 **2057** lb

$R(L) =$ 1678 lb

$R(R) =$ 444 lb

$M(Max) =$ 1672 ft-lb



Support Conditions: (Pinned - Pinned)

Check: $V =$ 1678 lb $M =$ 1672 ft-lb $w_{eq} =$ 535 plf

$$A_{req} = \frac{1.5V}{F'_v} = 8.7 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 6.9 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 23 \text{ in}^4$$

Parallam

F_v	= 290	F'_v	= 290
F_b	= 2900	F'_b	= 2903
E	= 2000000	Δ: L / 360	

3 1/2" x 11 7/8" PSL Parallam
A = 41.6, S = 82.3, I = 488

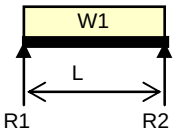
CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	9

RENOVATION

RB 11 $L =$ 5.0 ft $C(D) =$ 1.00 $C(F) =$ 1.10

(0'-5') $w_1 = (10.1D + 20L)(6') + (10D)(6') + 10 =$ **251** plf

$R(L) =$ 628 lb
$R(R) =$ 628 lb
$M(Max) =$ 784 ft-lb



Support Conditions: (Pinned - Pinned)

Check: $V =$ 628 lb $M =$ 784 ft-lb $w_{eq} =$ 251 plf

$$A_{req} = \frac{1.5V}{F'_v} = 9.9 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 9.8 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 13 \text{ in}^4$$

DF No. 2

F_v	= 95	F'_v	= 95
F_b	= 875	F'_b	= 963
E	= 1600000	Δ : L /	360

4x12 DF No. 2
A = 39.4, S = 73.8, I = 415

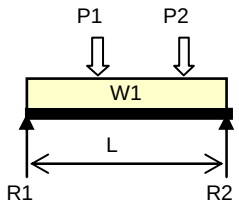
CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	10

RENOVATION

RB 12 $L =$ 14.0 ft $C(D) =$ 1.00 $C(F) =$ 1.00

(0'-14')	$w_1 =$ + 13 =		**13** plf
(@ 5')	$P_1 =$ RB6		**529** lb
(@ 11')	$P_2 =$ RB7		**529** lb

$R(L) =$ 544 lb
$R(R) =$ 696 lb
$M(Max) =$ 2560 ft-lb



Support Conditions: (Pinned - Pinned)

Check: $V =$ 696 lb $M =$ 2560 ft-lb $w_{eq} =$ 104 plf

$$A_{req} = \frac{1.5V}{F'_v} = 3.6 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 10.6 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 96 \text{ in}^4$$

Parallam

F_v	= 290	F'_v	= 290
F_b	= 2900	F'_b	= 2903
E	= 2000000	Δ: L / 360	

3 1/2" x 11 7/8" PSL Parallam
A = 41.6, S = 82.3, I = 488

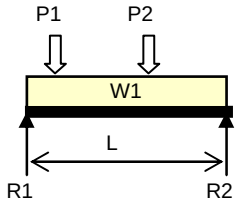
CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	11

RENOVATION

RB 13 $L =$ 14.0 ft $C(D) =$ 1.00 $C(F) =$ 1.00

(0'-14')	$w_1 =$ + 13 =	**13**	plf
(@ 2')	$P_1 =$ RB8	**529**	lb
(@ 8.5')	$P_2 =$ RB9	**529**	lb

$R(L) =$ 752 lb
$R(R) =$ 488 lb
$M(Max) =$ 2486 ft-lb



Support Conditions: (Pinned - Pinned)

Check: $V =$ 752 lb $M =$ 2486 ft-lb $w_{eq} =$ 101 plf

$$A_{req} = \frac{1.5V}{F'_v} = 3.9 \text{ in}^2$$

$$S_{req} = \frac{M(12''/')}{F'_b} = 10.3 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 94 \text{ in}^4$$

Parallam

F_v =	290	F'_v =	290
F_b =	2900	F'_b =	2903
E =	2000000	Δ: L /	360

3 1/2" x 11 7/8" PSL Parallam
A = 41.6, S = 82.3, I = 488

CHRIS OLIVEIRA AND ASSOCIATES	project	43 PALM RENOVATION	
	by	CO	no.
	date	7/7/20	12

RENOVATION

RB **14** L = 7.0 ft C(D) = 1.00

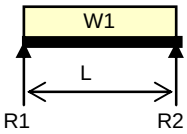
C(F) = 1.10

(0'-7') w_1 = (10.1D + 20L)(6')+(10D)(6') + 10 = **251** plf

R(L) = 879 lb

R(R) = 879 lb

M(Max) = 1537 ft-lb



Support Conditions: (Pinned - Pinned)

Check: V = 879 lb M = 1537 ft-lb w_{eq} = 251 plf

$$A_{req} = \frac{1.5V}{F'_v} = 13.9 \text{ in}^2$$

$$S_{req} = \frac{M(12"/')}{F'_b} = 19.2 \text{ in}^3$$

$$I_{req} = \frac{5\ wL^4}{384\ E\Delta} = 36 \text{ in}^4$$

DF No. 2

F_v	= 95	F'_v	= 95
F_b	= 875	F'_b	= 963
E	= 1600000	Δ: L / 360	

4x12 DF No. 2
A = 39.4, S = 73.8, I = 415