Structural Analysis

Project Name: Addition

Building Address: 923 Clemensen Ave. Santa Ana

Date: 10/14/2011

Project No.: **11-0815**

10176076

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

DATE 12-27-2011
JOB NO. 11-0815

ROOF RAFTERS TIE

Ceiling Joist Span=	25	ft
Uniform Load =	36.00	plf
Pitch =	4	:12
T = (w*L/4)*(12/pitch) = Tension	675	lbs
16d provides 141 lbs = of 16d =	3.8	

Use FIVE 16d @ every Roof Rafter and Ceiling Joist & Splice

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DATE 10-14-2011
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LOADING ANALYSIS (TYPICAL MATERIAL UNLESS NOTED OTHERWISE)

ROOF LOAD		
	ROOFING TYPE:	comp
	PITCH:	4 :12
DEAD LOAD		
	Roofing =	3.0 psf
	Sheathing =	1.5 psf
	Framing =	1.1 psf
	Misc =	1.4 psf
DEAD LOAD	SUB TOTAL:	7.0 psf
LIVE LOAD		20 PSF
TOTAL LOAD	:	27 PSF

CEILING LOAD		
DEAD LOAD		5 PSF
	SUB TOTAL:	5 PSF
LIVE LOAD	:	10 PSF
TOTAL LOAD	:	15 PSF

LOADING ANALYSIS (TYPICAL MATERIAL UNLESS NOTED OTHERWISE)

ROOF RAFTERS (SLOPED w/ RIDGE BD)

MAX SPAN = 12.5 FT
LL = 20 psf
DL = 7 psf
SPACING = 16 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 36.00 PLF
Reaction, R = 225 LBS
V = W*L/2= 225 LB
M = W*L^2/8 = 703 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	1.5 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	5.02 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.594 IN	<	L*12/120 IN	= 1.25 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 16" O.C

JOISTS

Ceiling Joists

MAX SPAN = 25 FT
LL = 10 psf
DL = 5 psf
SPACING = 16 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.1

Uniform Load W= 20.00 PLF
Reaction, R = 250 LBS
V = W*L/2= 250 LB
M = W*L^2/8 = 1563 LB-FT
Inertia Selected = 98.93 IN^4

A = 1.5*V/(Fv * CD.) =	1.7 IN^2	<	13.88 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	13.18 IN^3	<	21.39 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	1.111 IN	<	L*12/180 IN	= 1.67 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X10 D.F. #2 @ 16" O.C

ROOF RAFTERS (Patio)

MAX SPAN = 12.5 FT
LL = 20 psf
DL = 7 psf
SPACING = 24 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 54.00 PLF
Reaction, R = 338 LBS
V = W*L/2= 338 LB
M = W*L^2/8 = 1055 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	2.3 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	7.53 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.891 IN	<	L*12/120 IN	= 1.25 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 24" O.C

JOISTS

Ceiling Joists

MAX SPAN = 11 FT
LL = 10 psf
DL = 5 psf
SPACING = 24 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 30.00 PLF
Reaction, R = 165 LBS
V = W*L/2= 165 LB
M = W*L^2/8 = 454 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	1.1 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	3.24 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.297 IN	<	L*12/180 IN	= 0.73 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 24" O.C

Ceiling Framing Beams and Headers

BM 1 (@ Kit/Dining)

MAX SPAN L = 12.50 FT

Roof LL =	20 psf	Ceiling LL =	0 psf
Roof DL =	7 psf	Ceiling DL =	5 psf
Roof Tributary =	6.50 FT	Ceiling Tributary =	6.50 FT
		Wall DL =	15 psf
		Wall Height =	0 FT

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	208	PLF
Reaction R=	1300	LBS
V = W*L /2 =	1300	LB
M = W*L^2/8 =	4063	LB-FT
Inertia Selected =	392.96	IN^4

A = 1.5*V/(Fv * CD.) =	9.18	IN^2	<	52.25	IN^2		OK
S = M *12 / (Fb*CD*CF) =	28.89	IN^3	<	82.73	IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.182	IN	<	L*12/180 =	0.83	IN	OK

USE 6X10 D.F. #1

Hip Beam, HB1

Span, L =	17.5	ft	Wmax =	236.25	plf
LL =	20	psf	V =	2067	lbs
DL =	7	psf	Vmax =	1378	lbs
Tributary =	8.75	ft	Mmax =	4641	lbs-ft
fb =	1000	psi	Ra =	1378	lbs
fv =	180	psi	Rb =	689	lbs
E =	1.60E+06	psi	Inertia Selected =	230.8	in^4
CD = Duration Factor =	1.25				
CF = Size Factor =	1.2				

A = 1.5*V/(Fv * CD.) =	9.19	in^2	<	32.38	in^2	OK
S = M *12 / (Fb*CD*CF) =	37.13	in^3	<	49.91	in^3	OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	1.350	IN	<	L*12/120 = 1.75	IN	OK

* Table 1604.3 in 2010 California Building Code

USE 4X10 D.F. #1

BM2 (Supporting HB1 x2)

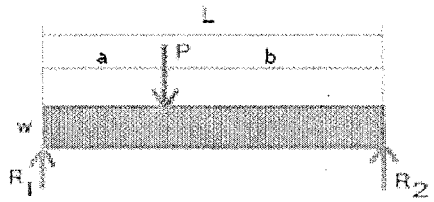
MAX SPAN, L = 8 ft

P =	2756 lbs
Located (from R1) =	4 ft
a =	4 ft
b =	4 ft

Fb =	1000	psi
Fv =	180	psi
E =	1.7E+06	psi
CD = Duration Factor =	1.25	
CF = Size Factor =	1.2	

*Table 1607.1 Footnote (i) CBC 2010
For attics without storage, this live load need not be assumed to act concurrently with any other live load

Uniform Load W =	0	plf
R1 = W*L /2+P*b/L =	1378	lbs
R2 =W*L /2+P*a/L =	1378	lbs
V =	1378	lbs
Mmax = W*L^2/8+(P*a*b)/L =	5513	lbs-ft
Inertia Selected =	230.8	in^4



A = 1.5*V/(Fv * CD.) =	9.19	in^2	<	32.38	in^2	OK
S = M *12 / (Fb*CD*CF) =	44.10	in^3	<	49.91	in^3	OK
Δ = (5/384)*(W*L^4)*1728/(E*I) + (P*a^2*b^2)/(3*E*I*L) =	0.13	in	<	L*12/180 = 0.53	in	OK

* Table 1604.3 in 2010 California Building Code

USE 4X10 D.F.#1

BM 3 @ Patio

MAX SPAN L =	25.00 FT			
Roof LL =	20 psf	Ceiling LL =	0 psf	
Roof DL =	7 psf	Ceiling DL =	5 psf	
Roof Tributary =	6.00 FT	Ceiling Tributary =	0.00 FT	
		Wall DL =	15 psf	
		Wall Height =	0 FT	

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	162	PLF					
Reaction R=	2025	LBS					
V = W*L /2 =	2025	LB					
M = W*L^2/8 =	12656	LB-FT					
Inertia Selected =	950.55	IN^4					
A = 1.5*V/(Fv * CD.) =	14.29	IN^2	<	86.25	IN^2		OK
S = M *12 / (Fb*CD*CF) =	90.00	IN^3	<	165.31	IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.936	IN	<	L*12/120 =	2.50	IN	OK

USE 8X12 D.F. #1

BM 4 @ Patio

MAX SPAN L =	12.50 FT			
Roof LL =	20 psf	Ceiling LL =	0 psf	
Roof DL =	7 psf	Ceiling DL =	5 psf	
Roof Tributary =	6.00 FT	Ceiling Tributary =	0.00 FT	
		Wall DL =	15 psf	
		Wall Height =	0 FT	

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	162	PLF					
Reaction R=	1013	LBS					
V = W*L /2 =	1013	LB					
M = W*L^2/8 =	3164	LB-FT					
Inertia Selected =	950.55	IN^4					
A = 1.5*V/(Fv * CD.) =	7.15	IN^2	<	86.25	IN^2		OK
S = M *12 / (Fb*CD*CF) =	22.50	IN^3	<	165.31	IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.059	IN	<	L*12/120 =	1.25	IN	OK

USE 8X12 D.F. #1

Wind Load Calculation

Basic Wind Speed =	85 mph		
Exposure =	B		
Pitch =	4	: 12	
Roof Angle =	18.43	degrees	
Importance Factor, I =	1		ASCE Standard 7-05 pg 116 Table 11.5-1
Adjustment Factor, l =	1		ASCE Standard 7-05 pg 40 Figure 6-2
Mean Roof Height, h =	13.67	ft	
Topographic Factor, Kzt =	1		ASCE Standard 7-05 pg 26 Section 6.5.7.2
Kzt = (1+K1*K2*K3)^2 =	1		ASCE Standard 7-05 pg 45 Figure 6-4
Design Wind Pressure, Ps30 =	15.9	psf	
Ps = I*Kzt*I*Ps30 =	15.9	psf	ASCE Standard 7-05 pg 24 Section 6.4.2.1

Seismic Coefficient

V=(F*Sds/R)*W

# of Stories = 1

F= 1 12.14.8 ASCE Standard 7-05 , P 141

R = 6.5 Table 12.2-1 ASCE Standard 7-05, P. 120

I = 1 Table 11.5-1 ASCE Standard 7-05, P. 116

SMs = 1.381 USGS*

Sds = 0.921

V = 0.142 W ρ = 1.3

Design V = V * W *ρ*0.7 (Working Stress) = 0.129 W

ASCE 7-05 Section 12.3.4.2, P. 126

*From Seismic Hazard Curves Response Parameteres and Deisgn Parameters

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Lateral Analysis (Y-Y Direction)

Line 1

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	2.84	270

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5.67	12.33	35	90

from: EXISTING

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

Σ =

Seismic Shear (LBS)
90

∴ **Wind Governs**

Governing Shear = 270 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6.33					6.3	43

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6.33	43	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.84	5	2.84	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	2164	3086	.67	15	Negligible

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Lateral Analysis (Y-Y Direction)

Line 2

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	5.335	509

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5.67	12.33	35	90

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5	6.25	15.625	40

Seismic Shear (LBS)
Σ = 130

∴ **Wind Governs**

Governing Shear = 509 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6					6.0	85

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6	85	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.84	5	2.84	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	4072	2773	.67	369	Negligible

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Lateral Analysis (Y-Y Direction)

Line 3

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	2.5	239

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5	6	15	39

from: EXISTING

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

	Seismic Shear (LBS)
Σ =	39

∴ **Wind Governs**

Governing Shear = 239 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6					6.0	40

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6	40	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.50	5	2.50	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	1908	2700	.67	17	Negligible

Lateral Analysis (Y-Y Direction)

Line 4

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	12.75	1216

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

Seismic Shear (LBS)
Σ = 1036

∴ **Wind Governs**

Governing Shear = 1216 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
8					8.0	152

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	8	152	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	12.75	5	12.75	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	9731	8736	.67	485	Negligible

Lateral Analysis (Y-Y Direction)

Line 5

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	12.75	1216

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

Σ =

Seismic Shear (LBS)
1036

∴ **Wind Governs**

Governing Shear = 1216 lbs

Shear Wall Segment					Total	Unit Shear
1	2	3	4	5	L (FT)	(PLF)
5.5					5.5	221

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	5.5	221	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	12.75	5	12.75	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	9731	4129	.67	1266	HDU2	3075

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Lateral Analysis (X-X Direction)

Line A

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	6.17	588

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
10.67	12.33	66	170

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

Seismic Shear (LBS)
Σ = 170

∴ **Wind Governs**

Governing Shear = 588 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
					0.0	See Perf Shear Design

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

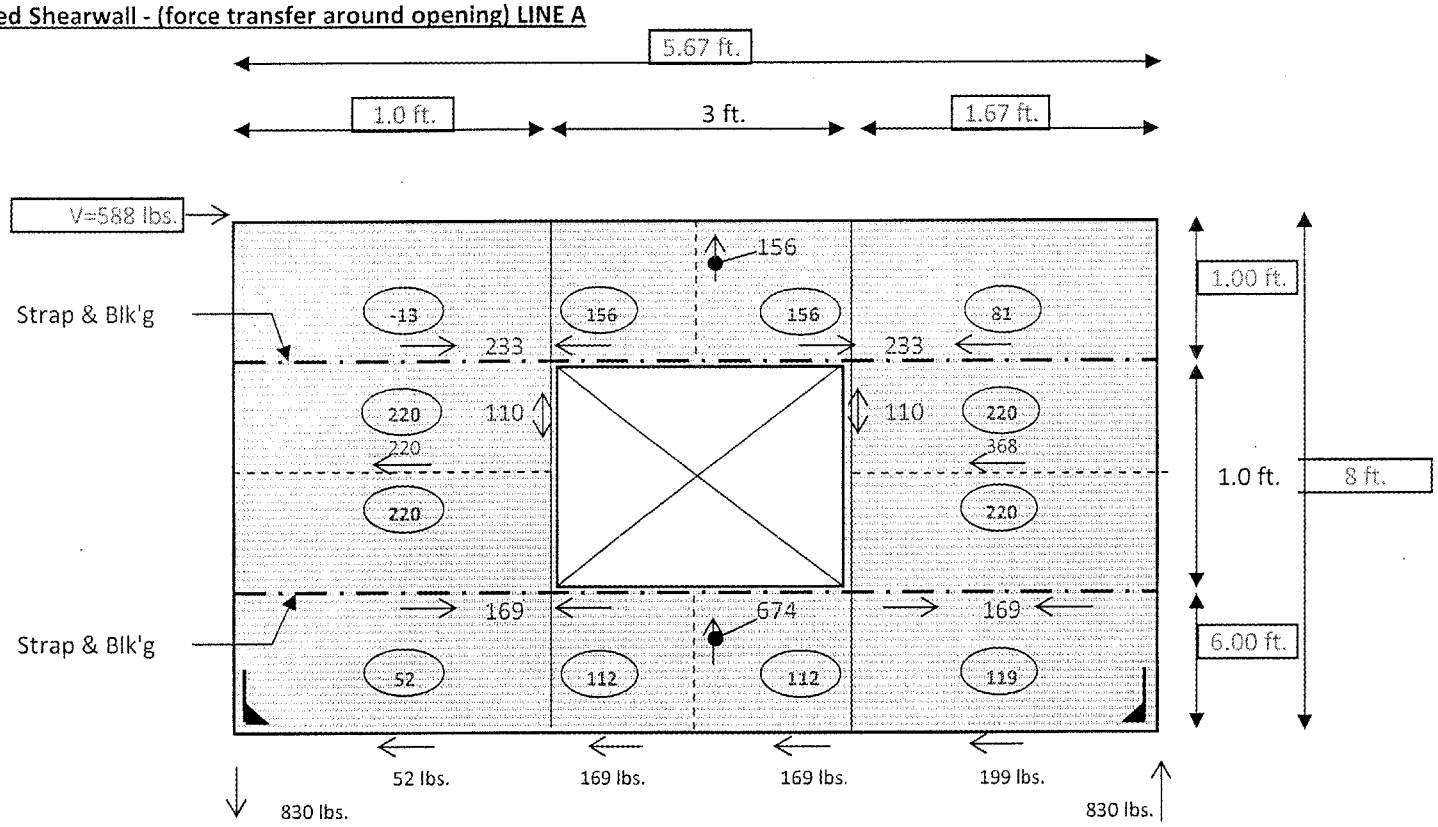
Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	0.0	**See Perf Shear Design**	0

SEE NEXT PAGE

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1						

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	**USE** Provides (lbs)
1					

Perforated Shearwall - (force transfer around opening) LINE A



xx = Panel Shear, plf

Unit Shear =	**104**	plf
Max Shear =	**220**	lbs
Header Strap=	**233**	lbs
Sill Strap=	**169**	lbs

Shear wall type = 10

Lateral Analysis (X-X Direction)

Line B

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	19.5	1860

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
10.67	12.33	66	170

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
55	16	440	1135

Seismic Shear (LBS)
Σ = 1304

∴ **Wind Governs**

Governing Shear = 1860 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
4.67	4.25				8.9	209

USE: Δ 11 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	4.67	209	1
2	8	4.3	209	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	8.0	5	8.0	15	8
2	7	8.0	5	8.0	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	7792	2355	.67	1331	HDU2	3075
2	7091	1951	.67	1361	HDU2	3075

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

DATE
JOB NO. 11-0815

Lateral Analysis (X-X Direction)

Line C

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	15.5	1479

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	31	395.25	1019

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

	Seismic Shear (LBS)
Σ =	1463

∴ **Wind Governs**

Governing Shear = 1479 lbs

Shear Wall Segment					Total	Unit Shear
1	2	3	4	5	L (FT)	(PLF)
4	4.0				8.0	185

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	4	185	0
2	8	4.0	185	0

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	0.0	5	0.0	15	8
2	7	0.0	5	0.0	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	5915	960	.67	1318	HDU2	3075
2	5915	960	.67	1318	HDU2	3075

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

DATE
JOB NO. 11-0815

Lateral Analysis (X-X Direction)

Line D

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	6.00	8	1	7.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
111	12.5	1391

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
55	12	330	851

Σ =

Seismic Shear (LBS)
1443

∴ **Seismic Governs**

Governing Shear = 1443 lbs

Shear Wall Segment					Total	Unit Shear
1	2	3	4	5	L (FT)	(PLF)
10					10.0	144

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	10	144	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	6.5	5	6.5	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	**USE** Provides (lbs)
1	11543	9900	.9	263	Negligible

Roof Diaphragm

Seismic V = 2.58 psf

	Length (ft)	Load (psf)
Y-Dir	18	46
X-Dir	25.5	66

Wind Load

	Wind Load (PLF)
Y-Dir	95
X-Dir	95

	Governing Load (psf)	X-Dir Length (L1, ft)	Y-Dir Length (L2, ft)
Y-Dir	95	25.5	18
X-Dir	95	25.5	18

LONG w*L1/(2*L2) = 68 lbs/ft
SHORT w*L2/(2*L1) = 34 lbs/ft

USE 15/32" CDX PLYWOOD OR OSB w/ 8d @ 6" and 12"
PROVIDES = 240#/ft UNBLOCKED
*Table 2306.2.1(1) CBC 2010

LONG Tension = Compression = w*L1^2/(L2*8) = 431 lbs
SHORT Tension = Compression = w*L2^2/(L1*8) = 152 lbs

USE ST22 PROVIDES = 1420 lbs
ST22 PROVIDES = 1420 lbs

FOUNDATION ANALYSIS:(ASSUME SOIL BEARING PRESSURE 1500 PSF)

Continous Footing

Roof DL = 7 psf
Roof LL = 19 psf
Roof Tributary = 12.75 ft
Ceiling DL = 5 psf
Ceiling Tributary = 12.75 ft
Floor DL = 40 psf
Floor LL = 10 psf
Floor Tributary = 0.00 ft
Wall DL = 15 psf
Wall Height = 8 ft

W max = 515 plf
Soil Bearing Pressure = 1500 psf
Width = 0.34 ft
4.12 inches

USE 12"x12"deep w/ #4 T.&B. MIN.

1 Pad Support BM 3 and BM 4 @ Patio

P max = 3038 lbs
A req = 1.42 sq ft
A req = 17.08 sq in

USE 24"x24"x12" w/ 2 #4 E.W.

SHEAR PANEL SCHEDULE (SEISMIC) C. B. C. 2010 EDITION TABLE 2306.3

NO.	MATERIAL	NAILING	LB/FT S/W	SOLE NAILING 16d @ ___ O.C.	A.B. SPACING 5/8" @ ___ O.C
10	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 6" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	280	6"	32"
11	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 4" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	350	4"	24"
12	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 4" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	430*	4"	24"
13	3/8"STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 3" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	550*	3"	16"
14	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 3" O.C. Edge & 12" FIELD OR 16d SINKER	665*	2"	12"
15	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 2" O.C. Edge & 12" FIELD OR 16d SINKER	870*	2"	8"

* FRAMING AT ADJOINING PANEL EDGES AND SILL PLATE SHALL BE 3x___ OR WIDER AND NAILS SHALL BE STAGGERED (IF SHEAR WALL EXCEED 350#/FT).

NOTES:

A. PROVIDE 2x___ BLOCKING AT HORIZONTAL PLYWOOD PANEL JOINTS

B. WHERE PLYWOOD IS APPLIED ON BOTH FACES OF WALL AND NAIL SPACING IS LESS THAN A 6" OC, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS OR FRAMING SHALL BE 3x___ OR WIDER (OR 2-2x___) AND NAILS STAGGERED ON EACH SIDE.

C. WHERE NAILS ARE SPACED AT 2" OC, THEY SHALL BE STAGGERED AND 3x___ OR WIDER FRAMING MEMBERS SHALL BE USED AT ADJOINING PANEL EDGES

D. USE .229"x3"x3" SQUARE WASHER FOR 5/8"X10" ANCHOR BOLTS

BUILDING ENERGY ANALYSIS REPORT

PROJECT:

SINGLE HOUSE ADDITION
923 CLEMENSEN
SANTA ANA, CA 92705

Project Designer:

KENS DESIGNS
4482 LARO LN.
YORBA LINDA, CA 92886
(714) 931-0295

Report Prepared by:

Perfect Design
PERFECT DESIGN & DEVELOPMENT, INC.
2416 W Valley Blvd
Alhambra, Ca 91803
(626)289-8808

Job Number:

F11-1001R

Date:

10/12/2011

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2008 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC – www.energysoft.com.

TABLE OF CONTENTS

PERFORMANCE CERTIFICATE: Residential (Part 1 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	10/12/2011

Project Address	California Energy Climate Zone	Total Cond. Floor Area	Addition	# of Stories
923 CLEMENSEN SANTA ANA	CA Climate Zone 08	2,194	381	1

FIELD INSPECTION ENERGY CHECKLIST

☐ Yes ☑ No HERS Measures -- If Yes, A CF-4R must be provided per Part 2 of 5 of this form.

☐ Yes ☑ No Special Features -- If Yes, see Part 2 of 5 of this form for details.

INSULATION

Construction	Type	Cavity	Area (ft^2)	Special Features (see Part 2 of 5)	Status
Roof	Wood Framed Attic	R-30	1,813		Existing
Wall	Wood Framed	R-11	1,229		Existing
Slab	Unheated Slab-on-Grade	None	1,813	Perim = 175'	Existing
Roof	Wood Framed Rafter	R-30	381		New
Wall	Wood Framed	R-13	547		New
Slab	Unheated Slab-on-Grade	None	381	Perim = 84'	New

FENESTRATION

Orientation	Area(ft^2)	U-Factor	SHGC	Overhang	Sidefins	Exterior Shades	Status
Right (W)	16.0	1.190	0.83	none	none	Bug Screen	Existing
Left (E)	36.0	1.190	0.83	none	none	Bug Screen	Existing
Left (E)	54.0	0.300	0.21	none	none	Bug Screen	New
Front (N)	37.2	1.190	0.83	none	none	Bug Screen	Existing
Rear (S)	40.2	1.190	0.83	none	none	Bug Screen	Existing
Rear (S)	117.5	0.300	0.21	none	none	Bug Screen	New
Right (W)	0.0	0.300	0.21	none	none	Bug Screen	New
Front (N)	0.0	0.300	0.21	none	none	Bug Screen	New

HVAC SYSTEMS

Qty.	Heating	Min. Eff	Cooling	Min. Eff	Thermostat	Status
1	Central Furnace	94% AFUE	Split Air Conditioner	15.0 SEER	Setback	Altered
1	Central Furnace	96% AFUE	Split Air Conditioner	15.0 SEER	Setback	New

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Status
EXISTING AREA	Ducted	Ducted	Attic, Ceiling Ins, vented	6.0	New
ADDITION AREA	Ducted	Ducted	Attic, Ceiling Ins, vented	6.0	New

WATER HEATING

Qty.	Type	Gallons	Min. Eff	Distribution	Status

PERFORMANCE CERTIFICATE: Residential	(Part 2 of 5)	CF-1R

Project Name	Building Type			Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Multi Family	☐ Addition Alone ☑ Existing+ Addition/Alteration		*10/12/2011*

SPECIAL FEATURES INSPECTION CHECKLIST

The enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

HERS REQUIRED VERIFICATION

Items in this section require field testing and/or verification by a certified HERS Rater. The inspector must receive a completed CF-4R form for each of the measures listed below for final to be given.

PERFORMANCE CERTIFICATE: Residential (Part 3 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	*10/12/2011*

ANNUAL ENERGY USE SUMMARY

TDV (kBtu/ft²-yr)	Standard	Proposed	Margin
Space Heating	9.35	8.62	0.73
Space Cooling	16.80	16.20	0.60
Fans	5.94	6.39	-0.45
Domestic Hot Water	18.56	18.56	0.00
Pumps	0.00	0.00	0.00
Totals	50.65	49.77	0.88
Percent Better Than Standard:			1.7 %

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

				Fenestration
Building Front Orientation:	(N) 0 deg	Ext. Walls/Roof	Wall Area	Area
Number of Dwelling Units:	1.00	(N)	444	37
Fuel Available at Site:	Natural Gas	(E)	594	90
Raised Floor Area:	0	(S)	444	158
Slab on Grade Area:	2,194	(W)	594	16
Average Ceiling Height:	8.0	Roof	2,194	0
Fenestration Average U-Factor:	0.68		TOTAL:	301
Average SHGC:	0.48		Fenestration/CFA Ratio:	13.7 %

REMARKS

STATEMENT OF COMPLIANCE

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 the Administrative Regulations and Part 6 the Efficiency Standards of the California Code of Regulations.

The documentation author hereby certifies that the documentation is accurate and complete.

Documentation Author

Company	*PERFECT DESIGN & DEVELOPMENT, INC*		
Address	*2416 W Valley Blvd*	Name	*Perfect Design*
City/State/Zip	*Alhambra, Ca 91803*	Phone	*(626)289-8808*

Signed *10/12/2011* Date

The individual with overall design responsibility hereby certifies that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application, and recognizes that compliance using duct design, duct sealing, verification of refrigerant charge, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Company	*KENS DESIGNS*		
Address	*4482 LARO LN.*	Name	
City/State/Zip	*YORBA LINDA, CA 92886*	Phone	*(714) 931-0295*

Signed License # Date

CERTIFICATE OF COMPLIANCE: Residential (Part 4 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	10/12/2011

OPAQUE SURFACE DETAILS

Surface Type	Area	U-Factor	Insulation Cavity	Exterior	Frame	Interior	Frame	Azm	Tilt	Status	Joint Appendix 4	Location/Comments
Roof	1,813	0.032	R-30					0	25	Existing	4.2.1-A8	EXISTING FLOOR
Wall	436	0.110	R-11					270	90	Existing	4.3.1-A2	EXISTING FLOOR
Wall	292	0.110	R-11					90	90	Existing	4.3.1-A2	EXISTING FLOOR
Wall	407	0.110	R-11					0	90	Existing	4.3.1-A2	EXISTING FLOOR
Wall	94	0.110	R-11					180	90	Existing	4.3.1-A2	EXISTING FLOOR
Slab	1,813	0.730	None					0	180	Existing	4.4.7-A1	EXISTING FLOOR
Roof	381	0.036	R-30					0	25	New	4.2.2-A16	NEW FLOOR
Wall	142	0.102	R-13					270	90	New	4.3.1-A3	NEW FLOOR
Wall	212	0.102	R-13					90	90	New	4.3.1-A3	NEW FLOOR
Wall	0	0.102	R-13					0	90	New	4.3.1-A3	NEW FLOOR
Wall	192	0.102	R-13					180	90	New	4.3.1-A3	NEW FLOOR
Slab	381	0.730	None					0	180	New	4.4.7-A1	NEW FLOOR

FENESTRATION SURFACE DETAILS

ID	Type	Area	U-Factor[1]		SHGC[2]		Azm	Status	Glazing Type	Location/Comments
1	Window	16.0	1.190	Default	0.83	Default	270	Existing	Single Metal Clear	EXISTING FLOOR
2	Window	36.0	1.190	Default	0.83	Default	90	Existing	Single Metal Clear	EXISTING FLOOR
3	Window	24.0	0.300	NFRC	0.21	NFRC	90	New	Double Non Metal Clear (6)	EXISTING FLOOR
4	Window	37.2	1.190	Default	0.83	Default	0	Existing	Single Metal Clear	EXISTING FLOOR
5	Window	40.2	1.190	Default	0.83	Default	180	Existing	Single Metal Clear	EXISTING FLOOR
6	Window	20.0	0.300	NFRC	0.21	NFRC	180	New	Double Non Metal Clear (6)	EXISTING FLOOR
7	Window	0.0	0.300	NFRC	0.21	NFRC	270	New	Double Non Metal Clear (6)	NEW FLOOR
8	Window	30.0	0.300	NFRC	0.21	NFRC	90	New	Double Non Metal Clear (6)	NEW FLOOR
9	Window	0.0	0.300	NFRC	0.21	NFRC	0	New	Double Non Metal Clear (6)	NEW FLOOR
10	Window	97.5	0.300	NFRC	0.21	NFRC	180	New	Double Non Metal Clear (6)	NEW FLOOR

(1) U-Factor Type: 116-A = Default Table from Standards, NFRC = Labeled Value
(2) SHGC Type: 116-B = Default Table from Standards, NFRC = Labeled Value

EXTERIOR SHADING DETAILS

ID	Exterior Shade Type	SHGC	Window Hgt	Window Wd	Overhang Len	Overhang Hgt	Overhang LExt	Overhang RExt	Left Fin Dist	Left Fin Len	Left Fin Hgt	Right Fin Dist	Right Fin Len	Right Fin Hgt
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												
6	Bug Screen	0.76												
7	Bug Screen	0.76												
8	Bug Screen	0.76												
9	Bug Screen	0.76												
10	Bug Screen	0.76												

CERTIFICATE OF COMPLIANCE: Residential (Part 5 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	*10/12/2011*

BUILDING ZONE INFORMATION

System Name	Zone Name	Floor Area (ft^2) New	Existing	Altered	Removed	Volume	Year Built
EXISTING AREA	*EXISTING FLOOR PLAN*		*1,813*			*14,504*	*1950*
ADDITION AREA	*NEW FLOOR PLAN*	*381*				*3,048*	
	Totals	*381*	*1,813*	*0*	*0*		

HVAC SYSTEMS

System Name	Qty.	Heating Type	Min. Eff.	Cooling Type	Min. Eff.	Thermostat Type	Status
EXISTING AREA	*1*	*Central Furnace*	*94% AFUE*	*Split Air Conditioner*	*15.0 SEER*	*Setback*	*Altered*
pre-altered for above		*Central Furnace*	*80% AFUE*	*Split Air Conditioner*	*10.0 SEER*	*Setback*	
ADDITION AREA	*1*	*Central Furnace*	*96% AFUE*	*Split Air Conditioner*	*15.0 SEER*	*Setback*	*New*

HVAC DISTRIBUTION

System Name	Heating	Cooling	Duct Location	Duct R-Value	Ducts Tested?	Status
EXISTING AREA	*Ducted*	*Ducted*	*Attic, Ceiling Ins, vented*	*6.0*	☐	*New*
pre-altered for above	*Ducted*	*Ducted*	*Attic, Ceiling Ins, vented*	*4.2*	☐	
ADDITION AREA	*Ducted*	*Ducted*	*Attic, Ceiling Ins, vented*	*6.0*	☐	*New*
					☐	
					☐	

WATER HEATING SYSTEMS

System Name	Qty.	Type	Distribution	Rated Input (Btuh)	Tank Cap. (gal)	Energy Factor or RE	Standby Loss or Pilot	Ext. Tank Insul. R-Value	Status
EXISTING WATER HEATE	*1*	*Small Gas*	*All Pipes Ins*	*37,000*	*50*	*0.53*	*n/a*	*n/a*	*Existing*

MULTI-FAMILY WATER HEATING DETAILS

Control	Qty.	HP	Eff. Premium	Hot Water Piping Length (ft) Plenum	Outside	Buried	Add ½" Insulation
			☐				☐
			☐				☐
			☐				☐
			☐				☐
			☐				☐

HYDRONIC HEATING SYSTEM PIPING

System Name	Pipe Length	Pipe Diameter	Insul. Thick.

MANDATORY MEASURES SUMMARY: Residential (Page 1 of 3) MF-1R

Project Name	Date
SINGLE HOUSE ADDITION	*10/12/2011*

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

§116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.

§116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).

§117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.

§118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.

§118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.

*§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.

§150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.

*§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.

*§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.

§150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.

§150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.

§150(l): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

§150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.

§150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.

§150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

§110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.

§113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.

§115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.

§150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.

§150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).

§150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.

§150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.

§150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.

§150(j)2: Cooling system piping (suction, chilled water, or brine lines),and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.

§150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.

§150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.

§150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.

§150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft^2 or 100 watts for dwelling units larger than 2,500 ft^2 may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.
EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.
EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luimnaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
SINGLE HOUSE ADDITION	10/12/2011
System Name	**Floor Area**
EXISTING AREA	1,813

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	75,000
Total Output (Btuh)	75,000
Output (Btuh/sqft)	41.4
Cooling System	
Output per System	46,000
Total Output (Btuh)	46,000
Total Output (Tons)	3.8
Total Output (Btuh/sqft)	25.4
Total Output (sqft/Ton)	473.0
Air System	
CFM per System	1,600
Airflow (cfm)	1,600
Airflow (cfm/sqft)	0.88
Airflow (cfm/Ton)	417.4
Outside Air (%)	0.0 %
Outside Air (cfm/sqft)	0.00

Note: values above given at ARI conditions

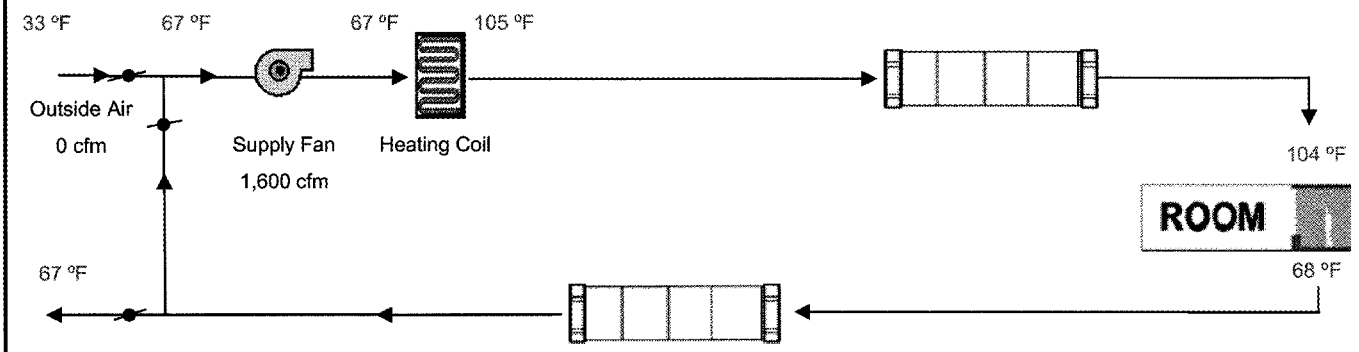
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	Sensible	Latent	CFM	Sensible
Total Room Loads	689	14,590	1,022	531	20,789
Return Vented Lighting		0			
Return Air Ducts		539			1,080
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		539			1,080
TOTAL SYSTEM LOAD		15,668	1,022		22,950

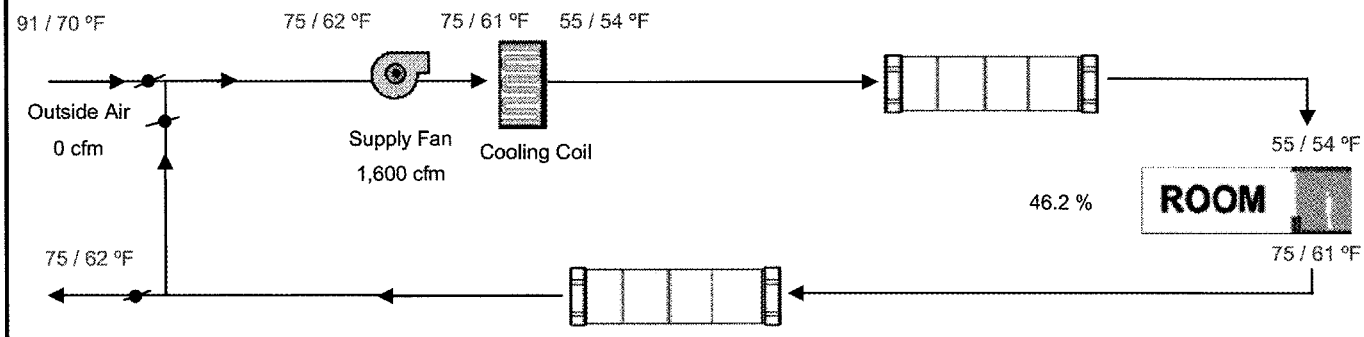
HVAC EQUIPMENT SELECTION

CARRIER 38TDB-048/58MVP-080-20	33,622	9,334		75,000
Total Adjusted System Output (Adjusted for Peak Design conditions)	33,622	9,334		75,000
TIME OF SYSTEM PEAK	Aug 3 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name	Date
SINGLE HOUSE ADDITION	10/12/2011
System Name	Floor Area
ADDITION AREA	381

ENGINEERING CHECKS	
Number of Systems	1
Heating System	
Output per System	37,000
Total Output (Btuh)	37,000
Output (Btuh/sqft)	97.1
Cooling System	
Output per System	22,400
Total Output (Btuh)	22,400
Total Output (Tons)	1.9
Total Output (Btuh/sqft)	58.8
Total Output (sqft/Ton)	204.1
Air System	
CFM per System	800
Airflow (cfm)	800
Airflow (cfm/sqft)	2.10
Airflow (cfm/Ton)	428.6
Outside Air (%)	0.0 %
Outside Air (cfm/sqft)	0.00
Note: values above given at ARI conditions	

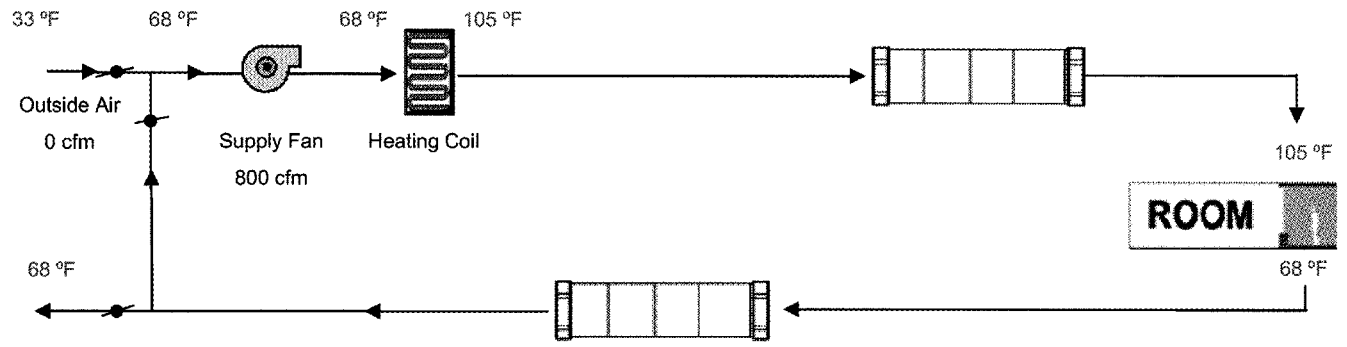
SYSTEM LOAD

	COIL COOLING PEAK			COIL HTG. PEAK	
	CFM	Sensible	Latent	CFM	Sensible
Total Room Loads	242	5,152	531	170	6,702
Return Vented Lighting		0			
Return Air Ducts		190			348
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		190			348
TOTAL SYSTEM LOAD		5,533	531		7,399

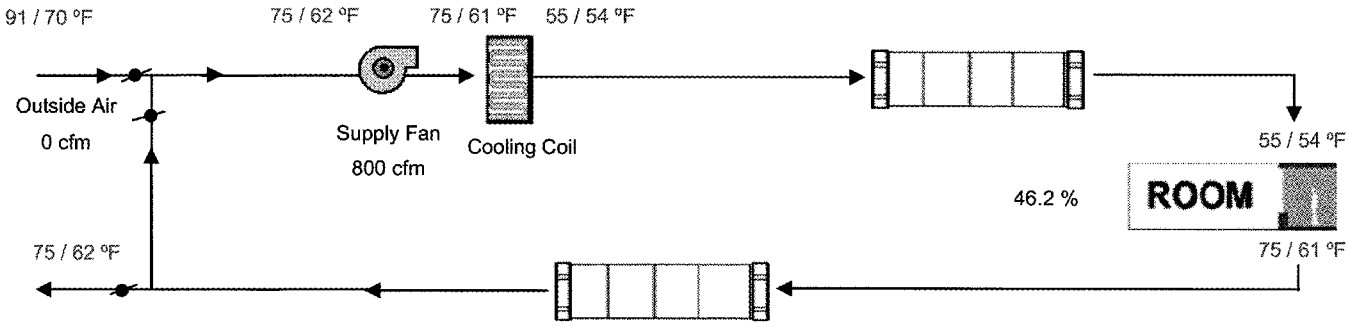
HVAC EQUIPMENT SELECTION

CARRIER 38TDB-024/58MVP-040-14	16,219	4,693		37,000
Total Adjusted System Output (Adjusted for Peak Design conditions)	16,219	4,693		37,000
TIME OF SYSTEM PEAK		Aug 3 PM		Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETICS (Airstream Temperatures at Time of Cooling Peak)



ROOM LOAD SUMMARY

Project Name	Date
SINGLE HOUSE ADDITION	*10/12/2011*
System Name	Floor Area
EXISTING AREA	*1,813*

ROOM LOAD SUMMARY

			ROOM COOLING PEAK			COIL COOLING PEAK			COIL HTG. PEAK	
Zone Name	Room Name	Mult.	CFM	Sensible	Latent	CFM	Sensible	Latent	CFM	Sensible
EXISTING FLOOR	*EXISTING FLOOR PLAN*	*1*	*689*	*14,590*	*1,022*	*689*	*14,590*	*1,022*	*531*	*20,789*
PAGE TOTAL						*689*	*14,590*	*1,022*	*531*	*20,789*
TOTAL *						*689*	*14,590*	*1,022*	*531*	*20,789*

* Total includes ventilation load for zonal systems.

ROOM LOAD SUMMARY

Project Name	Date
SINGLE HOUSE ADDITION	*10/12/2011*
System Name	Floor Area
ADDITION AREA	*381*

ROOM LOAD SUMMARY

			ROOM COOLING PEAK			COIL COOLING PEAK			COIL HTG. PEAK	
Zone Name	Room Name	Mult.	CFM	Sensible	Latent	CFM	Sensible	Latent	CFM	Sensible
NEW FLOOR	*NEW FLOOR PLAN*	*1*	*242*	*5,152*	*531*	*242*	*5,152*	*531*	*170*	*6,702*
						PAGE TOTAL	*242*	*5,152*	*531*	*170*	*6,702*
						TOTAL *	*242*	*5,152*	*531*	*170*	*6,702*

* Total includes ventilation load for zonal systems.

ROOM HEATING PEAK LOADS

Project Name	Date
SINGLE HOUSE ADDITION	*10/12/2011*

ROOM INFORMATION		DESIGN CONDITIONS	
Room Name	*EXISTING FLOOR PLAN*	**Time of Peak**	*Jan 1 AM*
Floor Area	*1,813.0 ft²*	**Outdoor Dry Bulb Temperature**	*33 °F*
Indoor Dry Bulb Temperature	*68 °F*		

Conduction	Area		U-Value		ΔT °F		Btu/hr
Default Roof 1950 to Present	1,813.0	X	0.0320	X	35	=	2,031
Default Wall 1950 to Present	1,229.0	X	0.1100	X	35	=	4,732
Single Metal Clear	129.4	X	1.1900	X	35	=	5,390
Double Non Metal Clear (6)	44.0	X	0.3000	X	35	=	462
Slab-On-Grade	perim = 175.3	X	0.7300	X	35	=	4,479
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	
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		X		X		=	
		X		X		=	
		X		X		=	
		X		X		=	

Items shown with an asterisk (*) denote conduction through an interior surface to another room — **Page Total** 17,093

Infiltration:[1.00 (Schedule Fraction) **X** 1.075 (Air Sensible) **X** 1,813 (Area) **X** 8.00 (Ceiling Height) **X** 0.406 (ACH) **/ 60] X** 35 (ΔT) **=** 3,697

TOTAL HOURLY HEAT LOSS FOR ROOM *20,789*

ROOM HEATING PEAK LOADS

Project Name	Date
SINGLE HOUSE ADDITION	*10/12/2011*

ROOM INFORMATION		DESIGN CONDITIONS	
Room Name	*NEW FLOOR PLAN*	**Time of Peak**	*Jan 1 AM*
Floor Area	*381.0 ft²*	**Outdoor Dry Bulb Temperature**	*33 °F*
Indoor Dry Bulb Temperature	*68 °F*		

Conduction	Area		U-Value		ΔT °F		Btu/hr
R-30 Roof(R.30.2x12.16)	*381.0*	X	*0.0360*	X	*35*	=	*480*
R-13 Wall	*546.9*	X	*0.1020*	X	*35*	=	*1,952*
Double Non Metal Clear (6)	*127.5*	X	*0.3000*	X	*35*	=	*1,339*
Slab-On-Grade	*perim = 84.3*	X	*0.7300*	X	*35*	=	*2,154*

Items shown with an asterisk (*) denote conduction through an interior surface to another room **Page Total** *5,925*

Infiltration:[*1.00* (Schedule Fraction) **X** *1.075* (Air Sensible) **X** *381* (Area) **X** *8.00* (Ceiling Height) **X** *0.406* (ACH) **/ 60] X** *35* (ΔT) **=** *777*

TOTAL HOURLY HEAT LOSS FOR ROOM *6,702*

RESIDENTIAL ROOM COOLING LOAD SUMMARY

Project Name	Date
SINGLE HOUSE ADDITION	*10/12/2011*

ROOM INFORMATION		DESIGN CONDITIONS	
Room Name	*EXISTING FLOOR PLAN*	**Outdoor Dry Bulb Temperature**	*91 °F*
Floor Area	*1,813.0 ft²*	**Outdoor Wet Bulb Temperature**	*70 °F*
Indoor Dry Bulb Temperature	*75 °F*	**Outdoor Daily Range:**	*26 °F*

Opaque Surfaces	Orientation	Area		U-Factor		CLTD[1]		Btu/hr
Default Roof 1950 to Present	*(N)*	*1,813.0*	X	*0.0320*	X	*38.0*	=	*2,205*
Default Wall 1950 to Present	*(W)*	*436.0*	X	*0.1100*	X	*14.0*	=	*671*
Default Wall 1950 to Present	*(E)*	*292.0*	X	*0.1100*	X	*14.0*	=	*450*
Default Wall 1950 to Present	*(N)*	*406.8*	X	*0.1100*	X	*4.0*	=	*179*
Default Wall 1950 to Present	*(S)*	*94.2*	X	*0.1100*	X	*7.0*	=	*73*
			X		X		=	
			X		X		=	
			X		X		=	
			X		X		=	
						Page Total		*3,577*

Items shown with an asterisk (*) denote conduction through an interior surface to another room.

1. Cooling Load Temperature Difference (CLTD)

		Shaded			Unshaded			
Fenestration	**Orientation**	**Area**	**GLF**		**Area**	**GLF**		**Btu/hr**
WINDOWS	*(W)*	*0.0* X	*32.3*	+	*16.0* X	*80.2*	=	*1,284*
WINDOWS	*(E)*	*0.0* X	*32.3*	+	*36.0* X	*80.2*	=	*2,889*
WINDOWS-1	*(E)*	*0.0* X	*8.7*	+	*24.0* X	*21.7*	=	*520*
WINDOWS	*(N)*	*0.0* X	*32.3*	+	*37.2* X	*32.3*	=	*1,200*
WINDOWS	*(S)*	*0.0* X	*32.3*	+	*40.2* X	*38.1*	=	*1,532*
WINDOWS-1	*(S)*	*0.0* X	*8.7*	+	*20.0* X	*10.2*	=	*205*
		X		+	X		=	
		X		+	X		=	
		X		+	X		=	
						Page Total		*7,629*

Internal Gain						Btu/hr
Occupants	*2.0*	Occupants	X	*230* Btuh/occ.	=	*460*
Equipment	*1.0*	Dwelling Unit	X	*1,600* Btu	=	*1,600*

Infiltration: *1.075* (Air Sensible) X *0.68* (CFM) X *112.26* (ELA) X *16* (ΔT) = *1,323*

TOTAL HOURLY SENSIBLE HEAT GAIN FOR ROOM *14,590*

Latent Gain						Btu/hr
Occupants	*2.0*	Occupants	X	*200* Btuh/occ.	=	*400*

Infiltration: *4,822* (Air Sensible) X *0.68* (CFM) X *112.26* (ELA) X *0.00168* (ΔW) = *622*

TOTAL HOURLY LATENT HEAT GAIN FOR ROOM *1,022*

RESIDENTIAL ROOM COOLING LOAD SUMMARY

Project Name	Date
SINGLE HOUSE ADDITION	*10/12/2011*

ROOM INFORMATION		DESIGN CONDITIONS	
Room Name	*NEW FLOOR PLAN*	**Outdoor Dry Bulb Temperature**	*91 °F*
Floor Area	*381.0 ft²*	**Outdoor Wet Bulb Temperature**	*70 °F*
Indoor Dry Bulb Temperature	*75 °F*	**Outdoor Daily Range:**	*26 °F*

Opaque Surfaces	Orientation	Area		U-Factor		CLTD[1]		Btu/hr
R-30 Roof(R.30.2x12.16)	*(N)*	*381.0*	X	*0.0360*	X	*38.0*	=	*521*
R-13 Wall	*(W)*	*142.4*	X	*0.1020*	X	*14.0*	=	*203*
R-13 Wall	*(E)*	*212.4*	X	*0.1020*	X	*14.0*	=	*303*
R-13 Wall	*(S)*	*192.1*	X	*0.1020*	X	*7.0*	=	*137*
			X		X		=	
			X		X		=	
			X		X		=	
			X		X		=	
			X		X		=	
						Page Total		*1,165*

Items shown with an asterisk (*) denote conduction through an interior surface to another room.

1. Cooling Load Temperature Difference (CLTD)

		Shaded			Unshaded			
Fenestration	**Orientation**	**Area**	**GLF**		**Area**	**GLF**		**Btu/hr**
WINDOWS	*(W)*	*0.0* X	*8.7*	+	*0.0* X	*21.7*	=	*0*
WINDOWS	*(E)*	*0.0* X	*8.7*	+	*30.0* X	*21.7*	=	*650*
WINDOWS	*(N)*	*0.0* X	*8.7*	+	*0.0* X	*8.7*	=	*0*
WINDOWS	*(S)*	*0.0* X	*8.7*	+	*97.5* X	*10.2*	=	*999*
		X		+	X		=	
		X		+	X		=	
		X		+	X		=	
		X		+	X		=	
		X		+	X		=	
						Page Total		*1,649*

Internal Gain						Btu/hr
Occupants	*2.0*	Occupants	X	*230* Btuh/occ.	=	*460*
Equipment	*1.0*	Dwelling Unit	X	*1,600* Btu	=	*1,600*

Infiltration: *1.075* (Air Sensible) X *0.68* (CFM) X *23.59* (ELA) X *16* (ΔT) = *278*

TOTAL HOURLY SENSIBLE HEAT GAIN FOR ROOM *5,152*

Latent Gain						Btu/hr
Occupants	*2.0*	Occupants	X	*200* Btuh/occ.	=	*400*

Infiltration: *4,822* (Air Sensible) X *0.68* (CFM) X *23.59* (ELA) X *0.00168* (ΔW) = *131*

TOTAL HOURLY LATENT HEAT GAIN FOR ROOM *531*

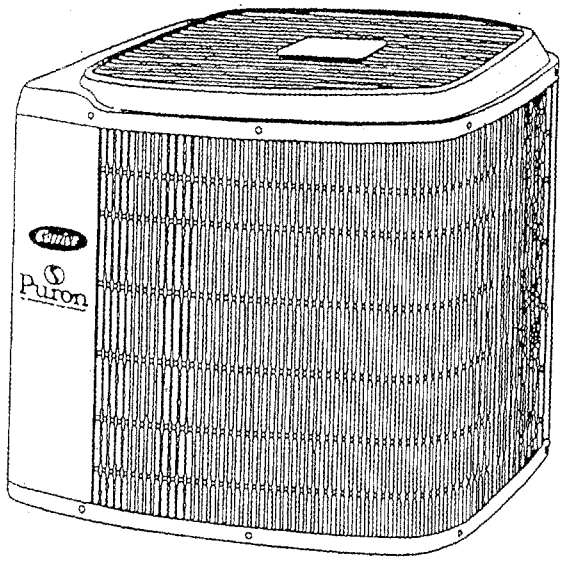
DATA SHEET

Carrier®
HEATING & COOLING

Product Data

Infinity™ 18 38TDB (60 Hz) Two-Speed Air Conditioner with Puron® Refrigerant

Sizes 024, 036, 037, 048, and 060



INFINITY SERIES

The Model 38TDB Infinity™ Air Conditioner incorporates innovative two-speed compressor technology with Puron® refrigerant, providing quiet, efficient cooling performance. Built into these units are features most desired by homeowners today, including SEER ratings up to 18.0 when matched with a VARIABLE SPEED indoor Carrier product. All models are listed with UL (U.S. and Canada), ARI and CEC. The 38TDB exceeds the Energy Star® requirements for energy efficiency.

FEATURES/BENEFITS

Electrical Range — All units are offered in 208/230v single phase. Simplified field-stripped lead wire connections facilitate ease of installation.

Range of Sizes — Available in 5 nominal sizes: 024, 036, 037, 048, and 060 to meet the needs of residential applications.

Carrier's Infinity™ Controls — These industry-leading controls, when installed with Carrier's Ideal Humidity™ variable-speed furnaces or fan coils, provide the homeowner with:

–unparalleled control of temperature, humidity, indoor air quality, and zoning
–unprecedented ease of use
–simple operation through on-screen, text-based service reminders
–worry-free equipment malfunction alert on the two-speed outdoor section

Optional remote access through telephone or Internet is also available when combined with a remote connectivity kit.

WeatherArmor™ III System is a three component system—The casing steel is galvanized and coated with a layer of zinc phosphate. A modified polyester powder coating is then applied and baked on, providing each unit with a hard, smooth finish that will last for many years.

All screws on the cabinet exterior are SermaGuard™ coated for a long lasting,

Combination ratings*

UNIT SIZE	INDOOR SECTION	INDOOR AIR CFM		TOTAL CAPACITY BTUH		SEER	EER
		High	Low	High	Low		
	*FV4BNF003	735	440	24,000	12,000	15.00	11.70
	CC5A/CD5AA024	885	475	23,600	11,400	12.25	10.05
	CC5A/CD5AA030	900	520	24,000	11,400	12.35	10.15
	CC5A/CD5AA036	900	475	24,000	11,600	12.50	10.35
	CC5A/CD5AW024	885	475	23,600	11,400	12.25	10.05
	CC5A/CD5AW030	900	475	24,000	11,400	12.40	10.15
	CC5A/CD5AW036	900	475	24,000	11,600	12.50	10.35
	CE3AA024	885	475	23,800	11,400	12.35	10.10
	CE3AA030	900	475	24,000	11,400	12.50	10.20
	CE3AA036	900	475	24,000	11,600	12.50	10.25
	CF5AA024	885	475	23,800	11,400	12.35	10.10
	CF5AA036	900	475	24,000	11,600	12.50	10.30
	CK3BA024	900	475	24,000	11,600	12.50	10.15
	CK3BA030	900	475	24,000	11,600	12.50	10.20
	CK3BA036	900	475	24,000	11,800	13.00	10.55
	CK5A/CK5BA024	900	475	24,000	11,600	12.50	10.15
	CK5A/CK5BA030	900	475	24,000	11,600	12.50	10.20
	CK5A/CK5BA036	900	475	24,000	11,800	13.00	10.55
	CK5A/CK5BT036	900	475	24,000	11,800	13.00	10.55
	CK5A/CK5BW024	900	475	24,000	11,600	12.50	10.15
	CK5A/CK5BW030	900	475	24,000	11,600	12.50	10.20
	CK5A/CK5BW036	900	475	24,000	11,800	13.00	10.55
	CK5PA024	900	475	24,000	11,600	12.50	10.15
	CK5PA030	900	475	24,000	11,600	12.50	10.20
	CK5PA036	900	475	24,000	11,800	13.00	10.55
	CK5PT036	900	475	24,000	11,800	13.00	10.55
	CK5PW024	900	475	24,000	11,600	12.50	10.15
	CK5PW030	900	475	24,000	11,600	12.50	10.20
	CK5PW036	900	475	24,000	11,800	13.00	10.55
	FE4ANF002	735	440	24,000	11,800	14.85	11.50
	FE4ANF003	735	440	24,000	12,000	15.00	11.70
	FK4DNF001	735	440	24,000	11,800	14.50	11.40
	FV4BNF002	735	440	24,000	11,800	14.85	11.50
	40FKB/FK4DNF002	735	440	24,000	11,800	14.85	11.50
	40FKB/FK4DNF003	735	440	24,000	12,000	15.00	11.70
	CC5A/CD5AA024	700	525	23,000	11,600	14.00	11.00
	CC5A/CD5AA030	700	525	23,400	11,800	14.00	11.25
	CC5A/CD5AA036	700	525	24,000	12,000	14.50	11.50
	CC5A/CD5AW024	700	525	23,200	11,800	14.00	11.10
024-30	CC5A/CD5AW030	700	525	23,400	11,800	14.00	11.25
	CE3AA024	700	525	23,400	11,800	14.00	11.10
	CE3AA030	700	525	23,800	12,000	14.50	11.30
	CE3AA036	700	525	24,000	12,000	14.50	11.40
	CK3BA024	700	525	23,600	12,000	14.50	11.30
	CK3BA030	700	525	23,800	12,000	14.50	11.40
	CK3BA036	700	525	24,000	12,000	14.50	11.55
	CK5A/CK5BA024	700	525	24,000	12,000	14.50	11.45
	CK5A/CK5BA030	700	525	24,000	12,000	14.50	11.50
	CK5A/CK5BA036	700	525	24,000	12,000	14.50	11.55
	CK5A/CK5BT036	700	525	24,000	12,000	14.50	11.55
	CK5A/CK5BW024	700	525	24,000	12,000	14.50	11.45
	CK5A/CK5BW030	700	525	24,000	12,000	14.50	11.50
	CK5PA024	700	525	24,000	12,000	14.50	11.45
	CK5PA030	700	525	24,000	12,000	14.50	11.50
	CK5PA036	700	525	24,000	12,000	14.50	11.55
	CK5PT036	700	525	24,000	12,000	14.50	11.55
	CK5PW024	700	525	24,000	12,000	14.50	11.45
	CK5PW030	700	525	24,000	12,000	14.50	11.50
	CC5A/CD5AA024	700	525	23,200	11,800	14.00	11.10
	CC5A/CD5AA030	700	525	23,600	11,800	14.50	11.30
	CC5A/CD5AA036	700	525	24,000	12,000	14.50	11.60
	CC5A/CD5AW024	700	525	23,200	11,800	14.00	11.15
	CC5A/CD5AW030	700	525	23,600	11,800	14.50	11.30
	CC5A/CD5AW036	700	525	24,000	12,000	14.50	11.60
	CE3AA024	700	525	23,400	11,800	14.00	11.15
	CE3AA030	700	525	23,800	12,000	14.50	11.40
	CE3AA036	700	525	24,000	12,000	14.50	11.50
	CK3BA024	700	525	23,600	12,000	14.50	11.40
	CK3BA030	700	525	23,800	12,000	14.50	11.45
	CK3BA036	700	525	24,000	12,000	15.00	11.65
	CK5A/CK5BA024	700	525	24,000	12,000	14.50	11.50
	CK5A/CK5BA030	700	525	24,000	12,000	14.50	11.55
	CK5A/CK5BA036	700	525	24,000	12,000	15.00	11.65
	CK5A/CK5BT036	700	525	24,000	12,000	15.00	11.65
	CK5A/CK5BW024	700	525	24,000	12,000	14.50	11.55
	CK5A/CK5BW030	700	525	24,000	12,000	14.50	11.60
	CK5A/CK5BW036	700	525	24,000	12,000	15.00	11.65
	CK5PA024	700	525	24,000	12,000	14.50	11.50
	CK5PA030	700	525	24,000	12,000	14.50	11.55
	CK5PA036	700	525	24,000	12,000	15.00	11.65
	CK5PT036	700	525	24,000	12,000	15.00	11.65

See notes on pg.18.

Combination ratings continued

UNIT SIZE-SERIES	INDOOR UNIT	ARI STANDARD RATINGS†										
		Cooling						Heating				
			Seasonal Efficiency SEER									
		TC	Factory-Supplied Enhance-ment	Standard Rating	Field-Supplied Accessory ‡		EER	High-Temp		Low-Temp		Seasonal Efficiency HSPF
					TXV	TXV & TDR**		TC	COP	TC	COP	
048-32, 33	*FK4DNB006	47,500	TDR&TXV	14.00	—		12.00	50,000	3.70	29,400	2.54	9.0
	FC4CNB054	47,000	TDR&TXV	13.00	—		11.20	50,000	3.56	30,000	2.44	8.5
	FK4DNF005	47,500	TDR&TXV	13.50	—		11.65	50,000	3.26	30,200	2.08	7.5
	COILS + 58CV(A,X)110-22 VARIABLE SPEED FURNACE											
	CK5A/CK5BX060	47,000	NONE	—	13.70		11.80	51,000	3.22	30,000	2.16	7.7
	COILS + 58CV(A,X)135-22 VARIABLE SPEED FURNACE											
	CC5A/CD5AW060	46,000	NONE	—	13.30		11.50	49,500	3.30	29,800	2.32	8.0
	CK5A/CK5BX060	47,000	NONE	—	13.60		11.70	51,000	3.22	30,200	2.14	7.7
	COILS + 58CV(A,X)155-22 VARIABLE SPEED FURNACE											
	CC5A/CD5AW060	46,000	NONE	—	13.50		11.60	50,000	3.32	29,800	2.34	8.0

* Outdoor section/indoor section combination tested in accordance with DOE test procedures for heat pumps. Ratings for other combinations are determined under DOE computer simulation procedures.

† Ratings are net values reflecting the effects of circulating fan heat. Supplemental electric heat is not included. Ratings are based on:
Cooling Standard: 80°F (27°C) db 67°F (19°C) wb indoor entering air temperature and 95°F (35°C) db air entering outdoor unit.
High-Temp Heating Standard: 70°F (21°C) db indoor entering air temperature and 47°F (8°C) db 43°F (6°C) wb air entering outdoor unit.
Low-Temp Heating Standard: 70°F (21°C) db indoor entering air temperature and 17°F (–9°C) db 15°F (–10°C) wb air entering outdoor unit.

‡ In most cases, only 1 method should be used to achieve TDR function. Using more than 1 method in a system may cause degradation in performance. Use either the accessory Time-Delay Relay KAATD0101TDR or a furnace equipped with TDR. All Carrier furnaces are equipped with TDR except for the 58GFA.

** Requires hard shutoff TXV; based on computer simulation.

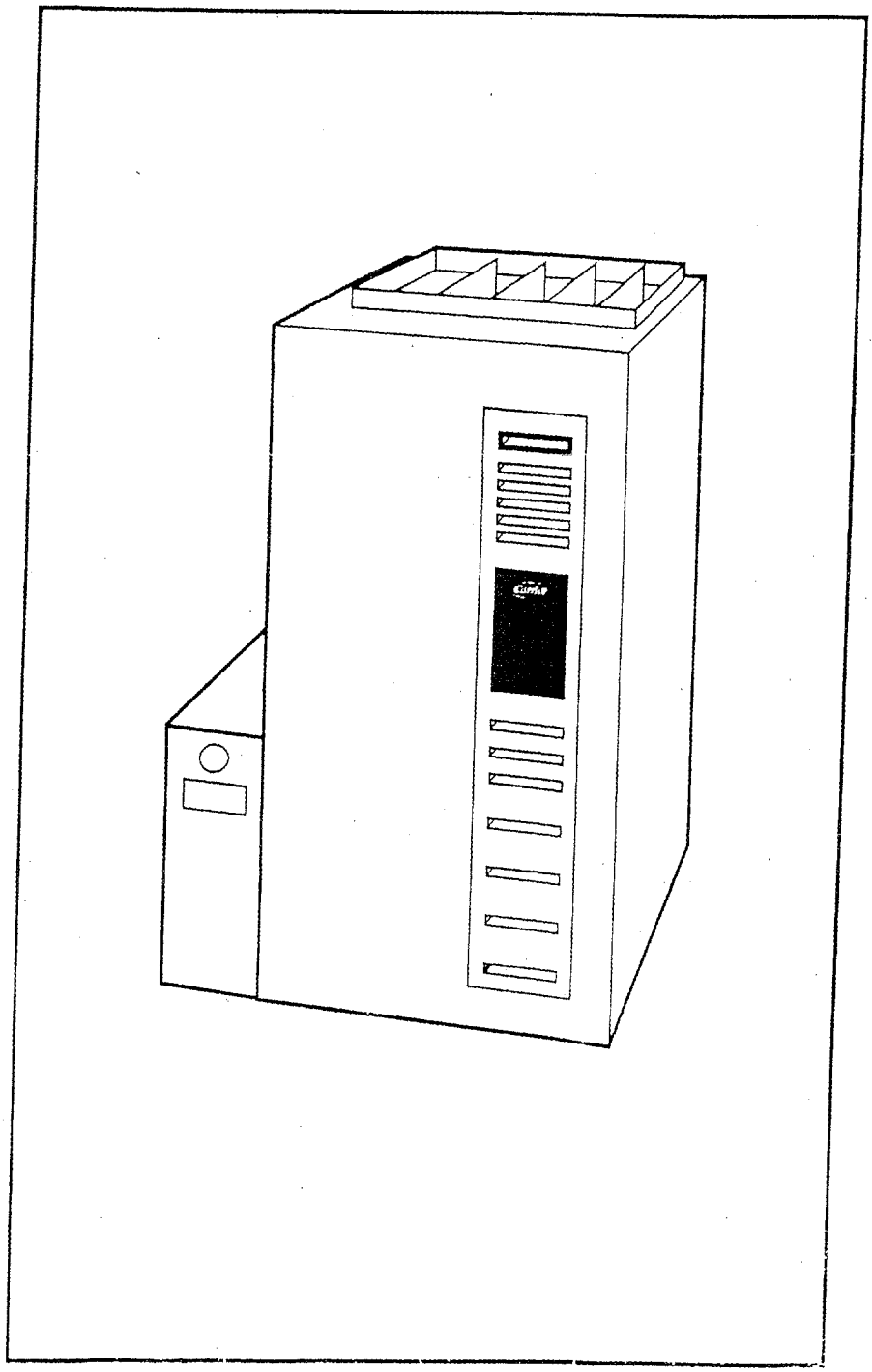
SEER— Seasonal Energy Efficiency Ratio
COP— Coefficient of Performance
HSPF— Heating Seasonal Performance Factor
TC— Total Capacity (Btuh)
TXV— Thermostatic Expansion Valve
TDR— Time-Delay Relay

Carrier

Product Data

Infinity™ 96
Model 58MVP
Deluxe 4-Way Multipoise Direct-Vent Variable-Speed Deluxe Condensing Gas Furnace

Series 170
Input Capacities: 40,000 thru 120,000 Btuh



ComfortHeat IdealHumidity SYSTEM

Comfort Heat™ technology, the ultimate in heating comfort . . .

The Carrier Infinity 96 with ComfortHeat technology achieves the optimum combination of comfort and efficency.

The Infinity 96 achieves industry-leading ultra-high efficiency at up to 96.6 percent Annual Fuel Utilization Efficiency (AFUE). Efficient performance is enhanced through the variable-speed design. To maintain ideal comfort, ComfortHeat technology automatically adjusts the heating level, maximizing the use of low heating levels that produce near silent furnace operation while meeting the exact heating needs. This unit is designed to keep the indoor temperature within 1 degree of the thermostat setpoint. Because it operates in low heat most of the time, the Infinity 96 uses up to 80% less power than single-capacity furnaces.

In addition to providing ultimate comfort, the Infinity 96 has a sealed combustion system. This system brings combustion air from outdoors to the furnace and vents flue gases safely outside the home. Because it is sealed, operational noise is minimal. A sealed combustion system also means fewer cold drafts and less air infiltration.

Quality materials are the key behind the Infinity 96's outstanding performance. Carrier stands behind quality. We offer lifetime warranty protection* on the heat exchangers, the heart of the Infinity 96. The rest of the unit is backed by a limited 5-year warranty.

The Infinity 96 is available in 6 heat/airflow combinations. The unit has a 4-way multipoise design and can

Physical data

UNIT SIZE			040-14	060-14	080-14	080-20	100-20	120-20
OUTPUT CAPACITY BTUH* (ICS) (Shaded capacities are specified on rating plate)	Low	Upflow	25,000	37,000	49,000	49,000	61,000	73,000
		Downflow	25,000	36,000	49,000	49,000	61,000	73,000
		Horizontal	25,000	36,000	49,000	49,000	61,000	73,000
	High	Upflow	38,000	57,000	75,000	75,000	94,000	113,000
		Downflow	37,000	56,000	75,000	75,000	94,000	113,000
		Horizontal	37,000	56,000	75,000	75,000	93,000	112,000
AFUE%*		Upflow	96.6	94.1	94.1	94.1	94.1	94.1
		Downflow	95.0	92.7	92.7	92.7	92.7	92.7
		Horizontal	96.1	93.7	93.7	93.7	93.7	93.7
INPUT BTUH†		Low	26,000	39,000	52,000	52,000	65,000	78,000
		High	40,000	60,000	80,000	80,000	100,000	120,000
SHIPPING WEIGHT (Lb)			205	170	182	204	203	234
CERTIFIED TEMP RISE RANGE (°F)		Low	25 — 55	50 — 80	50 — 80	50 — 80	50 — 80	50 — 80
		High	30 — 60	35 — 65	35 — 65	35 — 65	45 — 75	45 — 75
CERTIFIED EXT STATIC PRESSURE (ESP) (In. wc)		Heating	0.10	0.12	0.15	0.15	0.20	0.20
		Cooling	0.50	0.50	0.50	0.50	0.50	0.50
AIRFLOW CFM‡		Heating Low	585(690**)	500 (590**)	720 (850**)	705 (830**)	920 (1085**)	1160 (1370**)
		Heating High	800	1065	1500	1500	1525	1880
		Cooling (Max)	1400	1400	1395	1990	2000	2100
LIMIT CONTROL			SPST					
HEATING BLOWER CONTROL (Off Delay)			Selectable 90, 120, 150, or 180 Sec Intervals					
BURNERS (Monoport)			2	3	4	4	5	6
GAS CONNECTION SIZE			1/2-in. NPT					
GAS VALVE (Redundant) Manufacturer			White-Rodgers					
Minimum Inlet Pressure (In. wc)			4.5 (Natural Gas)					
Maximum Inlet Pressure (In. wc)			13.6 (Natural Gas)					
IGNITION DEVICE			Hot Surface					

* Capacity in accordance with U.S. Government DOE test procedures.

† Gas input ratings are certified for elevations to 2000 ft. For elevations above 2000 ft, reduce ratings 2 percent for each 1000 ft above sea level. In Canada, derate the unit 5 percent for elevations from 2000 to 4500 ft above sea level.

‡ Airflow shown is for bottom only return-air supply with factory-supplied 1-in. washable filter(s). For air delivery above 1800 CFM, see Air Delivery table for other options.

** Low heat CFM when low-heat rise adjustment switch (SW1-3) on furnace control is used.

Performance data

UNIT SIZE	040-14	060-14	080-14	080-20	100-20	120-20
DIRECT-DRIVE MOTOR Hp (ECM)	1/2	1/2	1/2	1	1	1
MOTOR FULL LOAD AMPS	7.7	7.7	7.7	12.8	12.8	12.8
RPM (Nominal) — SPEEDS	Variable 250 — 1300					
BLOWER WHEEL DIAMETER x WIDTH (In.)	11 x 10	10 x 7	11 x 10	11 x 10	11 x 10	11 x 10
FILTER SIZE (In.) NOMINAL (Washable)	(1) 24 x 25 x 1	(1) 16 x 25 x 1	(1) 20 x 25 x 1	(1) 20 x 25 x 1	(1) 20 x 25 x 1	(1) 24 x 25 x 1

ECM — Electronically Commutated Motor

Structural Analysis

Project Name: Addition

Building Address: 923 Clemensen Ave. Santa Ana

Date: 10/14/2011

Project No.: **11-0815**

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

PAGE 1 **OF** 19
DATE 10-14-2011
JOB NO. 11-0815

LOADING ANALYSIS (TYPICAL MATERIAL UNLESS NOTED OTHERWISE)

ROOF LOAD		
	ROOFING TYPE:	comp
	PITCH:	4 :12
DEAD LOAD		
	Roofing =	3.0 psf
	Sheathing =	1.5 psf
	Framing =	1.1 psf
	Misc =	1.4 psf
DEAD LOAD	SUB TOTAL:	7.0 psf
LIVE LOAD		20 PSF
TOTAL LOAD	:	27 PSF

CEILING LOAD		
DEAD LOAD		5 PSF
	SUB TOTAL:	5 PSF
LIVE LOAD	:	10 PSF
TOTAL LOAD	:	15 PSF

LOADING ANALYSIS (TYPICAL MATERIAL UNLESS NOTED OTHERWISE)

ROOF RAFTERS (SLOPED w/ RIDGE BD)

MAX SPAN = 12.5 FT
LL = 20 psf
DL = 7 psf
SPACING = 16 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 36.00 PLF
Reaction, R = 225 LBS
V = W*L/2= 225 LB
M = W*L^2/8 = 703 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	1.5 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	5.02 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.594 IN	<	L*12/120 IN	= 1.25 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 16" O.C

JOISTS

Ceiling Joists

MAX SPAN = 25 FT
LL = 10 psf
DL = 5 psf
SPACING = 16 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.1

Uniform Load W= 20.00 PLF
Reaction, R = 250 LBS
V = W*L/2= 250 LB
M = W*L^2/8 = 1563 LB-FT
Inertia Selected = 98.93 IN^4

A = 1.5*V/(Fv * CD.) =	1.7 IN^2	<	13.88 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	13.18 IN^3	<	21.39 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	1.111 IN	<	L*12/180 IN	= 1.67 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X10 D.F. #2 @ 16" O.C

ROOF RAFTERS (Patio)

MAX SPAN = 12.5 FT
LL = 20 psf
DL = 7 psf
SPACING = 24 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 54.00 PLF
Reaction, R = 338 LBS
V = W*L/2= 338 LB
M = W*L^2/8 = 1055 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	2.3 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	7.53 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.891 IN	<	L*12/120 IN	= 1.25 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 24" O.C

JOISTS

Ceiling Joists

MAX SPAN = 11 FT
LL = 10 psf
DL = 5 psf
SPACING = 24 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 30.00 PLF
Reaction, R = 165 LBS
V = W*L/2= 165 LB
M = W*L^2/8 = 454 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	1.1 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	3.24 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.297 IN	<	L*12/180 IN	= 0.73 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 24" O.C

Ceiling Framing Beams and Headers

BM 1 (@ Kit/Dining)

MAX SPAN L = 12.50 FT

Roof LL =	20 psf	Ceiling LL =	0 psf
Roof DL =	7 psf	Ceiling DL =	5 psf
Roof Tributary =	6.50 FT	Ceiling Tributary =	6.50 FT
		Wall DL =	15 psf
		Wall Height =	0 FT

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	208	PLF
Reaction R=	1300	LBS
V = W*L /2 =	1300	LB
M = W*L^2/8 =	4063	LB-FT
Inertia Selected =	392.96	IN^4

A = 1.5*V/(Fv * CD.) =	9.18	IN^2	<	52.25	IN^2		OK
S = M *12 / (Fb*CD*CF) =	28.89	IN^3	<	82.73	IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.182	IN	<	L*12/180 =	0.83	IN	OK

USE 6X10 D.F. #1

Hip Beam, HB1

Span, L =	17.5	ft	Wmax =	236.25	plf
LL =	20	psf	V =	2067	lbs
DL =	7	psf	Vmax =	1378	lbs
Tributary =	8.75	ft	Mmax =	4641	lbs-ft
fb =	1000	psi	Ra =	1378	lbs
fv =	180	psi	Rb =	689	lbs
E =	1.60E+06	psi	Inertia Selected =	230.8	in^4
CD = Duration Factor =	1.25				
CF = Size Factor =	1.2				

A = 1.5*V/(Fv * CD.) =	9.19	in^2	<	32.38 in^2		OK
S = M *12 / (Fb*CD*CF) =	37.13	in^3	<	49.91 in^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	1.350	IN	<	L*12/120 =	1.75 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 4X10 D.F. #1

BM2 (Supporting HB1 x2)

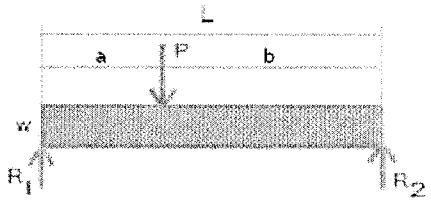
MAX SPAN, L = 8 ft

P =	2756	lbs
Located (from R1) =	4	ft
a =	4	ft
b =	4	ft

Fb =	1000	psi
Fv =	180	psi
E =	1.7E+06	psi
CD = Duration Factor =	1.25	
CF = Size Factor =	1.2	

*Table 1607.1 Footnote (i) CBC 2010
For attics without storage, this live load need not be assumed to act concurrently with any other live load

Uniform Load W =	0	plf
R1 = W*L /2+P*b/L =	1378	lbs
R2 =W*L /2+P*a/L =	1378	lbs
V =	1378	lbs
Mmax = W*L^2/8+(P*a*b)/L =	5513	lbs-ft
Inertia Selected =	230.8	in^4



A = 1.5*V/(Fv * CD.) =	9.19	in^2	<	32.38 in^2		OK
S = M *12 / (Fb*CD*CF) =	44.10	in^3	<	49.91 in^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) + (P*a^2*b^2)/(3*E*I*L) =	0.13	in	<	L*12/180 =	0.53 in	OK

* Table 1604.3 in 2010 California Building Code

USE 4X10 D.F.#1

BM 3 @ Patio

MAX SPAN L =	25.00	FT			
Roof LL =	20	psf	Ceiling LL =	0	psf
Roof DL =	7	psf	Ceiling DL =	5	psf
Roof Tributary =	6.00	FT	Ceiling Tributary =	0.00	FT
			Wall DL =	15	psf
			Wall Height =	0	FT

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	162	PLF
Reaction R=	2025	LBS
V = W*L /2 =	2025	LB
M = W*L^2/8 =	12656	LB-FT
Inertia Selected =	950.55	IN^4

A = 1.5*V/(Fv * CD.) =	14.29	IN^2	<	86.25	IN^2			OK
S = M *12 / (Fb*CD*CF) =	90.00	IN^3	<	165.31	IN^3			OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.936	IN	<	L*12/120	=	2.50	IN	OK

USE 8X12 D.F. #1

BM 4 @ Patio

MAX SPAN L =	12.50	FT			
Roof LL =	20	psf	Ceiling LL =	0	psf
Roof DL =	7	psf	Ceiling DL =	5	psf
Roof Tributary =	6.00	FT	Ceiling Tributary =	0.00	FT
			Wall DL =	15	psf
			Wall Height =	0	FT

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	162	PLF
Reaction R=	1013	LBS
V = W*L /2 =	1013	LB
M = W*L^2/8 =	3164	LB-FT
Inertia Selected =	950.55	IN^4

A = 1.5*V/(Fv * CD.) =	7.15	IN^2	<	86.25	IN^2			OK
S = M *12 / (Fb*CD*CF) =	22.50	IN^3	<	165.31	IN^3			OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.059	IN	<	L*12/120	=	1.25	IN	OK

USE 8X12 D.F. #1

Wind Load Calculation

Basic Wind Speed =	85 mph		
Exposure =	B		
Pitch =	4	: 12	
Roof Angle =	18.43	degrees	
Importance Factor, I =	1		ASCE Standard 7-05 pg 116 Table 11.5-1
Adjustment Factor, I =	1		ASCE Standard 7-05 pg 40 Figure 6-2
Mean Roof Height, h =	13.67	ft	
Topographic Factor, Kzt =	1		ASCE Standard 7-05 pg 26 Section 6.5.7.2
Kzt = (1+K1*K2*K3)^2 =	1		ASCE Standard 7-05 pg 45 Figure 6-4
Design Wind Pressure, Ps30 =	15.9	psf	
Ps = I*Kzt*I*Ps30 =	15.9	psf	ASCE Standard 7-05 pg 24 Section 6.4.2.1

Seismic Coefficient

V=(F*Sds/R)*W

# of Stories = 1

F= 1 12.14.8 ASCE Standard 7-05 , P 141

R = 6.5 Table 12.2-1 ASCE Standard 7-05, P. 120

I = 1 Table 11.5-1 ASCE Standard 7-05, P. 116

SMs = 1.381 USGS*

Sds = 0.921

V = 0.142 W ρ = 1.3

Design V = V * W *ρ*0.7 (Working Stress) = 0.129 W

ASCE 7-05 Section 12.3.4.2, P. 126

*From Seismic Hazard Curves Response Parameteres and Deisgn Parameters

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Lateral Analysis (Y-Y Direction)

Line 1

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	2.84	270

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5.67	12.33	35	90

from: EXISTING

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

	Seismic Shear (LBS)
Σ =	90

∴ **Wind Governs**

Governing Shear = 270 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6.33					6.3	43

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6.33	43	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.84	5	2.84	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	2164	3086	.67	15	Negligible

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Lateral Analysis (Y-Y Direction)

Line 2

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	5.335	509

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5.67	12.33	35	90

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5	6.25	15.625	40

Seismic Shear (LBS)
Σ = 130

∴ **Wind Governs**

Governing Shear = 509 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6					6.0	85

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6	85	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.84	5	2.84	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	4072	2773	.67	369	Negligible

Lateral Analysis (Y-Y Direction)

Line 3

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	2.5	239

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5	6	15	39

from: EXISTING

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

Σ =

Seismic Shear (LBS)
39

∴ **Wind Governs**

Governing Shear = 239 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6					6.0	40

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6	40	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.50	5	2.50	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	1908	2700	.67	17	Negligible

Lateral Analysis (Y-Y Direction)

Line 4

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	12.75	1216

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

	Seismic Shear (LBS)
Σ =	1036

∴ **Wind Governs**

Governing Shear = 1216 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
8					8.0	152

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	8	152	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	12.75	5	12.75	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	9731	8736	.67	485	Negligible

Lateral Analysis (Y-Y Direction)

Line 5

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	12.75	1216

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

Seismic Shear (LBS)
Σ = 1036

∴ **Wind Governs**

Governing Shear = 1216 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
5.5					5.5	221

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	5.5	221	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	12.75	5	12.75	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	9731	4129	.67	1266	HDU2	3075

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Lateral Analysis (X-X Direction)

Line A

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	6.17	588

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
10.67	12.33	66	170

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

	Seismic Shear (LBS)
Σ =	170

∴ **Wind Governs**

Governing Shear = 588 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
					0.0	See Perf Shear Design

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

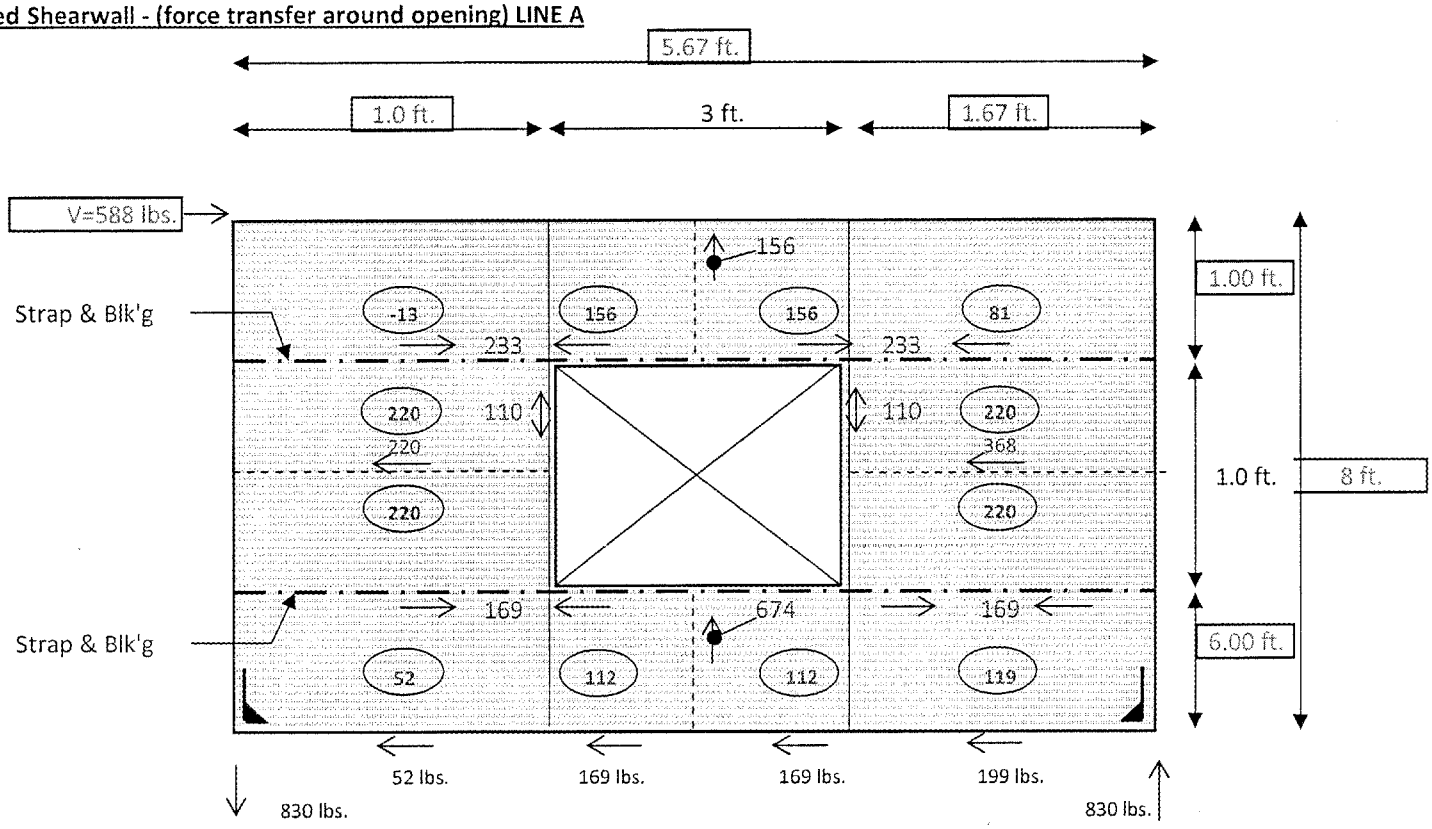
Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	0.0	**See Perf Shear Design**	0

SEE NEXT PAGE

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1						

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	**USE** Provides (lbs)
1					

Perforated Shearwall - (force transfer around opening) LINE A



xx = Panel Shear, plf

Unit Shear =	**104** plf	Shear wall type = 10
Max Shear =	**220** lbs	
Header Strap=	**233** lbs	
Sill Strap=	**169** lbs	

Lateral Analysis (X-X Direction)

Line B

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	19.5	1860

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
10.67	12.33	66	170

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
55	16	440	1135

Seismic Shear (LBS)
Σ = 1304

∴ **Wind Governs**

Governing Shear = 1860 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
4.67	4.25				8.9	209

USE: Δ 11 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	4.67	209	1
2	8	4.3	209	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	8.0	5	8.0	15	8
2	7	8.0	5	8.0	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	7792	2355	.67	1331	HDU2	3075
2	7091	1951	.67	1361	HDU2	3075

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Lateral Analysis (X-X Direction)

Line C

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	15.5	1479

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	31	395.25	1019

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

	Seismic Shear (LBS)
Σ =	1463

∴ **Wind Governs**

Governing Shear = 1479 lbs

Shear Wall Segment					Total	Unit Shear
1	2	3	4	5	L (FT)	(PLF)
4	4.0				8.0	185

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	4	185	0
2	8	4.0	185	0

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	0.0	5	0.0	15	8
2	7	0.0	5	0.0	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	5915	960	.67	1318	HDU2	3075
2	5915	960	.67	1318	HDU2	3075

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Lateral Analysis (X-X Direction)

Line D

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	6.00	8	1	7.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
111	12.5	1391

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
55	12	330	851

	Seismic Shear (LBS)
Σ =	1443

∴ **Seismic Governs**

Governing Shear = 1443 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
10					10.0	144

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	10	144	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	6.5	5	6.5	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	11543	9900	.9	263	Negligible

Roof Diaphragm

Seismic V = 2.58 psf

	Length (ft)	Load (psf)
Y-Dir	18	46
X-Dir	25.5	66

Wind Load

	Wind Load (PLF)
Y-Dir	95
X-Dir	95

	Governing Load (psf)	X-Dir Length (L1, ft)	Y-Dir Length (L2, ft)
Y-Dir	95	25.5	18
X-Dir	95	25.5	18

LONG w*L1/(2*L2) = 68 lbs/ft
SHORT w*L2/(2*L1) = 34 lbs/ft

USE 15/32" CDX PLYWOOD OR OSB w/ 8d @ 6" and 12"
PROVIDES = 240#/ft UNBLOCKED

*Table 2306.2.1(1) CBC 2010

LONG Tension = Compression = w*L1^2/(L2*8) = 431 lbs
SHORT Tension = Compression = w*L2^2/(L1*8) = 152 lbs

USE ST22 PROVIDES = 1420 lbs
ST22 PROVIDES = 1420 lbs

FOUNDATION ANALYSIS:(ASSUME SOIL BEARING PRESSURE 1500 PSF)

Continous Footing

Roof DL = 7 psf
Roof LL = 19 psf
Roof Tributary = 12.75 ft
Ceiling DL = 5 psf
Ceiling Tributary = 12.75 ft
Floor DL = 40 psf
Floor LL = 10 psf
Floor Tributary = 0.00 ft
Wall DL = 15 psf
Wall Height = 8 ft

W max = 515 plf
Soil Bearing Pressure = 1500 psf
Width = 0.34 ft
4.12 inches

USE 12"x12"deep w/ #4 T.&B. MIN.

1 Pad Support BM 3 and BM 4 @ Patio

P max = 3038 lbs
A req = 1.42 sq ft
A req = 17.08 sq in

USE 24"x24"x12" w/ 2 #4 E.W.

SHEAR PANEL SCHEDULE (SEISMIC) C. B. C. 2010 EDITION TABLE 2306.3

NO.	MATERIAL	NAILING	LB/FT S/W	SOLE NAILING 16d @ ___ O.C.	A.B. SPACING 5/8" @ ___ O.C
10	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 6" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	280	6"	32"
11	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 4" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	350	4"	24"
12	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 4" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	430*	4"	24"
13	3/8"STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 3" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	550*	3"	16"
14	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 3" O.C. Edge & 12" FIELD OR 16d SINKER	665*	2"	12"
15	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 2" O.C. Edge & 12" FIELD OR 16d SINKER	870*	2"	8"

* FRAMING AT ADJOINING PANEL EDGES AND SILL PLATE SHALL BE 3x___ OR WIDER AND NAILS SHALL BE STAGGERED (IF SHEAR WALL EXCEED 350#/FT).

NOTES:

A. PROVIDE 2x___ BLOCKING AT HORIZONTAL PLYWOOD PANEL JOINTS

B. WHERE PLYWOOD IS APPLIED ON BOTH FACES OF WALL AND NAIL SPACING IS LESS THAN A 6" OC, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS OR FRAMING SHALL BE 3x___ OR WIDER (OR 2-2x___) AND NAILS STAGGERED ON EACH SIDE.

C. WHERE NAILS ARE SPACED AT 2" OC, THEY SHALL BE STAGGERED AND 3x___ OR WIDER FRAMING MEMBERS SHALL BE USED AT ADJOINING PANEL EDGES

D. USE .229"x3"x3" SQUARE WASHER FOR 5/8"X10" ANCHOR BOLTS

CITY OF SANTA ANA

BUILDING PERMIT WORKSHEET

PLEASE PRINT

1/14/09:forms/Bldg.App.Worksheet

PROJECT ADDRESS: 923 CLEMENSEN 92705 | SUITE: | SAPIN # 10173676

USE OF BUILDING: (RESIDENTIAL) COMMERCIAL INDUSTRIAL OTHER | MASTER ID#

NATURE OF WORK: NEW (ADD) ALTER/T.I. DEMO REROOF REPAIR SIGN MISC

NEW/ADDITION/ALTERATION:

1ST FL..	368 ~~772~~ SF	BASEMENT: YES/NO	SF	NO. OF STORIES:	1
2ND FL..	0 SF	PATIO/ENCL. PATIO:	~~300~~ 284 SF	BLDG. HEIGHT:	
TOTAL OF OTHER FLS:	SF	RES. REMODEL:	SF	PROPOSED USE:	
GARAGE/CARPORT:	SF	ALTER/T.I.:	SF		

JOB DESCRIPTION (non-residential projects see reverse side of this application) : Room addition to existing house.

BUILDING OWNER'S NAME: MATTHEW & JENNIFER FRANKLIN			PHONE NO: (714) 538-8559
ADDRESS: 923 E. CLEMENSEN	CITY: SA	STATE: CA	ZIP: 92705
TENANT'S NAME (Comm/Ind):			PHONE NO:
CONTRACTOR'S NAME: Birchwood Builders	STATE CONTR. #: 424933	LICENSE CLASS: B	PHONE NO: (714) 342-4814
ADDRESS: PO Box 1939, ~~Rustin~~	CITY: RUSTIN	STATE: CA	ZIP: 92781
WORKERS COMP. POLICY#: EXEMPT	EXP. DATE:	INSURANCE COMPANY:	SANTA ANA BUS. LIC. #:
ARCHITECT/ENGINEER: PINCHING LI	STATE LICENSE #: 38408		PHONE NO: (562) 860-0311
ADDRESS: 20332 E. CRESTLINE	CITY: WALNUT	STATE: CA	ZIP: 91789
CONTACT NAME: STEVE GNADT			PHONE NO: (714) 342-4814
E-MAIL ADDRESS: stevegnadt@birchwood-builders.com			FAX NO:

OFFICE USE ONLY: ACC OR SPC (CIRCLE ONE) _____ HRS PER _____ BLDG. FEE $ _____

OCC. GROUP: _____ RECEIPT #: 58379 P/C FEE PD $ 335.16

TYPE OF CONSTR: _____ VALUATION: $ 29,000 SUBMITTAL DATE: 11/10

FIRE SPKR: YES / NO A/C: YES / NO FLOOD ZONE: AE PROCESSED CH

RES. DEV. FEE: YES / NO **PRIOR DWELLING UNIT:** YES / NO COMMENTS: _____

PLANNING OK TO CHECK & DATE _____ BLDG. DEPT. APPROVAL & DATE _____

PLNG CONDITIONS: _____

PLEASE CHECK ALL THAT APPLY TO YOUR PROJECT

JOB DESCRIPTION CHECKLIST:

- ☐ Additional square footage
- ☐ Awnings
- ☐ Canopy
- ☐ Ceiling work
- ☐ Change of occupancy (use)
- ☐ Disabled accessible (H/C) restrooms
- ☐ Dust collector
- ☐ Elevator shaft
- ☐ Exterior doors or windows
- ☐ Equipment pads
- ☐ Interior demo
- ☐ Kitchen equipment
- ☐ Partition walls
- ☐ Rated corridors
- ☐ Rated shafts
- ☐ Roof mounted equipment
- ☐ Security bars
- ☐ Screening for equipment
- ☐ Skylights
- ☐ Stairs
- ☐ Storefront/facade improvements
- ☐ Storage racks or shelving over 5'-9"
- ☐ Walk-in coolers

ITEMS REQUIRING SEPARATE BUILDING PERMIT APPLICATIONS:

- ☐ Block wall
- ☐ Card readers
- ☐ Complete demo
- ☐ Fence
- ☐ Fire signaling system
- ☐ Fire sprinklers
- ☐ Flagpole
- ☐ Lawn sprinkler system
- ☐ Light Standards
- ☐ Parking lot repaving
- ☐ Parking lot restriping
- ☐ Pedestrian protection
- ☐ Pool/Spa
- ☐ Signs
- ☐ Spray booth
- ☐ Temporary power pole
- ☐ Trash enclosure

FEE CHECKLIST WORKSHEET

Received by: KH SAPIN #: 10173676

FEE TYPE	REQUIRED	
	Yes	No
Plan Check Fee	☒	☐
Disability Fee	☐	☒
SMIP Fee	☒	☐
Res. Dev. Fee	☐	☒
Fire Facility Fee	☐	☒
School Distr. Fee	☐	☒
Microfilm	☒	☒
FCWP Surcharge	☒	☐

CALCULATION AREA

COST/SQ FT	X	TOTAL SQ FT	=	VALUATION
109	X	266 ϕ	=	28,994

Counter computations/valuation $ 29,000

Plan checker computation/final valuation $_____

CITY OF SANTA ANA
PLAN CHECK - CHECKLIST

JOB ADDRESS: 923 E Clemenson

TRACKING #: 10173676 DATE: 11-10-11

FOR PLANCHECK STATUS CALL (714) 647-5800

PLEASE INITIAL EACH ITEM BELOW

SG 1. I agree to pay a plancheck fee established for this project with the understanding that this payment is not a guarantee that a permit will be issued and that this fee is not refundable once a plancheck has commenced.

SG 2. I understand that I may request an "Accelerated Plancheck" at an additional cost to me. This plancheck will be performed by an in-house plan checker with the intention of reducing plancheck time for the Building & Safety Division.

SG 3. I understand that the project valuation (from which plancheck and permit fees are calculated) will be reviewed during the plancheck process and that said valuation shall be adjusted up or down in accordance with established fee computation regulations.

SG 4. I understand that I shall submit **separate plans, applications and plancheck fees** for the following when plan check is required:

a. Electrical Plans - 2 complete sets
b. Plumbing Plans - 3 complete sets
c. Mechanical Plans - 2 complete sets
d. Grading Plans - 3 complete sets

SG 5. I understand that I shall visit the Public Works Department to verify whether a field inspection of the property is required. I understand that prior to the issuance of the Building permit I am required to obtain Public Works Agency approval if my project valuation exceeds $30,000 or has added plumbing fixtures, or added bedrooms, or exceeds 500 sq.ft.

AGREED TO BY APPLICANT OR AGENT

Applicant's Signature Steve Gnadt

Print Name STEVE GNADT Address PO Box 1939, TUSTIN 92781

Telephone Number (714) 342-4814 Fax

FOR OFFICE USE ONLY: "Checklist of items discussed" APPROVALS & FEES REQUIRED: Y/N

1. ✓ Planning Department
2. ✓ Public Works Agency
3. NA Fire Departmemt
4. NA Police Department
5. NA School District
6. NA Health Department
7. ✓ Title 24 (Energy)
8. NA Title 24 (Disabled Access)
9. NA Roof Mounted Equip.
10. ✓ List of Subcontr.
11. ✓ Bldg. Pmt. Info.
12. ✓ Summary of Appr. Req.
13. ✓ FY Information
14. ✓ Constr. Act. Req.
15. NA Res. Dev. Fees
16. ✓ SMIP
17. ✓ Microfilming
18. ✓ Const. Debris Recyc.
19. ✓ FCWP Surcharge
20. NA LOA/Owner-Builder Ver.

PERMIT TECHNICIAN Kathernander

Form 58: 3-26-04

Address Information

Number	Partial	Dir	Street	Type	Unit	Building	Address Range
923		E	Clemensen	Avenue			

Holds | OCC | SPG

City: Santa Ana | State: CA | Zip: 92705-6714

Master Id #: 2011-98856 | Link | Project Name: Franklin Addition | MID Status: In Progress

Date Received: 10/27/2011 | Planner/Proj Mgr: Perry, Lynnette | Ext: 2735 | Date Closed:

Down Link: | UpLink: | Agency: PBA

Description: Add 368 sq ft: Extending family rm and remodel kitchen; convert living rm to Master bedroom and bath

ABC | Proj. Desc.

Mod Desc | Copy Master ID Description | Fee Schedule: Square Footage | Add Application

Application | Owner | Environmentals | Fees | Conditions(3) | BPR

Seq#	Application Nbr	Memo Type	Memo Date	Occured On	Memo Placed By	Employee	Memo Subject	Memo Text
1	RES-2011-1673-ADD	DevRev Condition	10/27/2011	10/27/2011	Perry, Lynnette	counteri		Accepted for H
Accepted for Hally's review. Park Santiago neighborhood.								
2	RES-2011-1673-ADD	DevRev Condition	10/31/2011	10/31/2011	Soboleske, Hally	hsoboleske		Rear setback
Rear setback must be 20' from PL to fascia boards. Applicant indicates 17.5' only. Correction required prior to approval.								
3	RES-2011-1673-ADD	DevRev Condition	11/10/2011	11/10/2011	Soboleske, Hally	HSoboleske		OK to planche
OK to plancheck.								

View Memo Detail

Planning & Building Agency
Building Safety Division
20 Civic Center Plaza
P.O. Box 1988 (M-19)
Santa Ana, CA 92702
(714) 647-5800
www.santa-ana.org

RESIDENTIAL PLAN CHECK COMMENTS

PLAN CHECK NO: 10173676
PROJECT ADDRESS: 923 E Clemensen Ave
PLAN CHECK ENGINEER: George Moran **TEL: 714** 667-2771
FAX: 714 647-5897

TYPE OF CONSTRUCTION: V B
OCCUPANCY CLASSIFICATION(S): R-3, U

PLAN CHECK DATES:
APPLICATION 11/10/2011
INITIAL REVIEW 12/6/2011
EXPIRATION 5/8/2012
RECHECKS: 1.
2.
3.

VALUATION: $29,000.00

FLOOD ZONE: AE-0602320163J

REMARKS/RECHECK ITEMS:

PROJECT APPLICANT CONTACT PERSON:
Steve Gnadt
TEL: (714)342-4814
FAX:
EMAIL: stevegnadt@birchwood-builders.com

Note: Numbers in parenthesis (unless otherwise noted) refer to code sections of the 2010 California Residential Code (CRC); 2010 California Building Code (CBC); CMC = 2010 California Mechanical Code; CPC = 2010 California Plumbing Code; CEC = 2010 California Electrical Code; T = Table; ICC = International Code Council.

1. All items noted on this plan check report must be addressed. If you feel that an item is not applicable to your project, note "N/A" and discuss the reason with the plan checker.

2. Please indicate the sheet number and detail to the right of each correction, or note the number on the plans where the correction is made. Resubmit marked original, calculations and this correction sheet. A separate sheet for response may be used.

3. Resubmit 3 corrected sets of plans.

4. Meetings between the project applicant/designer and the plan reviewer shall be by appointment only. Please call (714) for an appointment.

5. The drawings/information submitted for Building Safety Division review is incomplete. The applicant shall, prior to resubmitting, complete all construction documents to show compliance with the 2010 California Building Standards Code with local amendments and to clearly indicate the scope of work under this building permit application. There may be additional requirements when complete construction drawings and supporting data is submitted for Building Safety Division review.

6. All drawings and supporting documents shall be prepared, stamped, and signed by a California licensed architect or registered professional engineer. (CRC R301.1.3, CBC 107.1 and 107.3.4.1).

7. All persons preparing plans for others shall sign those plans. Business and Professions Code Chapter 3, Division 3, Section 5536.1 (a).

8. This review does not include mechanical, plumbing or electrical work. Separate plans, applications, fees, plan checks, and permits are required for mechanical, plumbing, and electrical work. Call 647-5800 for information.

9. The applicant shall obtain clearances/approvals for the following, prior to building permit issuance:

   - Planning Division approval on the corrected/final set of drawings (647-5804). Previously approved plans should be submitted to expedite the process.

   - Public Works Agency approval (647-5039).

   - Proof of Worker's Compensation Insurance shall be required at the time of permit issuance.

10. Show the complete legal description and assessor's parcel number on the plans.

11. Provide an Index of drawings on cover sheet.

12. List the use of each room or area.

13. Provide wall legend to distinguish between new / existing / demo walls.

14. Provide window and door schedule. Callout sizes and types of openings and if new or existing.

15. Show location of heating equipment on the plans. (CRC R303.8)

16. For an FAU located in the attic provide a minimum access of 22 x 30 inches, a 24-inch wide walkway, a 30-inch deep work platform, and electric light outlet adjacent to the furnace and switched by the opening. (CMC 904.11 & 305)

17. Interior spaces intended for human occupancy shall be provided with heating facilities capable of maintaining a room temperature of 68 degrees Fahrenheit at a point 3 feet above the floor and 2 feet from exterior walls in all habitable rooms. (CRC R303.8)

18. Glazing in door and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathrooms, showers less than 5' above the standing surface shall have a minimum category classification of II (CPSC 16 CFR 1201). (CRC TR308.3.1 (1) & 308.4(5))

19. Provide cross ventilation for attic and each enclosed rafter space as specified in CRC Section R806.

20. Callout attic vent locations, sizes and types on plans. Provide attic ventilation calculation to show minimum ventilation is provided. (CRC R806.2)

21. On the drawings, provide Nailing Schedule in conformance with CRC Table R602.3(1).

22. Provide a minimum of two No. 4 bars at top and at bottom of continuous footing.

23. Revise footing detail to show bottom rebar at least 3" CLEAR from ground below. (1907.5)

24. Provide detail of post support with positive connections. (1203.3)

25. Provide a weep screed for stucco at the foundation plate line a minimum of 4 inches above the earth or 2 inches above paved areas. (2512.1.2)

26. Post-beam connections must be detailed on the drawings ensuring against uplift and lateral displacement (2304.9.7)

27. Detail how the interior shear walls are connected to the roof/floor diaphragm(s). (1603)

28. The City has encountered a large number of inspection problems arising from a lack of specific framing details. The following listed items are required to be shown on the plans (CBC 107.1):

    - All plumbing walls are to be framed with a minimum of 6" studs.

    - Permissible notching and boring of joists are to be shown on the plans and shall not exceed CBC Section 2308.10.4.2 allowances.

    - Notching of exterior and bearing/nonbearing walls shall not exceed 25%/40% respectively. Bored holes in bearing/nonbearing walls shall not exceed 40%/60% respectively. In no case shall the edge of the bored hole be nearer than 5/8 inch to the edge of the stud. (2308.9.10 and 2308.9.11)

    - Header and trimmer details for doors and windows are to be shown with full length trimmers, specifying the size of the header and trimmer. (2308.10.4.3)

29. Fasteners for preservative treated and fire treated wood shall be of hot dipped zinc coated galvanized steel, silicon bronze or copper. The coating weights for zinc coated fasteners shall be in accordance with ASTM A 153. CRC R317.3

30. Provide details for retrofit shear and tension anchor bolts on plans. Provide calculations as needed

31. Provide continuous operating exhaust fan in the bathroom with required ventilation rate per Section 150-o, Table 4-7 of 2008 Residential Compliance Manual. Ventilation air must come directly from the outdoors and not from attic or crawl spaces.

32. Revise plans to indicate how separate combustion air is provided for FAU located in attic. (CMC 701.3)

Planning & Building Agency
Building Safety Division
20 Civic Center Plaza
P.O. Box 1988 (M-19)
Santa Ana, CA 92702
(714) 647-5800
www.santa-ana.org

RESIDENTIAL PLAN CHECK COMMENTS

396-411-21

PLAN CHECK NO: 10173676

PROJECT ADDRESS: 923 E Clemensen Ave

PLAN CHECK ENGINEER: George Moran **TEL: 714** 667-2771

FAX: 714 647-5897

TYPE OF CONSTRUCTION: V B

OCCUPANCY CLASSIFICATION(S): R-3, U

PLAN CHECK DATES:

APPLICATION 11/10/2011

INITIAL REVIEW 12/6/2011

EXPIRATION 5/8/2012

RECHECKS: 1. 1-18-2012

2.

3.

VALUATION: $29,000.00

FLOOD ZONE: AE-0602320163J

REMARKS/RECHECK ITEMS:

Flood zone A.

369 sf Addition

PROJECT APPLICANT CONTACT PERSON:
Steve Gnadt

TEL: (714)342-4814

FAX:

EMAIL: stevegnadt@birchwood-builders.com

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✓3. Resubmit 3 corrected sets of plans. OK

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1-18-2012

32. Revise plans to indicate how separate combustion air is provided for FAU located in attic. (CMC or 701.3)

NEW 24"X14" AIR INTAKE
SEE FLOOR PLAN SHEET 3
IN FAMILY ROOM

Pending

(34) on Left elevation show Bedrooms windows and Maximum 44" Sill height.

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RESIDENTIAL PLAN CHECK COMMENTS

396-411-27

PLAN CHECK NO: 10173676

PROJECT ADDRESS: 923 E Clemensen Ave

PLAN CHECK ENGINEER: George Moran **TEL: 714** 667-2771

FAX: 714 647-5897

TYPE OF CONSTRUCTION: V B

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VALUATION: $29,000.00

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1-18-2012

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1-18-2012 OK

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- Public Works Agency approval (647-5039).

1-18-2012 OK

- Proof of Worker's Compensation Insurance shall be required at the time of permit issuance.

1-18-2012 10. Show the complete legal description and assessor's parcel number on the plans. SHEET 1 @ PLOT PLAN

1-18-12 11. Provide an Index of drawings on cover sheet. INDEX AT TOP LEFT OF SHEET 1

1-18-12 12. List the use of each room or area. SHEET 3 & 4

OK 1-18-12 13. Provide wall legend to distinguish between new / existing / demo walls. SHEET 3

OK 1-18-12 14. Provide window and door schedule. Callout sizes and types of openings and if new or existing. SHEET 3

1-18-12 15. Show location of heating equipment on the plans. (CRC R303.8)

1-18-12 16. For an FAU located in the attic provide a minimum access of 22 x 30 inches, a 24-inch wide walkway, a 30-inch deep work platform, and electric light outlet adjacent to the furnace and switched by the opening. (CMC 904.11 & 305) 30x30 OK SEE SHEET 3 IN EXIST'G ATTIC

1-18-12 17. Interior spaces intended for human occupancy shall be provided with heating facilities capable of maintaining a room temperature of 68 degrees Fahrenheit at a point 3 feet above the floor and 2 feet from exterior walls in all habitable rooms. (CRC R303.8) YES NEW FAU IN ATTIC PER T-24 SEE SHEETS 7 & 8

1-18-12 18. Glazing in door and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathrooms, showers less than 5' above the standing surface shall have a minimum category classification of II (CPSC 16 CFR 1201). (CRC TR308.3.1 (1) & 308.4(5)) OK SEE SHEET 3 & NEW WINDOW SCHEDULE

19. Provide cross ventilation for attic and each enclosed rafter space as specified in CRC Section R806. OK EAVE & DORMER VENTS SEE SHEET 5 & 6

20. Callout attic vent locations, sizes and types on plans. Provide attic ventilation calculation to show minimum ventilation is provided. (CRC R806.2) CALCS ON ATTIC SEE SHEET 5

21. On the drawings, provide Nailing Schedule in conformance with CRC Table R602.3(1). ON SHEET 2

22. Provide a minimum of two No. 4 bars at top and at bottom of continuous footing. OK SHEET 1

23. Revise footing detail to show bottom rebar at least 3" CLEAR from ground below. (1907.5) OK SHEET 1

24. Provide detail of post support with positive connections. (1203.3) OK SEE DTL "E" SHEET 4

25. Provide a weep screed for stucco at the foundation plate line a minimum of 4 inches above the earth or 2 inches above paved areas. (2512.1.2) OK DTL A SHEET 1

26. Post-beam connections must be detailed on the drawings ensuring against uplift and lateral displacement (2304.9.7) ECCL OR ECCR 86 SEE DTL "E" SHEET 4

27. Detail how the interior shear walls are connected to the roof/floor diaphragm(s). (1603) SEE NEW SECTION "C" SHEET 5

28. The City has encountered a large number of inspection problems arising from a lack of specific framing details. The following listed items are required to be shown on the plans (CBC 107.1):

- All plumbing walls are to be framed with a minimum of 6" studs. OK SEE FLOOR PLAN SHEET 3 & FRAMING PLAN SHEET 4

- Permissible notching and boring of joists are to be shown on the plans and shall not exceed CBC Section 2308.10.4.2 allowances.

- Notching of exterior and bearing/nonbearing walls shall not exceed 25%/40% respectively. Bored holes in bearing/nonbearing walls shall not exceed 40%/60% respectively. In no case shall the edge of the bored hole be nearer than 5/8 inch to the edge of the stud. (2308.9.10 and 2308.9.11)

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29. Fasteners for preservative treated and fire treated wood shall be of hot dipped zinc coated galvanized steel, silicon bronze or copper. The coating weights for zinc coated fasteners shall be in accordance with ASTM A 153. CRC R317.3 OK NOTE SHEET 4 UNDER SHEAR WALL SCHEDULE

30. Provide details for retrofit shear and tension anchor bolts on plans. Provide calculations as needed OK SEE DTL "D" SHEET 1

31. Provide continuous operating exhaust fan in the bathroom with required ventilation rate per Section 150-o, Table 4-7 of 2008 Residential Compliance Manual. Ventilation air must come directly from the outdoors and not from attic or crawl spaces.

OK
50 CFM

CONT. SEE SHEET 3

1-18-2012

32. Revise plans to indicate how separate combustion air is provided for FAU located in attic. (CMC or 701.3)

NEW 24"X14" AIR INTAKE
SEE FLOOR PLAN SHEET 3
IN FAMILY ROOM

Pending

(34) on Left elevation show Bedrooms windows and Maximum 44" Sill height.

YES I HAVE CHANGED
BUT WINDOW IS A 3° WIDE X 4° TALL
6-8 - 4° = 2-8 = 32" AND IS NOT
MAIN FIRE ESCAPE WIN THE OTHER
5°X4° WIN IN BEDROOM IS
SEE ELEV ON SHEET 6

2-13 2-8-2012

2-13 Provide Shear transfer detail (Gable Roof) at the back of the Family room.

2-13 Change Framing Based on omiting Patio Cover for the Fam Family room.

— add King Post

Planning and Building Agency
Planning Division
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PATIOS AND ARCHITECTURAL FEATURES

Sec. 41-605. Same—Patios and architectural features.

(a) Cornices, eaves, chimneys, and similar architectural features may extend into the required yards of the A1, RE, and R1 districts as follows: A distance not to exceed forty-eight (48) inches into any required front, rear, and/or side yard of the street side of a corner lot; and a distance not to exceed eighteen (18) inches into any other required side yard. The aforesaid architectural features may extend into the required yards of the R2 and R3 districts as follows: A distance not to exceed forty-eight (48) inches into any required front, rear, and/or side yard of the street side of a corner lot; and a distance not to exceed six (6) inches into any other required side yard.

(b) A wholly or partly enclosed covered patio attached to a residence shall maintain the same yards as required for the main building, except as set forth in subsection (c) of this section. A patio with a roof having open-frame or eggcrate construction shall be considered a covered patio.

(c) A landing place may extend into any yard to a distance of six (6) feet across one-half (1/2) of the width or depth of the lot; provided that such landing place shall have its floor no higher than the entrance floor of the building. Stairs leading from the ground to said landing place may project beyond said six (6) feet. Further, an open railing no higher than three (3) feet may be placed around said landing place. A covered patio may encroach up to ten (10) feet into the required rear yard. Nothing herein shall prohibit the extension of an unenclosed, nonroofed, open patio into any and all required side and rear yards.

(d) Any cornice, eave, chimney, or similar architectural feature, patio cover or canopy may extend into any other required open space provided for in this chapter, other than required yards, a distance not to exceed two (2) feet; provided, however, nothing herein shall prohibit the full extension of an uncovered patio into said required open space.

From the office of Pin Ching Li

I have been informed of a change on the Franklin Project at 923 Clememson, Santa Ana, CA. The patio cover and new master bathroom and closet have been eliminated from this job. The engineering of the family room addition will not be affected by these changes. Calculations are ok as is.

Pin Ching Li Date

Structural Analysis

Project Name: Addition

Building Address: 923 Clemensen Ave. Santa Ana

Date: 10/14/2011

Project No.: **11-0815**

10173676

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

DATE 12-27-2011
JOB NO. 11-0815

ROOF RAFTERS TIE

Ceiling Joist Span=	25	ft
Uniform Load =	36.00	plf
Pitch =	4	:12
T = (w*L/4)*(12/pitch) = Tension	675	lbs
16d provides 141 lbs = of 16d =	3.8	

Use FIVE 16d @ every Roof Rafter and Ceiling Joist & Splice

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

DATE 10-14-2011
JOB NO. 11-0815

LOADING ANALYSIS (TYPICAL MATERIAL UNLESS NOTED OTHERWISE)

ROOF LOAD		
	ROOFING TYPE:	comp
	PITCH:	4 :12
DEAD LOAD		
	Roofing =	3.0 psf
	Sheathing =	1.5 psf
	Framing =	1.1 psf
	Misc =	1.4 psf
DEAD LOAD	SUB TOTAL:	7.0 psf
LIVE LOAD		20 PSF
TOTAL LOAD	:	27 PSF

CEILING LOAD		
DEAD LOAD		5 PSF
	SUB TOTAL:	5 PSF
LIVE LOAD	:	10 PSF
TOTAL LOAD	:	15 PSF

LOADING ANALYSIS (TYPICAL MATERIAL UNLESS NOTED OTHERWISE)

ROOF RAFTERS (SLOPED w/ RIDGE BD)

MAX SPAN = 12.5 FT
LL = 20 psf
DL = 7 psf
SPACING = 16 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 36.00 PLF
Reaction, R = 225 LBS
V = W*L/2= 225 LB
M = W*L^2/8 = 703 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	1.5 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	5.02 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.594 IN	<	L*12/120 IN	= 1.25 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 16" O.C

JOISTS

Ceiling Joists

MAX SPAN = 25 FT
LL = 10 psf
DL = 5 psf
SPACING = 16 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.1

Uniform Load W= 20.00 PLF
Reaction, R = 250 LBS
V = W*L/2= 250 LB
M = W*L^2/8 = 1563 LB-FT
Inertia Selected = 98.93 IN^4

A = 1.5*V/(Fv * CD.) =	1.7 IN^2	<	13.88 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	13.18 IN^3	<	21.39 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	1.111 IN	<	L*12/180 IN	= 1.67 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X10 D.F. #2 @ 16" O.C

ROOF RAFTERS (Patio)

MAX SPAN = 12.5 FT
LL = 20 psf
DL = 7 psf
SPACING = 24 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 54.00 PLF
Reaction, R = 338 LBS
V = W*L/2= 338 LB
M = W*L^2/8 = 1055 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	2.3 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	7.53 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.891 IN	<	L*12/120 IN	= 1.25 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 24" O.C

JOISTS

Ceiling Joists

MAX SPAN = 11 FT
LL = 10 psf
DL = 5 psf
SPACING = 24 in

Fb = 900 PSI
Fv = 180 PSI
E = 1.60E+06 PSI

D.F. #2	Size F	Fb	d	A	S	I
2X4	1.5	900	3.5	5.25	3.06	5.36
2X6	1.3	900	5.5	8.25	7.56	20.80
2X8	1.2	900	7.25	10.88	13.14	47.63
2X10	1.1	900	9.25	13.88	21.39	98.93
2X12	1	900	11.25	16.88	31.64	178.00
2X14	0.9	900	13.25	19.88	43.89	290.80

CD = Duration Factor = 1.25
Cr = Repetitive use = 1.15
CF = Size Factor = 1.3

Uniform Load W= 30.00 PLF
Reaction, R = 165 LBS
V = W*L/2= 165 LB
M = W*L^2/8 = 454 LB-FT
Inertia Selected = 20.8 IN^4

A = 1.5*V/(Fv * CD.) =	1.1 IN^2	<	8.25 IN^2		OK
S = M *12 / (Fb*CD*Cr*CF) =	3.24 IN^3	<	7.56 IN^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.297 IN	<	L*12/180 IN	= 0.73 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 2X6 D.F. #2 @ 24" O.C

Ceiling Framing Beams and Headers

BM 1 (@ Kit/Dining)

MAX SPAN L = 12.50 FT

Roof LL =	20 psf	Ceiling LL =	0 psf
Roof DL =	7 psf	Ceiling DL =	5 psf
Roof Tributary =	6.50 FT	Ceiling Tributary =	6.50 FT
		Wall DL =	15 psf
		Wall Height =	0 FT

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	208	PLF
Reaction R=	1300	LBS
V = W*L /2 =	1300	LB
M = W*L^2/8 =	4063	LB-FT
Inertia Selected =	392.96	IN^4

A = 1.5*V/(Fv * CD.) =	9.18 IN^2	<	52.25	IN^2			OK
S = M *12 / (Fb*CD*CF) =	28.89 IN^3	<	82.73	IN^3			OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.182 IN	<	L*12/180	=	0.83	IN	OK

USE 6X10 D.F. #1

Hip Beam, HB1

Span, L =	17.5	ft	Wmax =	236.25	plf
LL =	20	psf	V =	2067	lbs
DL =	7	psf	Vmax =	1378	lbs
Tributary =	8.75	ft	Mmax =	4641	lbs-ft
fb =	1000	psi	Ra =	1378	lbs
fv =	180	psi	Rb =	689	lbs
E =	1.60E+06	psi	Inertia Selected =	230.8	in^4
CD = Duration Factor =	1.25				
CF = Size Factor =	1.2				

A = 1.5*V/(Fv * CD.) =	9.19	in^2	<	32.38 in^2		OK
S = M *12 / (Fb*CD*CF) =	37.13	in^3	<	49.91 in^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	1.350	IN	<	L*12/120 =	1.75 IN	OK

* Table 1604.3 in 2010 California Building Code

USE 4X10 D.F. #1

BM2 (Supporting HB1 x2)

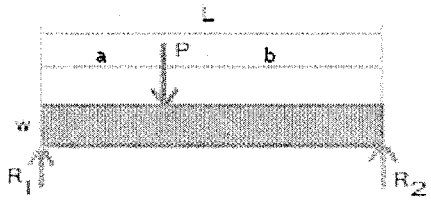
MAX SPAN, L = 8 ft

P =	2756	lbs
Located (from R1) =	4	ft
a =	4	ft
b =	4	ft

Fb =	1000	psi
Fv =	180	psi
E =	1.7E+06	psi
CD = Duration Factor =	1.25	
CF = Size Factor =	1.2	

*Table 1607.1 Footnote (i) CBC 2010
For attics without storage, this live load need not be assumed to act concurrently with any other live load

Uniform Load W =	0	plf
R1 = W*L /2+P*b/L =	1378	lbs
R2 =W*L /2+P*a/L =	1378	lbs
V =	1378	lbs
Mmax = W*L^2/8+(P*a*b)/L =	5513	lbs-ft
Inertia Selected =	230.8	in^4



A = 1.5*V/(Fv * CD.) =	9.19	in^2	<	32.38 in^2		OK
S = M *12 / (Fb*CD*CF) =	44.10	in^3	<	49.91 in^3		OK
Δ = (5/384)*(W*L^4)*1728/(E*I) + (P*a^2*b^2)/(3*E*I*L) =	0.13	in	<	L*12/180 =	0.53 in	OK

* Table 1604.3 in 2010 California Building Code

USE 4X10 D.F.#1

BM 3 @ Patio

MAX SPAN L =	25.00	FT			
Roof LL =	20	psf	Ceiling LL =	0	psf
Roof DL =	7	psf	Ceiling DL =	5	psf
Roof Tributary =	6.00	FT	Ceiling Tributary =	0.00	FT
			Wall DL =	15	psf
			Wall Height =	0	FT

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	162	PLF
Reaction R=	2025	LBS
V = W*L /2 =	2025	LB
M = W*L^2/8 =	12656	LB-FT
Inertia Selected =	950.55	IN^4

A = 1.5*V/(Fv * CD.) =	14.29	IN^2	<	86.25	IN^2			OK
S = M *12 / (Fb*CD*CF) =	90.00	IN^3	<	165.31	IN^3			OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.936	IN	<	L*12/120	=	2.50	IN	OK

USE 8X12 D.F. #1

BM 4 @ Patio

MAX SPAN L =	12.50	FT			
Roof LL =	20	psf	Ceiling LL =	0	psf
Roof DL =	7	psf	Ceiling DL =	5	psf
Roof Tributary =	6.00	FT	Ceiling Tributary =	0.00	FT
			Wall DL =	15	psf
			Wall Height =	0	FT

Fb =	1350	PSI
Fv =	170	PSI
E =	1.6E+06	PSI
CD = Duration Factor =	1.25	
CF = Size Factor =	1	

Uniform Load W=	162	PLF
Reaction R=	1013	LBS
V = W*L /2 =	1013	LB
M = W*L^2/8 =	3164	LB-FT
Inertia Selected =	950.55	IN^4

A = 1.5*V/(Fv * CD.) =	7.15	IN^2	<	86.25	IN^2			OK
S = M *12 / (Fb*CD*CF) =	22.50	IN^3	<	165.31	IN^3			OK
Δ = (5/384)*(W*L^4)*1728/(E*I) =	0.059	IN	<	L*12/120	=	1.25	IN	OK

USE 8X12 D.F. #1

Wind Load Calculation

Basic Wind Speed =	85 mph		
Exposure =	B		
Pitch =	4	: 12	
Roof Angle =	18.43	degrees	
Importance Factor, I =	1		ASCE Standard 7-05 pg 116 Table 11.5-1
Adjustment Factor, l =	1		ASCE Standard 7-05 pg 40 Figure 6-2
Mean Roof Height, h =	13.67	ft	
Topographic Factor, Kzt =	1		ASCE Standard 7-05 pg 26 Section 6.5.7.2
Kzt = (1+K1*K2*K3)^2 =	1		ASCE Standard 7-05 pg 45 Figure 6-4
Design Wind Pressure, Ps30 =	15.9	psf	
Ps = I*Kzt*I*Ps30 =	15.9	psf	ASCE Standard 7-05 pg 24 Section 6.4.2.1

Seismic Coefficient

V=(F*Sds/R)*W

# of Stories = 1

F= 1 12.14.8 ASCE Standard 7-05 , P 141

R = 6.5 Table 12.2-1 ASCE Standard 7-05, P. 120

I = 1 Table 11.5-1 ASCE Standard 7-05, P. 116

SMs = 1.381 USGS*

Sds = 0.921

V = 0.142 W ρ = 1.3

Design V = V * W *ρ*0.7 (Working Stress) = 0.129 W

ASCE 7-05 Section 12.3.4.2, P. 126

*From Seismic Hazard Curves Response Parameteres and Deisgn Parameters

Lateral Analysis (Y-Y Direction)

Line 1

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	2.84	270

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5.67	12.33	35	90

from: EXISTING

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

Σ =	Seismic Shear (LBS)
	90

∴ **Wind Governs**

Governing Shear = 270 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6.33					6.3	43

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1, N=0)
1	8	6.33	43	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.84	5	2.84	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	2164	3086	.67	15	Negligible

Lateral Analysis (Y-Y Direction)

Line 2

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	5.335	509

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5.67	12.33	35	90

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5	6.25	15.625	40

Seismic Shear (LBS)
Σ = 130

∴ **Wind Governs**

Governing Shear = 509 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6					6.0	85

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6	85	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.84	5	2.84	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	4072	2773	.67	369	Negligible

Lateral Analysis (Y-Y Direction)

Line 3

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	2.5	239

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
5	6	15	39

from: EXISTING

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

Σ =

Seismic Shear (LBS)
39

∴ **Wind Governs**

Governing Shear = 239 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
6					6.0	40

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	6	40	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	2.50	5	2.50	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	1908	2700	.67	17	Negligible

Lateral Analysis (Y-Y Direction)

Line 4

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	12.75	1216

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

Seismic Shear (LBS)
Σ = 1036

∴ **Wind Governs**

Governing Shear = 1216 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
8					8.0	152

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	8	152	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	12.75	5	12.75	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	9731	8736	.67	485	Negligible

Lateral Analysis (Y-Y Direction)

Line 5

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	12.75	1216

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

Seismic Shear (LBS)
Σ = 1036

∴ **Wind Governs**

Governing Shear = 1216 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
5.5					5.5	221

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	5.5	221	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	12.75	5	12.75	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	9731	4129	.67	1266	HDU2	3075

Lateral Analysis (X-X Direction)

Line A

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	6.17	588

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
10.67	12.33	66	170

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
0	0	0	0

Seismic Shear (LBS)
Σ = 170

∴ **Wind Governs**

Governing Shear = 588 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
					0.0	See Perf Shear Design

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

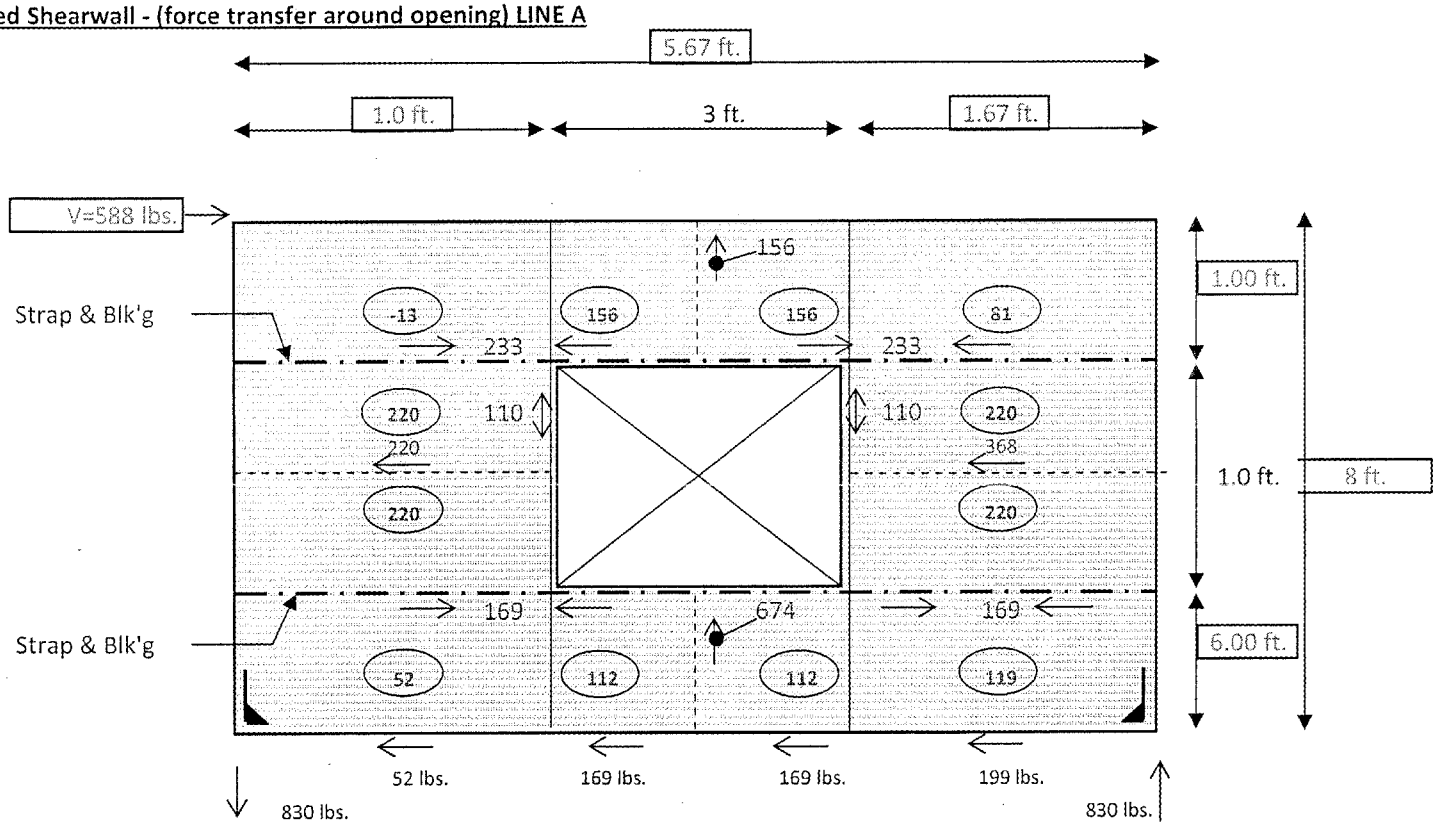
Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	0.0	**See Perf Shear Design**	0

SEE NEXT PAGE

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1						

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	**USE** Provides (lbs)
1					

Perforated Shearwall - (force transfer around opening) LINE A



(xx) = Panel Shear, plf

Unit Shear =	**104**	plf
Max Shear =	**220**	lbs
Header Strap=	**233**	lbs
Sill Strap=	**169**	lbs

Shear wall type = 10

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

DATE
JOB NO. 11-0815

Lateral Analysis (X-X Direction)

Line B

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	19.5	1860

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
10.67	12.33	66	170

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
55	16	440	1135

	Seismic Shear (LBS)
Σ =	1304

∴ **Wind Governs**

Governing Shear = 1860 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
4.67	4.25				8.9	209

USE: Δ 11 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	4.67	209	1
2	8	4.3	209	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	8.0	5	8.0	15	8
2	7	8.0	5	8.0	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	7792	2355	.67	1331	HDU2	3075
2	7091	1951	.67	1361	HDU2	3075

Lateral Analysis (X-X Direction)

Line C

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	4.00	8	1	6.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
95	15.5	1479

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	31	395.25	1019

from: New Patio

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	13.5	172.125	444

Seismic Shear (LBS)
Σ = 1463

∴ **Wind Governs**

Governing Shear = 1479 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
4	4.0				8.0	185

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 16 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	4	185	0
2	8	4.0	185	0

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	0.0	5	0.0	15	8
2	7	0.0	5	0.0	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE	Provides (lbs)
1	5915	960	.67	1318	HDU2	3075
2	5915	960	.67	1318	HDU2	3075

PIN-CHING LI & ASSOCIATES
REGISTERED CIVIL ENGINEER
OWNER :
PROJECT :

DATE
JOB NO. 11-0815

Lateral Analysis (X-X Direction)

Line D

Wind

Design Wind Pressure (PSF)	Roof Height (FT)	Story Height (FT)	# of Stories (FT)	Height for Calc (FT)
15.9	6.00	8	1	7.00

Wind Load (PLF)	Trib Width (FT)	Wind Shear (LBS)
111	12.5	1391

Seismic

Design V	Roof DL (PSF)	Ceiling DL (PSF)	Half Wall DL (PSF)	V (PSF)
0.129	7	5	8	2.58

from: NEW

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
25.5	18	229.5	592

from: Existing

X Width (FT)	Y Length (FT)	Half Area (FT^2)	Shear (LBS)
55	12	330	851

Seismic Shear (LBS)
Σ = 1443

∴ **Seismic Governs**

Governing Shear = 1443 lbs

Shear Wall Segment 1	2	3	4	5	Total L (FT)	Unit Shear (PLF)
10					10.0	144

USE: Δ 10 SHEAR PANEL and Simpson A-35 @ 32 " O.C.

Uplift

Wall	Wall Height (ft)	Wall Segment (ft)	Unit Shear (lbs/ft)	Bearing? (Y=1. N=0)
1	8	10	144	1

Wall	Roof D.L. (psf)	Roof Tributary (ft)	Ceiling D.L. (psf)	Ceiling Tributary (ft)	Wall D.L. (psf)	Tot. Wall Height (ft)
1	7	6.5	5	6.5	15	8

Wall	Overturning Moment (ft-lbs)	Resistance Moment (ft-lbs)	Adjustment Factor	Uplift (lbs)	USE Provides (lbs)
1	11543	9900	.9	263	Negligible

Roof Diaphragm

Seismic V = 2.58 psf

	Length (ft)	Load (psf)
Y-Dir	18	46
X-Dir	25.5	66

Wind Load

	Wind Load (PLF)
Y-Dir	95
X-Dir	95

	Governing Load (psf)	X-Dir Length (L1, ft)	Y-Dir Length (L2, ft)
Y-Dir	95	25.5	18
X-Dir	95	25.5	18

LONG w*L1/(2*L2) = 68 lbs/ft
SHORT w*L2/(2*L1) = 34 lbs/ft

USE 15/32" CDX PLYWOOD OR OSB w/ 8d @ 6" and 12"
PROVIDES = 240#/ft UNBLOCKED
*Table 2306.2.1(1) CBC 2010

LONG Tension = Compression = w*L1^2/(L2*8) = 431 lbs
SHORT Tension = Compression = w*L2^2/(L1*8) = 152 lbs

USE ST22 PROVIDES = 1420 lbs
ST22 PROVIDES = 1420 lbs

FOUNDATION ANALYSIS:(ASSUME SOIL BEARING PRESSURE 1500 PSF)

Continous Footing

Roof DL = 7 psf
Roof LL = 19 psf
Roof Tributary = 12.75 ft
Ceiling DL = 5 psf
Ceiling Tributary = 12.75 ft
Floor DL = 40 psf
Floor LL = 10 psf
Floor Tributary = 0.00 ft
Wall DL = 15 psf
Wall Height = 8 ft

W max = 515 plf
Soil Bearing Pressure = 1500 psf
Width = 0.34 ft
4.12 inches

USE 12"x12"deep w/ #4 T.&B. MIN.

1 Pad Support BM 3 and BM 4 @ Patio

P max = 3038 lbs
A req = 1.42 sq ft
A req = 17.08 sq in

USE 24"x24"x12" w/ 2 #4 E.W.

SHEAR PANEL SCHEDULE (SEISMIC) C. B. C. 2010 EDITION TABLE 2306.3

NO.	MATERIAL	NAILING	LB/FT S/W	SOLE NAILING 16d @ ___ O.C.	A.B. SPACING 5/8" @ ___ O.C
10	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 6" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	280	6"	32"
11	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 4" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	350	4"	24"
12	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 4" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	430*	4"	24"
13	3/8"STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 3" O.C. EDGE & 12" FIELD OR 10d BOX OR 12d SINKER	550*	3"	16"
14	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 3" O.C. Edge & 12" FIELD OR 16d SINKER	665*	2"	12"
15	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 2" O.C. Edge & 12" FIELD OR 16d SINKER	870*	2"	8"

* FRAMING AT ADJOINING PANEL EDGES AND SILL PLATE SHALL BE 3x___ OR WIDER AND NAILS SHALL BE STAGGERED (IF SHEAR WALL EXCEED 350#/FT).

NOTES:

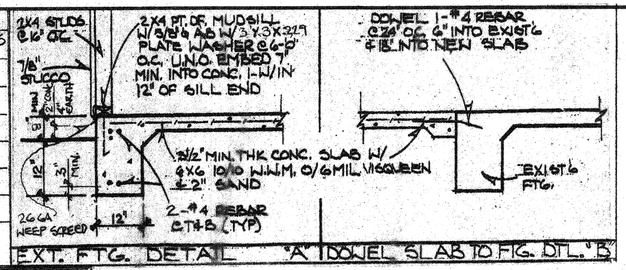
A. PROVIDE 2x___ BLOCKING AT HORIZONTAL PLYWOOD PANEL JOINTS

B. WHERE PLYWOOD IS APPLIED ON BOTH FACES OF WALL AND NAIL SPACING IS LESS THAN A 6" OC, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS OR FRAMING SHALL BE 3x___ OR WIDER (OR 2-2x___) AND NAILS STAGGERED ON EACH SIDE.

C. WHERE NAILS ARE SPACED AT 2" OC, THEY SHALL BE STAGGERED AND 3x___ OR WIDER FRAMING MEMBERS SHALL BE USED AT ADJOINING PANEL EDGES

D. USE .229"x3"x3" SQUARE WASHER FOR 5/8"X10" ANCHOR BOLTS

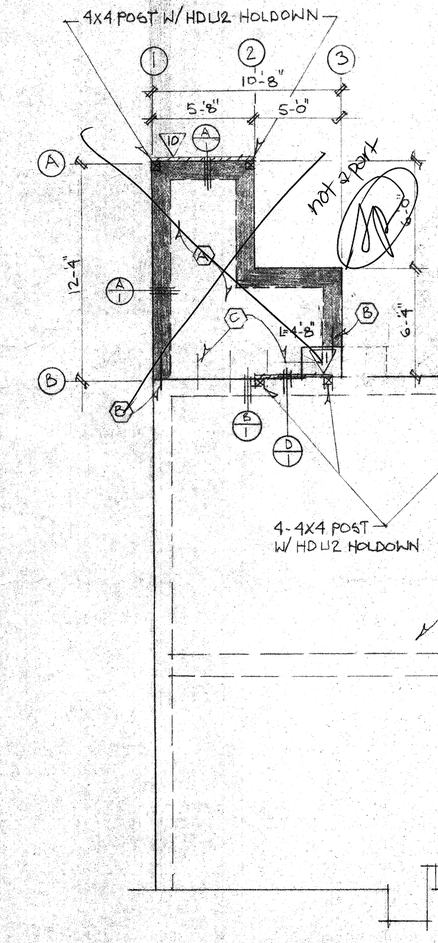
SHEET INDEX



EXT. FTG. DETAIL "A" DOWEL SLAB TO FTG. DTL. "B"

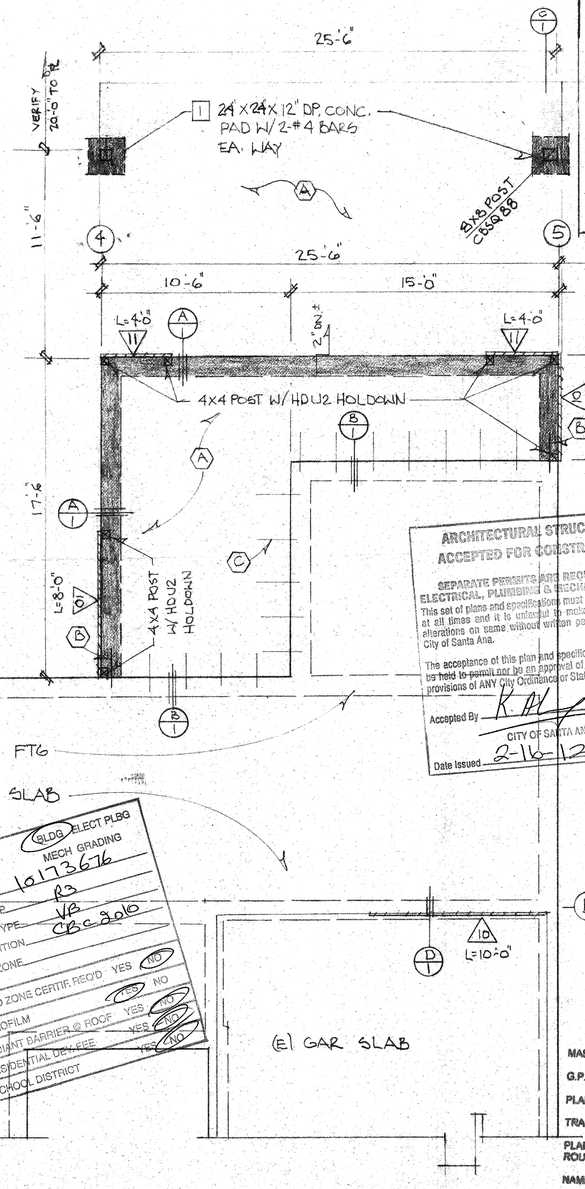
CONC. SYMBOLS

- (A) 3½" MIN. THK CONC. SLAB W/ 6X6 10/10 W.W.M. O/ 2" SAND & 6 MIL VISQUEEN
- (B) DOWEL 1-#4 REBAR @ T&B 6" INTO EXIST'G W/ SET EPOXY (NO SPECIAL INSPECTION REQ'D) & 18" MIN. INTO NEW FTG.
- (C) DOWEL 1-#4 REBAR @ 24" OC. 6" INTO EXIST'G W/ SET EPOXY (NO SPECIAL INSPECTION REQ'D) & 18" INTO NEW SLAB



FOUNDATION PLAN

SCALE: 1/4"=1'-0"



ARCHITECTURAL STRUCTURAL
ACCEPTED FOR CONSTRUCTION

SEPARATE PERMITS ARE REQUIRED FOR ELECTRICAL, PLUMBING & MECHANICAL PLANS. This set of plans and specifications must be kept on the job at all times and it is unlawful to make any changes or alterations on same without written permission from the City of Santa Ana.

The acceptance of this plan and specifications SHALL NOT be held to permit nor be an approval of the violation of any provisions of ANY City Ordinance or State Law.

Accepted By: K. [illegible] Date: 2-13-2012

CITY OF SANTA ANA

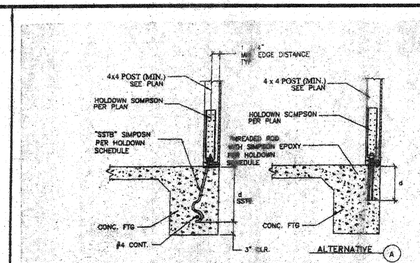
Date Issued: 2-16-12

PERMIT TYPE: BLDG ELECT PLBG MECH GRADING
PERMIT# 1017367G
OCC. GROUP R3
CONSTR. TYPE VB
CODE EDITION CBC 2010
FLOOD ZONE
FLOOD ZONE CERTIF. REQ'D YES NO
MICROFILM YES NO
RADIANT BARRIER @ ROOF YES NO
RESIDENTIAL DEV. FEE YES NO
SCHOOL DISTRICT YES NO

(D) legalize 4 vinyl sliders
" 2 " sliding doors
344 ☐ patio

APPROVED
PLANNING DIVISION
MASTER I.D. 2011-99856
G.P. LR7 Zone R1
PLANNER [illegible] DATE 02/03/12
TRANSFERRED BY HS ONLY DATE
PLANNING INSPECTION REQUIRED:
ROUGH FINAL NONE
NAME (714)
RETAIN PLANS FOR FUTURE REVISIONS
SUBJECT TO ITEMS CHECKED AND CONDITIONS BELOW:
- ☐ INTERIOR TI ONLY
- ☐ NO EXTERIOR ALTERATIONS/MODIFICATIONS
- ☐ ALL MATERIALS TO MATCH EXISTING
- ☐ SCREENING REQUIRED
- ☐ SUBMIT LANDSCAPE PLANS

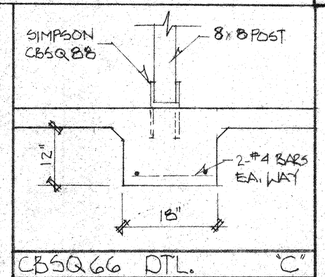
DESIGNED BY: KEN SACKETT
4932 LARD LN, YORBA LINDA CA 92886 (714) 931-0295
DRAWN BY: PIN CHING LI
20332 E. CRESTLINE WALNUT CA 91789 (562) 860-0311 EXT. 2006



HOLDOWN	ø SSTB	ø EPOXY	INTO CONCRETE FOUNDATION
HDU2-SDS2.5	16 5/8"	6 3/4"	5/8"x16 5/8" EMBED. SIMPSON "SSTB20" ANCHOR BOLTS OR 5/8" THREADED ROD INTO 3/4"x6" DRILL HOLE WITH "SET" SIMPSON EPOXY I.C.C. # ESR 2508
HDU4-SDS2.5	20 5/8"	8 3/4"	5/8"x20 5/8" EMBED. SIMPSON "SSTB24" ANCHOR BOLTS OR 5/8" THREADED ROD INTO 7/8"x8" 3/4" DRILL HOLE WITH "SET" SIMPSON EPOXY I.C.C. # ESR 2508
HDU5-SDS2.5	24 7/8"	7 3/4"	7/8"x24 7/8" EMBED. SIMPSON "SSTB28" ANCHOR BOLTS OR 7/8" THREADED ROD INTO 1"x7 3/4" DRILL HOLE WITH "SET" SIMPSON EPOXY I.C.C. # ESR 2508
HDU8-SDS2.5	24 7/8"	7 3/4"	7/8"x24 7/8" EMBED. SIMPSON "SSTB34" ANCHOR BOLTS OR 7/8" THREADED ROD INTO 1"x7 3/4" DRILL HOLE WITH "SET" SIMPSON EPOXY I.C.C. # ESR 2508

ALL SIMPSON EPOXY REQUIRED SPECIAL INSPECTION
– ALL SHEARWALL ANCHOR BOLTS AND HOLD-DOWN HARDWARE MUST BE SECURED IN PLACE PRIOR TO FOUNDATION INSPECTION.

HDU2 HOLDOWN DETAIL



CBSQ66 DTL. "C"

ADD 2X BLK'G IN BETWEEN (E) STUDS W/ 5/8"ø X 10" THREADED ROD W/ "SET" EPOXY ICC# ESR 2508

ROD TO (E) FTG. DTL. "D"

APPLICABLE BUILDING STANDARDS

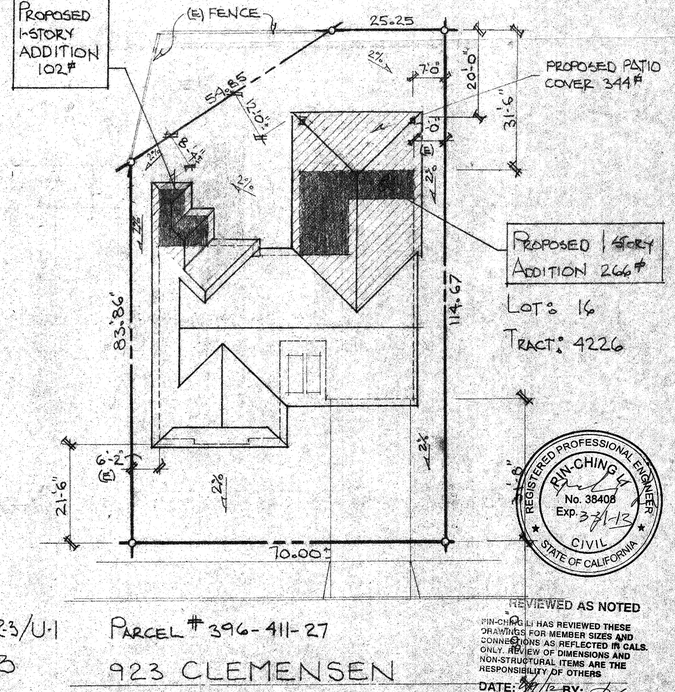
1) 2008 CALIF. ENERGY CODE T-24
2) 2010 CALIF. BUILDING CODE
3) 2010 CALIF. ELECTRICAL CODE
4) 2010 CALIF. MECHANICAL CODE
5) 2010 CALIF. PLUMBING CODE
6) 2010 CALIF. RESIDENTIAL CODE

GENERAL NOTES:

1) CONC. TO MADE W/ TYPE V CEMENT AND SAX MIX TO DEVELOP 2,500 P.S.I. IN 28 DAYS
2) USE 5/8"ø X 10" A.B. @ 6'-0" O.C. U.N.O. 1-BOLT W/ IN 12" OF SILL END EMBED 7" INTO CONC. USE 3"X3"X1/4" PLATE WASHER
3) USE 26 GA. FLASHING AS REQ'D
4) ALUMINUM WIRE SHALL NOT BE USED IN ELECTRICAL SYSTEMS.
5) ALL LUMBER TO GRADE STAMPED AS FOLLOWS:
   HORIZONTAL - DF # 2
   VERTICAL - DF # 2
   STUDS - STUD
6) CONTRACTOR/OWNER TO VERIFY ALL NOTES/DIMENSIONS PRIOR TO STARTING CONSTRUCTION
7) CONTRACTOR WILL ADD 3- WORKING DAYS TO CONSTRUCTION FOR EVERY DAY OF RAIN DURING CONSTRUCTION.

EXIST'G LOT:	7,407 ☐
EXIST'G HOUSE:	1813 ☐
EXIST'G GAR:	410 ☐
PROPOSED ADDITIONS:	~~388~~ 285 ☐
TOTAL LOT COV.:	2591 ☐ = 34.98%

RECEIVED
JAN 11 2012
City of Santa Ana



LOT: 16
TRACT: 4226

PARCEL # 396-411-27

923 CLEMENSEN

PLOT PLAN

SCALE: 1/16"=1'-0"

REGISTERED PROFESSIONAL ENGINEER
PIN-CHING LI
No. 38408
Exp. 3-31-13
CIVIL
STATE OF CALIFORNIA

REVIEWED AS NOTED
PIN-CHING LI HAS REVIEWED THESE DRAWINGS FOR MEMBER SIZES AND CONNECTIONS AS REFLECTED IN CALS. ONLY. REVIEW OF DIMENSIONS AND NON-STRUCTURAL ITEMS ARE THE RESPONSIBILITY OF OTHERS
DATE: 2/7/12 BY:

REVISIONS	BY

ARCHITECTURAL ACCEPTED FOR CONSTRUCTION
SEPARATE PERMITS ARE REQUIRED FOR ELECTRICAL, PLUMBING & MECHANICAL PLANS
set of plans and specifications must be kept on the job site at all times and it is unlawful to make any changes or alterations on same without written permission from the City of Santa Ana.
The acceptance of this plan and specifications SHALL NOT be held to permit nor be an approval of the violation of any provisions of ANY City Ordinance or State Law.
Accepted By: [illegible] Date: 2-13-2012
CITY OF SANTA ANA
Date Issued: 2-16-12

PREPARED FOR: MATTHEW & JENNIFER FRANKLIN
923 CLEMENSEN
SANTA ANA CA. 92705
(714) 538-8559

DESIGNED BY: KEN SACKETT 4932 LARD LN. YORBA LINDA CA. 92886 (714) 931-0295

DRAWN BY: PIN CHING LI

Date	JULY 2011
Scale	AS SHOWN
Drawn	KEN/PIN
Job	
Sheet	1
Of	Sheets

10172G

TABLE R602.3(1) FASTENER SCHEDULE FOR STRUCTURAL MEMBERS

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING OF FASTENERS
	Roof		
1	Blocking between joists or rafters to top plate, toe nail	3-8d ($2^1/_2$" × 0.113")	-
2	Ceiling joists to plate, toe nail	3-8d ($2^1/_2$" × 0.113")	-
3	Ceiling joists not attached to parallel rafter, laps over partitions, face nail	3-10d	-
4	Collar tie rafter, face nail or $1^1/_4$" × 20 gage ridge strap	3-10d (3" × 0.128")	-
5	Rafter to plate, toe nail	2-16d ($3^1/_2$" × 0.135")	-
6	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d ($3^1/_2$" × 0.135") 3-16d ($3^1/_2$" × 0.135")	- -
	Wall		
7	Built-up corner studs	10d (3" × 0.128")	24" o.c.
8	Built-up header, two pieces with $^1/_2$" spacer	16d ($3^1/_2$" × 0.135")	16" o.c. along each edge
9	Continued header, two pieces	16d ($3^1/_2$" × 0.135")	16" o.c. along each edge
10	Continuous header to stud, toe nail	4-8d ($2^1/_2$" × 0.113")	-
11	Double studs, face nail	10d (3" × 0.128")	24" o.c.
12	Double top plates, face nail	10d (3" × 0.128")	24" o.c.
13	Double top plates, minimum 48-inch offset of end joints, face nail in lapped area	8-16d ($3^1/_2$" × 0.135")	-
14	Sole plate to joist or blocking, face nail	16d ($3^1/_2$" × 0.135")	16" o.c.
15	Sole plate to joist or blocking at braced wall panels	3-16d ($3^1/_2$" × 0.135")	16" o.c.
16	Stud to sole plate, toe nail	3-8d ($2^1/_2$" × 0.113") or 2-16d ($3^1/_2$" × 0.135")	- -
17	Top or sole plate to stud, end nail	2-16d ($3^1/_2$" × 0.135")	-
18	Top plates, laps at corners and intersections, face nail	2-10d (3" × 0.128")	-
19	1" brace to each stud and plate, face nail	2-8d ($2^1/_2$" × 0.113") 2 staples $1^3/_4$"	- -
20	1" × 6" sheathing to each bearing, face nail	2-8d ($2^1/_2$" × 0.113") 2 staples $1^3/_4$"	- -
21	1" × 8" sheathing to each bearing, face nail	2-8d ($2^1/_2$" × 0.113") 3 staples $1^3/_4$"	- -
22	Wider than 1" × 8" sheathing to each bearing, face nail	3-8d ($2^1/_2$" × 0.113") 4 staples $1^3/_4$"	- -
	Floor		
23	Joist to sill or girder, toe nail	3-8d ($2^1/_2$" × 0.113")	
24	1" × 6" subfloor or less to each joist, face nail	2-8d ($2^1/_2$" × 0.113") 2 staples $1^3/_4$"	
25	2" subfloor to joist or girder, blind and face nail	2-16d ($3^1/_2$" × 0.135")	
26	Rim joist to top plate, toe nail (roof applications also)	8d ($2^1/_2$" × 0.113")	6" o.c.
27	2" planks (plank & beam - floor & roof)	2-16d ($3^1/_2$" × 0.135")	at each bearing
28	Built-up girders and beams, 2-inch lumber layers	10d (3" × 0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
29	Ledger strip supporting joists or rafters	3-16d ($3^1/_2$" × 0.135")	At each joist or rafter

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER[b, c, e]	SPACING OF FASTENERS: Edges (inches)	SPACING OF FASTENERS: Intermediate supports[c, e] (inches)
	Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing			
30	$^3/_8$"-$^1/_2$"	6d common (2" × 0.113") nail (subfloor wall) 8d common ($2^1/_2$" × 0.131") nail (roof)[f]	6	12[g]
31	$^5/_{16}$"-$^1/_2$"	6d common (2" × 0.113") nail (subfloor, wall) 8d common (21/2" × 0.131") nail (roof)[f]	6	12[g]
32	$^{19}/_{32}$"- 1"	8d common nail ($2^1/_2$" × 0.131")	6	12[g]
33	$1^1/_8$"- $1^1/_4$"	10d common (3" × 0.148") nail or 8d (21/2" × 0.131") deformed nail	6	12
	Other wall sheathing[h]			
34	$^1/_2$" structural cellulosic fiberboard sheathing	$^1/_2$" galvanized roofing nail, $^7/_{16}$" crown or 1" crown staple 16 ga., $1^1/_4$" long	3	6
35	$^{25}/_{32}$" structural cellulosic fiberboard sheathing	$1^1/_4$" galvanized roofing nail, $^7/_{16}$" crown or 1" crown staple 16 ga., $1^5/_8$" long	3	6
36	$^1/_2$" gypsum sheathing[i]	$1^1/_2$" galvanized roofing nail; staple galvanized, $1^1/_2$" long; $1^1/_4$" screws, Type W or S	7	7
37	$^5/_8$" gypsum sheathing[i]	$1^3/_4$" galvanized roofing nail; staple galvanized, $1^5/_8$" long; $1^5/_8$" screws, Type W or S	7	7
	Wood structural panels, combination subfloor underlayment to framing			
38	$^3/_4$" and less	8d deformed (2" × 0.120") nail or 8d common ($2^1/_2$" × 0.131") nail	6	12
39	$^7/_8$"- 1"	8d common ($2^1/_2$" × 0.131") nail or 8d deformed ($2^1/_2$" × 0.120") nail	6	12
40	$1^1/_8$"- $1^1/_4$"	10d common (3" × 0.148") nail or 8d deformed ($2^1/_2$" × 0.120") nail	6	12

For SI: 1 inch = 25.4 mm. 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1ksi = 6.895 MPa.

a. All nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less.

b. Staples are 16 gage wire and have a minimum 7/16-inch on diameter crown width.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot-by-8-foot or 4-foot-by-9-foot panels shall be applied vertically.

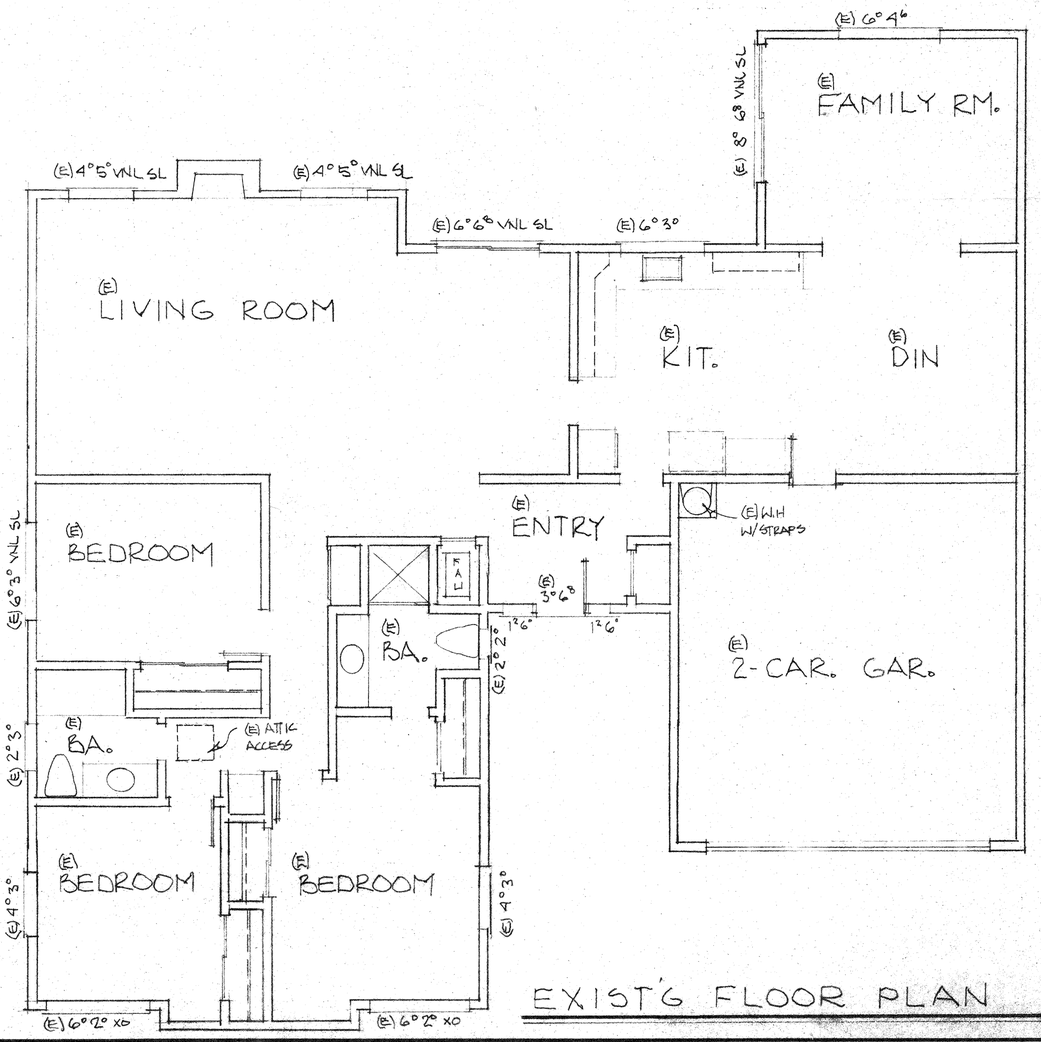
e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For regions having basic wind speed of 110 mph or greater, 8d deformed (2172- 0.120) nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls. If mean roof height is more than 25 feet, up to 35 feet maximum.

g. For regions having basic wind speed of 100 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than 100 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.

h. Gypsum sheathing shall conform to ASTM C 1396 and shall be installed in accordance with GA 253. Fiberboard sheathing shall conform to ASTM C 208.

i. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at all floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.



EXIST'G FLOOR PLAN AS 1/8

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REVISIONS	BY

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Date MAY 2011
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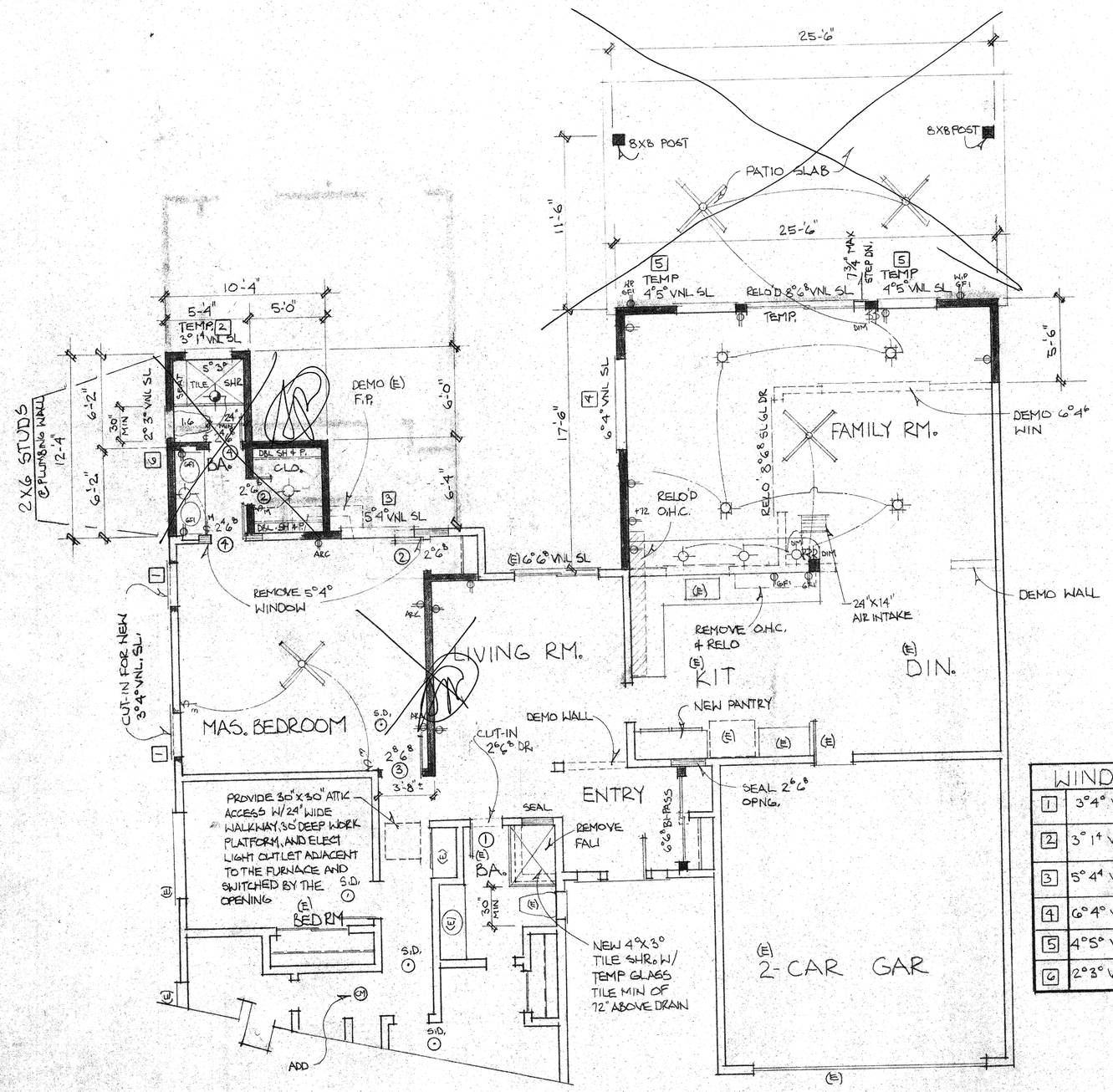

FLOOR PLAN

SCALE: ¼"=1'-0"

ELECTRICAL LEGEND

- 110 V. OUTLET
- GFI 110 V. OUTLET W/ GROUND FAULT INTERRUPTER
- ARC 110 V. OUTLET W/ ARC-FAULT INTERRUPTER
- M INTERIOR MOTION SENSOR SWITCH
- INTERIOR SWITCH
- RECESSED INCANDESCENT LIGHT
- RECESSED 13 WATT COMPACT FLUOR. QUAD PIN LIGHT PER. T-24
- RECESSED OCCUPANT SENSOR LGT. W/INTEGRAL PHOTO CONTROL CERTIFIED TO COMPLY WITH SECTION 119d
- WALL MOUNT OCCUPANT SENSOR LGT. W/ INTEGRAL PHOTO CONTROL CERTIFIED TO COMPLY WITH SECTION 119d
- CEILING FAN
- E.F. CONTINUOUS OPERATING E.F. W/ MIN. 50 CFM VENT TO O.S.A.
- S.D. SMOKE DETECTOR WITH BATTERY POWER FOR EXIST'G BEDROOMS & HALLS LEADING TO BEDROOMS. USE 110 V. W/ BATTERY BACK UP FOR NEW BEDROOM & HALLS LEADING TO BEDROOMS
- ADD TO (E) HALL → CM CARBON MONOXIDE ALARM PROVIDE 1 ALARM OUTSIDE OF ANY EXIST'G OR NEW BEDROOMS PRIMARY PWR. FROM BUILDING & WILL HAVE BATTERY BACK-UP

NOTE: ALL ALARMS SHALL BE LISTED IN ACCORDANCE W/ UL 217 SYSTEMS & COMPONENTS SHALL BE CALIF. STATE FIRE MARSHALL LISTED

WALL LEGEND

- EXIST'G WALL
- NEW WALL
- DEMO WALL
- DEMO OPENING FOR NEW WINDOW

WINDOW SCHEDULE		U FACTOR	QTY
1	3°4" VNL SL. DBL. PANE	.30	2
2	3°1⁴ VNL SL TEMP. GL. DBL. PANE	.30	1
3	5°4⁴ VNL SL DBL PANE	.30	1
4	6°4" VNL SL DBL. PANE	.30	1
5	4°5° VNL SL TEMP. GL. DBL PANE	.30	2
6	2°3° VNL SL DBL. PANE	.30	1

DOOR SCHEDULE		QTY
1	2°6⁸ H.C. PAINT GRADE BATHROOM DR	2
2	2°6⁸ H.C. PAINT GRADE CLO. DR	2
3	2⁸6⁸ S.C. PAINT GRADE BD. RM. DR	1
4	2⁴6⁸ H.C. PAINT GRADE BATHROOM DR.	2
5	RELO'D 8°6⁸ TEMP DBL P. VNL SL. GL. DR.	1
6	6°6⁸ BI-PASS CLOSET DR	1

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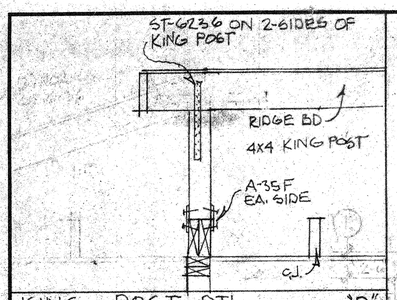

KING POST DTL. "D"

FRAMING PLAN

SCALE: 1/4"=1'-0"

WALL LEGEND

- EXIST'G WALL
- NEW WALL
- DEMO WALL
- DEMO OPENING FOR NEW WINDOW

1-EDGE NAIL'G
2-ROOF SHT'G
3-FULL HGT. BLK'G
4-A-35 @ 48" O.C. U.N.O.
5 SHEAR PNL SEE PLANS
6- 2X R.R.
7- STARTER BD MATCH EXIST'G
8- 5-16d C.J. TO R.R.

SHEAR TRANSFER DTL. "A"

1=2X R.R. SEE PLAN
2-2X FASCIA
3-10d'S @ 6" O.C.
4-2X FLAT BLK'G
5-ROOF SHT'G
6-SHEAR PNL SEE PLAN
7-2X4 STUD WALL
8-2X4 FLAT OUTRIGGER
9-EDGE NAIL
10-A35 TO R.R. OR (2) 16d END NAIL

SHEAR TRANSFER DTL. "B"

1. 4 x Sill
2. Dbl. Top Plates
3. (1) Simpson MST48* @ Ea. Corner
4. 4-x Blockings
5. Shear Wall Edge Nailing.

* U.N.O

SPECIAL SHEAR WALL DTL. "C"

ECCL88 & ECCR88 TO BM DTL "E"

BM TO POST DTL. "F"

SHEAR PANEL SCHEDULE C. B. C. 2010 EDITION TABLE 2306.3

NO.	MATERIAL	NAILING	LB/FT SHR	SOLE NAILING 10d @ O.C.	A.B. SPACING 5/8" @ O.C.
1@	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 6" O.C. EDGE & 12" FIELD OR 10d BOX OR 10d SINKER	260	6"	32"
1A	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 4" O.C. EDGE & 12" FIELD OR 10d BOX OR 10d SINKER	350	4"	24"
2A	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 3" O.C. EDGE & 12" FIELD OR 10d BOX OR 10d SINKER	430*	4"	24"
3A	3/8" STRUCTURAL 1 PLYWOOD OR OSB	8d COMMON @ 2" O.C. EDGE & 12" FIELD OR 10d BOX OR 10d SINKER	590*	3"	16"
4A	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 6" O.C. Edge & 12" FIELD OR 16d SINKER	669*	2"	12"
5A	15/32" STRUCTURAL 1 PLYWOOD OR OSB	10d COMMON @ 3" O.C. Edge & 12" FIELD OR 16d SINKER	870*	2"	8"

* FRAMING AT ADJOINING PANEL EDGES AND SILL PLATE SHALL BE 3x___ OR WIDER AND NAILS SHALL BE STAGGERED (IF SHEAR WALL EXCEED 350#/FT).

NOTES:

A. PROVIDE 2x___ BLOCKING AT HORIZONTAL PLYWOOD PANEL JOINTS

B. WHERE PLYWOOD IS APPLIED ON BOTH FACES OF WALL AND NAIL SPACING IS LESS THAN A 6" OC, PANEL JOINTS SHALL BE OFFSET TO FALL ON DIFFERENT FRAMING MEMBERS OR FRAMING SHALL BE 3x___ OR WIDER (OR 2-2x___) AND NAILS STAGGERED ON EACH SIDE.

C. WHERE NAILS ARE SPACED AT 2" OC, THEY SHALL BE STAGGERED AND 3x___ OR WIDER FRAMING MEMBERS SHALL BE USED AT ADJOINING PANEL EDGES

D. USE .229"x3"x3" SQUARE WASHER FOR 5/8"X10" ANCHOR BOLTS

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* Roof Diaph. Use 15/32" CDX Ply. Wood or O.S.B. Nail 8d @ 6"12" UNBLOCKED

USE SIMPSON ST-22 FOR PLATE SPLICE

NOTE: FASTENERS FOR PRESERVATION TREATED AND FIRE TREATED WD SHALL BE HOT DIPPED ZINC COATED GALVANIZED STEEL, SILICON BRONZE OR COPPER. THE COATING WEIGHTS FOR ZINC COATED FASTENERS SHALL BE IN ACCORDANCE W/ ASTM A 153, CLC. R317.3

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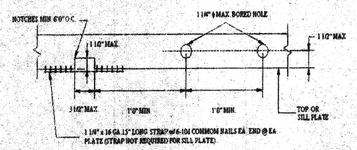
NOTCHING & BORING DETAILS

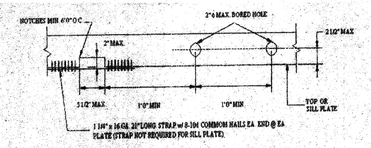
PART 2
Mechanical Penetrations of Top and Sill Plates of Wood Shear Walls

Plumbing, electrical and other mechanical penetrations of the top or sill plate framing members, when located within a wood panel shear wall, shall be limited to tolerances shown on **Figure 3** (unless an alternate designed detail is shown on the approved plans).

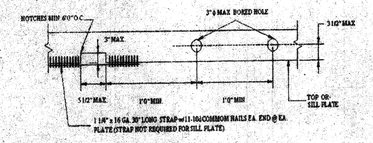


2 x 4 DBL. TOP PLATE, 2 x 4 or 3 x 4 SILL PLATE

Figure 3



2 x 6 DBL. TOP PLATE, 2 x 6 or 3 x 6 SILL PLATE



2 x 8 DBL. TOP PLATE, 2 x 8 or 3 x 8 SILL PLATE

Figure 3 *(continued)*

PART 3
Notching and Boring of Joist and Rafters

Section 2308.10.4.2 – Notches at the ends of joists shall not exceed one-fourth the joist depth. Holes bored in the joists shall not be within 2 inches of the top or bottom of the joist, and the diameter of any such hole shall not exceed one-third the depth of the joist. Notches in the top or bottom of joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span. **See Figure 4** below.

(NOTE: If floor/ceiling assembly separates two dwelling units, allow ¼ inch clearance around piping for sound transmission control).

NOTCHING AND BORING LIMITS FOR WOOD STUDS

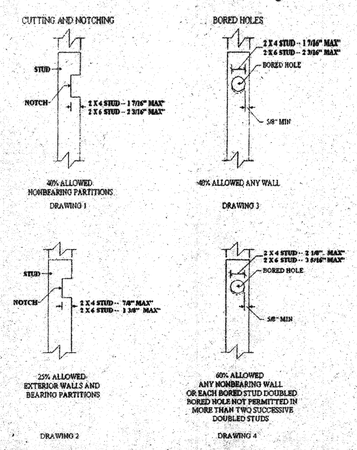
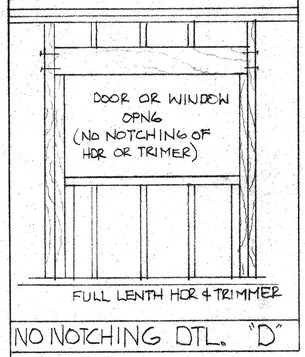
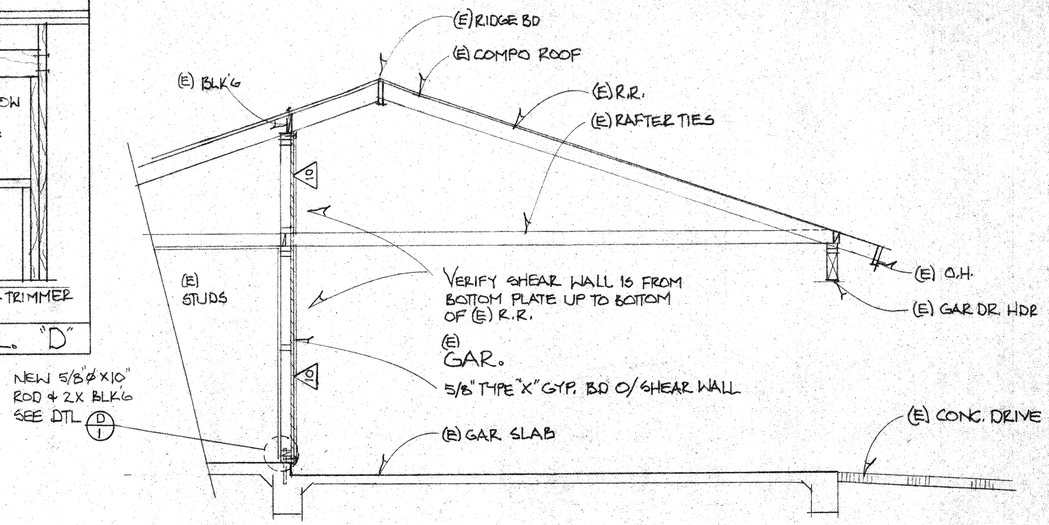


Figure 6: Maximum Allowed Notching and Drilling for Normal Construction with 2x Studs



NO NOTCHING DTL. "D"

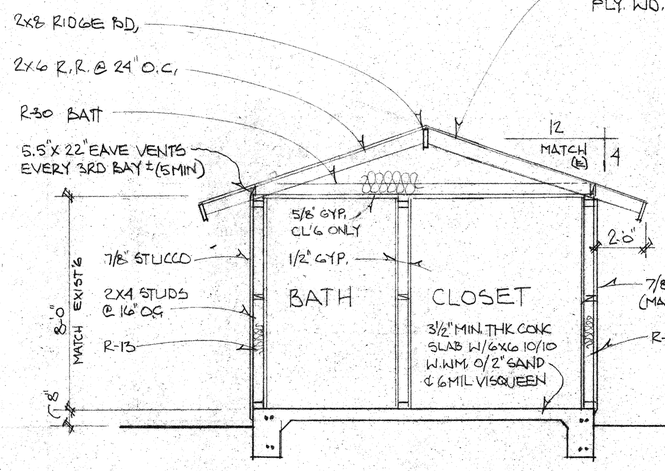


SECTION "C"

SCALE: 3/8"=1-0"

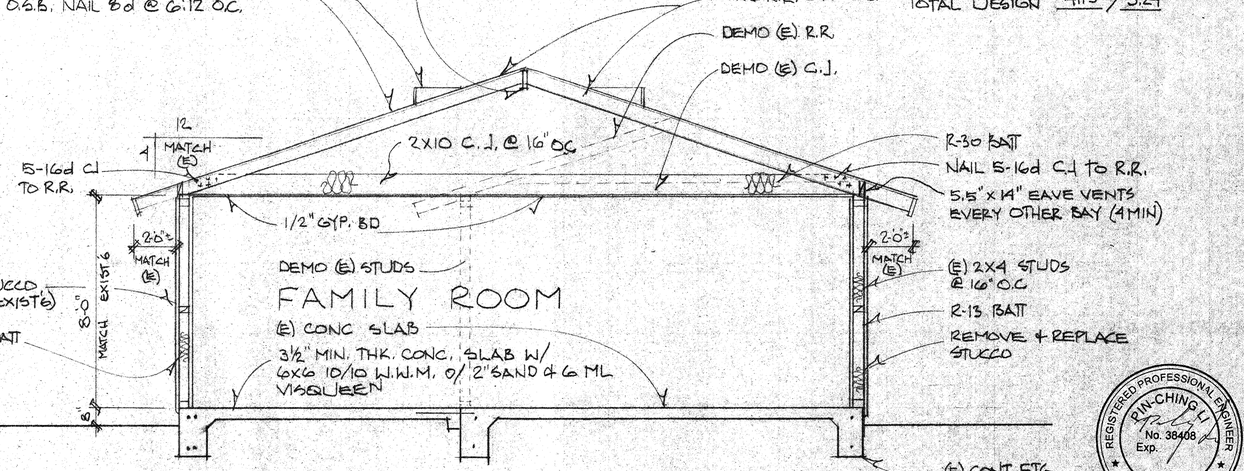
ATTIC DATA:
TOTAL ATTIC OVER MAS BATH & CLOSET= 41#
DESIGN= 5 5.5"X 22" EAVE VENTS = 4.8#
MIN DESIGN IS 41 ÷ 150 = .27
DESIGN: 4.8 > .27 MIN REQ'D

ATTIC DATA
TOTAL ATTIC OVER FAMILY RM 974#
DESIGN= 4 5.5 X 14" EAVE VENTS = 2.13#
DESIGN= 4 18" DORMER VENTS = 2#
MIN DESIGN= 974 ÷ 300 = 3.24 ½UP ½DN
TOTAL DESIGN 4.13 > 3.24



SECTION "B"

SCALE: 3/8"=1-0"



SECTION "A"

SCALE: 3/8"=1-0"

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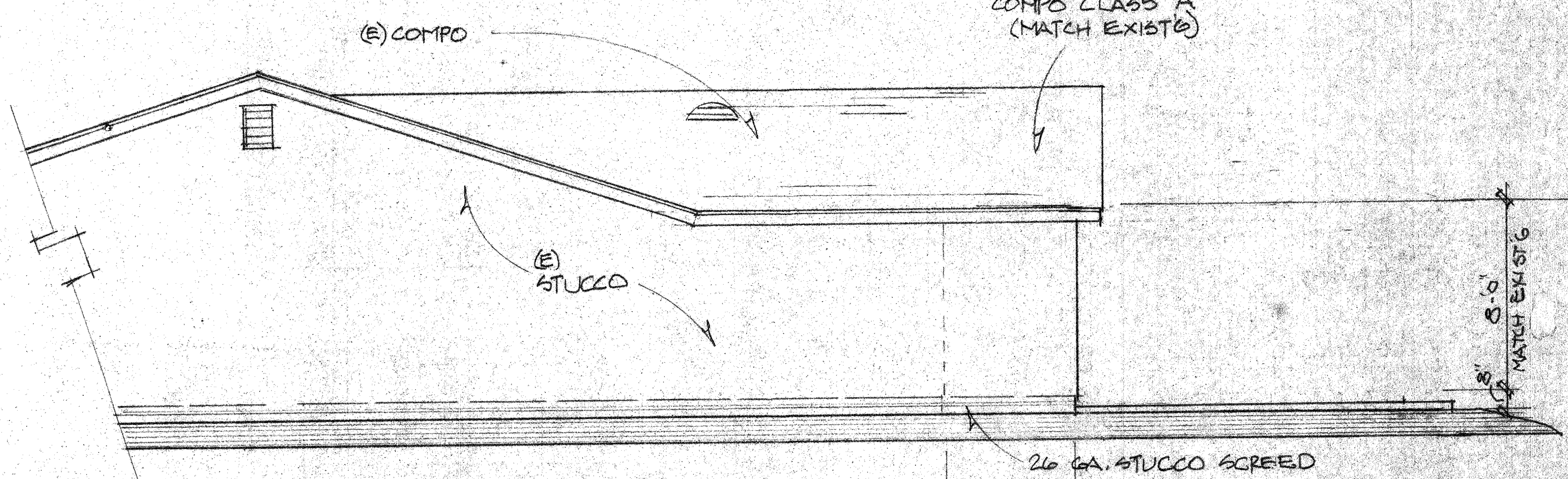
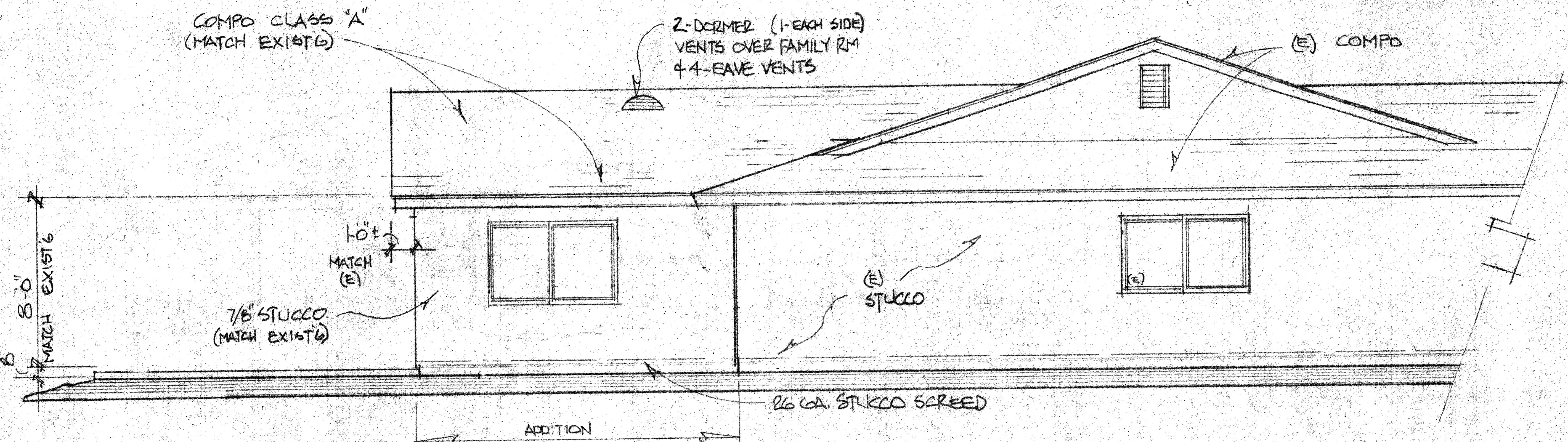


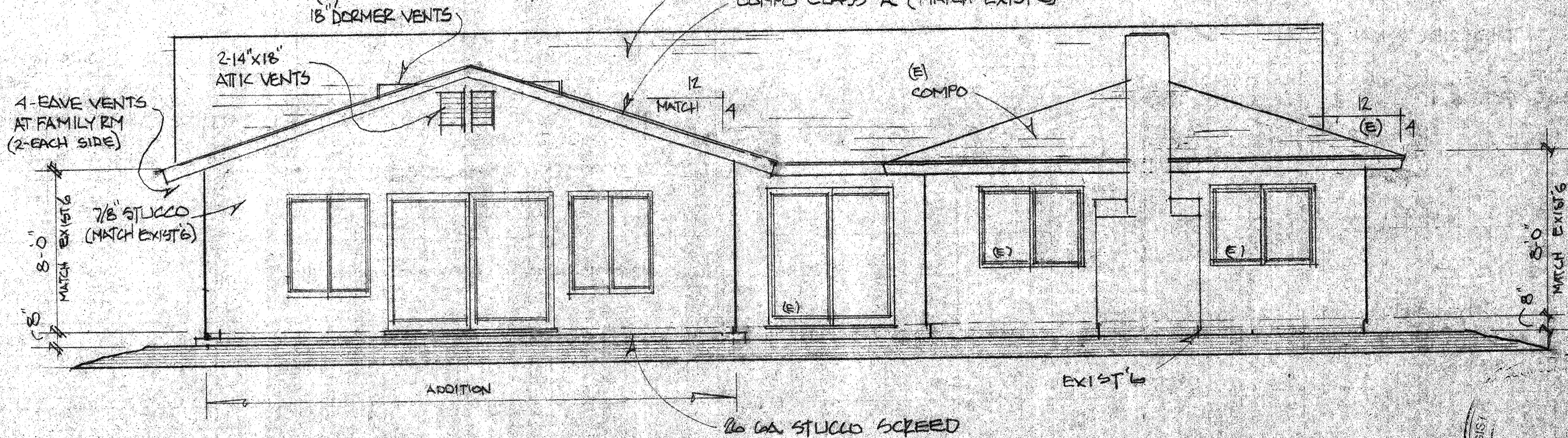
RIGHT ELEVATION

SCALE: 3/8"=1'-0"



LEFT ELEVATION

SCALE: 1/4"=1'-0"



REAR ELEVATION

SCALE: 1/4"=1'-0"

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PERFORMANCE CERTIFICATE: Residential (Part 1 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	10/12/2011

Project Address	California Energy Climate Zone	Total Cond. Floor Area	Addition	# of Stories
923 CLEMENSEN SANTA ANA	CA Climate Zone 08	2,194	381	1

FIELD INSPECTION ENERGY CHECKLIST

☐ Yes ☑ No HERS Measures -- If Yes, A CF-4R must be provided per Part 2 of 5 of this form.

☐ Yes ☑ No Special Features -- If Yes, see Part 2 of 5 of this form for details.

INSULATION

Construction	Type	Cavity	Area (ft^2)	Special Features (see Part 2 of 5)	Status
Roof	Wood Framed Attic	R-30	1,813		Existing
Wall	Wood Framed	R-11	1,229		Existing
Slab	Unheated Slab-on-Grade	None	1,813	Perim = 175'	Existing
Roof	Wood Framed Rafter	R-30	381		New
Wall	Wood Framed	R-13	547		New
Slab	Unheated Slab-on-Grade	None	381	Perim = 84'	New

FENESTRATION

Orientation	Area(ft^2)	U-Factor	SHGC	Overhang	Sidefins	Exterior Shades	Status
Right (W)	16.0	1.190	0.83	none	none	Bug Screen	Existing
Left (E)	36.0	1.190	0.83	none	none	Bug Screen	Existing
Left (E)	54.0	0.300	0.21	none	none	Bug Screen	New
Front (N)	37.2	1.190	0.83	none	none	Bug Screen	Existing
Rear (S)	40.2	1.190	0.83	none	none	Bug Screen	Existing
Rear (S)	117.5	0.300	0.21	none	none	Bug Screen	New
Right (W)	0.0	0.300	0.21	none	none	Bug Screen	New
Front (N)	0.0	0.300	0.21	none	none	Bug Screen	New

HVAC SYSTEMS

Qty.	Heating	Min. Eff	Cooling	Min. Eff	Thermostat	Status
1	Central Furnace	94% AFUE	Split Air Conditioner	15.0 SEER	Setback	Altered
1	Central Furnace	96% AFUE	Split Air Conditioner	15.0 SEER	Setback	New

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Status
EXISTING AREA	Ducted	Ducted	Attic, Ceiling Ins, vented	6.0	New
ADDITION AREA	Ducted	Ducted	Attic, Ceiling Ins, vented	6.0	New

WATER HEATING

Qty.	Type	Gallons	Min. Eff	Distribution	Status

PERFORMANCE CERTIFICATE: Residential (Part 2 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	10/12/2011

SPECIAL FEATURES INSPECTION CHECKLIST

The enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

HERS REQUIRED VERIFICATION

Items in this section require field testing and/or verification by a certified HERS Rater. The inspector must receive a completed CF-4R form for each of the measures listed below for final to be given.

PERFORMANCE CERTIFICATE: Residential (Part 3 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☐ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	10/12/2011

ANNUAL ENERGY USE SUMMARY

TDV (kBtu/ft^2-yr)	Standard	Proposed	Margin
Space Heating	9.35	8.62	0.73
Space Cooling	16.80	16.20	0.60
Fans	5.94	6.39	-0.45
Domestic Hot Water	18.56	18.56	0.00
Pumps	0.00	0.00	0.00
Totals	50.65	49.77	0.88
Percent Better Than Standard:			1.7 %

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

				Fenestration Area
Building Front Orientation:	(N) 0 deg	Ext. Walls/Roof	Wall Area	
Number of Dwelling Units:	1.00	(N)	444	37
Fuel Available at Site:	Natural Gas	(E)	594	90
Raised Floor Area:	0	(S)	444	158
Slab on Grade Area:	2,194	(W)	594	16
Average Ceiling Height:	8.0	Roof	2,194	0
Fenestration Average U-Factor:	0.68		TOTAL:	301
Average SHGC:	0.48		Fenestration/CFA Ratio:	13.7 %

REMARKS

STATEMENT OF COMPLIANCE

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 the Administrative Regulations and Part 6 the Efficiency Standards of the California Code of Regulations.

The documentation author hereby certifies that the documentation is accurate and complete.

Documentation Author

Company	PERFECT DESIGN & DEVELOPMENT, INC		
Address	2416 W Valley Blvd	Name Perfect Design	10/12/2011
City/State/Zip	Alhambra, Ca 91803	Phone (626)289-8808	Signed Date

The individual with overall design responsibility hereby certifies that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application, and recognizes that compliance using duct design, duct sealing, verification of refrigerant charge, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Company	KENS DESIGNS		
Address	4482 LARO LN.	Name	
City/State/Zip	YORBA LINDA, CA 92886	Phone (714) 931-0295	Signed License # Date

CERTIFICATE OF COMPLIANCE: Residential (Part 4 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Addition Alone ☐ Multi Family ☑ Existing+ Addition/Alteration	10/12/2011

OPAQUE SURFACE DETAILS

Surface Type	Area	U-Factor	Insulation Cavity	Exterior	Frame	Interior	Frame	Azm	Tilt	Status	Joint Appendix 4	Location/Comments
Roof	1,813	0.032	R-30					0	25	Existing	4.2.1-A8	EXISTING FLOOR
Wall	436	0.110	R-11					270	90	Existing	4.3.1-A2	EXISTING FLOOR
Wall	292	0.110	R-11					90	90	Existing	4.3.1-A2	EXISTING FLOOR
Wall	407	0.110	R-11					0	90	Existing	4.3.1-A2	EXISTING FLOOR
Wall	94	0.110	R-11					180	90	Existing	4.3.1-A2	EXISTING FLOOR
Slab	1,813	0.730	None									
Roof	381	0.036	R-30					0	25	New	4.2.2-A16	NEW FLOOR
Wall	142	0.102	R-13					270	90	New	4.3.1-A3	NEW FLOOR
Wall	212	0.102	R-13					90	90	New	4.3.1-A3	NEW FLOOR
Wall	0	0.102	R-13					0	90	New	4.3.1-A3	NEW FLOOR
Wall	192	0.102	R-13					180	90	New	4.3.1-A3	NEW FLOOR
Slab	381	0.730	None					0	180	New	4.4.7-A1	NEW FLOOR

FENESTRATION SURFACE DETAILS

ID	Type	Area	U-Factor[1]		SHGC[2]		Azm	Status	Glazing Type	Location/Comments
1	Window	16.0	1.190	Default	0.83	Default	270	Existing	Single Metal Clear	EXISTING FLOOR
2	Window	36.0	1.190	Default	0.83	Default	90	Existing	Single Metal Clear	EXISTING FLOOR
3	Window	24.0	0.300	NFRC	0.21	NFRC	90	New	Double Non Metal Clear (6)	EXISTING FLOOR
4	Window	37.2	1.190	Default	0.83	Default	0	Existing	Single Metal Clear	EXISTING FLOOR
5	Window	40.2	1.190	Default	0.83	Default	180	Existing	Single Metal Clear	EXISTING FLOOR
6	Window	20.0	0.300	NFRC	0.21	NFRC	180	New	Double Non Metal Clear (6)	EXISTING FLOOR
7	Window	0.0	0.300	NFRC	0.21	NFRC	270	New	Double Non Metal Clear (6)	NEW FLOOR
8	Window	30.0	0.300	NFRC	0.21	NFRC	90	New	Double Non Metal Clear (6)	NEW FLOOR
9	Window	0.0	0.300	NFRC	0.21	NFRC	0	New	Double Non Metal Clear (6)	NEW FLOOR
10	Window	97.5	0.300	NFRC	0.21	NFRC	180	New	Double Non Metal Clear (6)	NEW FLOOR

(1) U-Factor Type: 116-A = Default Table from Standards, NFRC = Labeled Value
(2) SHGC Type: 116-B = Default Table from Standards, NFRC = Labeled Value

EXTERIOR SHADING DETAILS

ID	Exterior Shade Type	SHGC	Window Hgt	Window Wd	Overhang Len	Overhang Hgt	Overhang LExt	Overhang RExt	Left Fin Dist	Left Fin Len	Left Fin Hgt	Right Fin Dist	Right Fin Len	Right Fin Hgt
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												
6	Bug Screen	0.76												
7	Bug Screen	0.76												
8	Bug Screen	0.76												
9	Bug Screen	0.76												
10	Bug Screen	0.76												

9. **Administrative Requirements:** The following notes (items) represent the administrative requirements for all buildings and shall appear as notes on the plans.

A) The person with overall responsibility for construction or the person responsible for the installation of regulated manufactured devices shall post, or make available with the building permit(s) issued for the building, the Installation Certificate(s) for manufactured devices regulated by the Appliance Efficiency Regulations or Part 6. Such Installation Certificate(s) shall be made available to the enforcement agency for all appropriate inspections. These certificates shall:

i) Identify features required to verify compliance with the Appliance Efficiency Regulations and Part 6.

ii) State the number of the building permit under which the construction or installation was performed. Sections of the certificate(s), for which submittal to a HERS provider data registry is required, shall display the unique registration number assigned by the HERS data registry.

iii) Include a statement indicating that the installed devices conform to the Appliance Efficiency Regulations and Part 6 and the requirements for such devices given in the plans and specifications approved by the local enforcement agency.

iv) Be signed by the individual eligible under Division 3 of the Business and Professional Code to accept responsibility for the building construction.

Sec. 10-103 (a) 3 A

B) After installing wall, ceiling, or floor insulation, the installer shall make available to the enforcement agency or post in a conspicuous location in the building a certificate signed by the installer stating that the installation is consistent with the plans and specifications described in Sec.10-103 (a) 2 A. The certificate shall also state the manufacturer's name, material identification, and the installed R-value.

Sec. 10-103 (a) 4

C) The builder shall provide the building owner or the person(s) responsible for building maintenance (in case of multi-tenant or centrally operated buildings) at occupancy the following:

1) Compliance information. The appropriate completed and signed Certificate(s) of Compliance (CF-1R), Installation Certificate(s) (CF-6R), and if applicable Certificate(s) of Field Verification and Diagnostic Testing (CF-4R).

2) Operating information. The appropriate Certificate (s) of Compliance and a list of the features, materials, components, and mechanical devices installed in the building and instructions on how to operate them efficiently.

3) Maintenance information. Required routine maintenance actions shall be clearly stated and incorporated on a readily accessible label. The label may be limited to identifying the operation and maintenance manual.

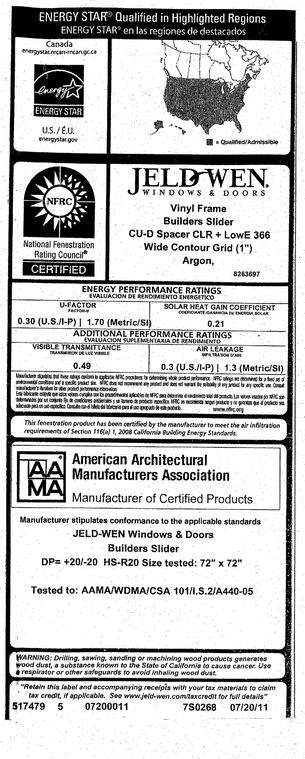
4) Ventilation Information. A description of the quantity of outdoor air that the ventilation system is designed to provide to the building conditioned space, and instructions for proper operation and maintenance.

Sec. 10-103 (b)

D) The Enforcement agency shall not issue a Certificate of Compliance until all required Certificates of Field Verification and Diagnostic Testing are posted or made available to the building department, and that all Certificates of Field Verification and Diagnostic Testing conform to the specifications of Section 10-103(a)5.

(12-20-2010)

Sec. 10-103 (d) 2



REVISIONS	BY

PERFECT DESIGN & DEVELOPMENT, INC.
Design & Consulting
Air-Conditioning, Plumbing, Fire Sprinkler System.
Electrical, Title 24 Energy Calculation.
2416 W. Valley Blvd. Tel: (626) 289-8808
Alhambra, CA 91803 Fax: (626) 289-4913
E-Mail:PERFECTAM@aol.com

SINGLE HOUSE ADDITION
923 CLEMENSEN
SANTA ANA, CA 92705

Date	10/12/2011
Scale	
Drawn	
Job	F11-1001R
Sheet	CF-1R, MF-1R & MANDATORY REQUIREMENTS of 2 Sheets

CERTIFICATE OF COMPLIANCE: Residential (Part 5 of 5) CF-1R

Project Name	Building Type	Date
SINGLE HOUSE ADDITION	☑ Single Family ☐ Multi Family ☐ Addition Alone ☑ Existing+ Addition/Alteration	10/12/2011

BUILDING ZONE INFORMATION

System Name	Zone Name	Floor Area (ft²) New	Existing	Altered	Removed	Volume	Year Built
EXISTING AREA	EXISTING FLOOR PLAN		1,813			14,504	1950
ADDITION AREA	NEW FLOOR PLAN	381				3,048	
	Totals	381	1,813	0	0		

HVAC SYSTEMS

System Name	Qty.	Heating Type	Min. Eff.	Cooling Type	Min. Eff.	Thermostat Type	Status
EXISTING AREA	1	Central Furnace	94% AFUE	Split Air Conditioner	15.0 SEER	Setback	Altered
pre-altered for above		Central Furnace	80% AFUE	Split Air Conditioner	10.0 SEER	Setback	
ADDITION AREA	1	Central Furnace	96% AFUE	Split Air Conditioner	15.0 SEER	Setback	New

HVAC DISTRIBUTION

System Name	Heating	Cooling	Duct Location	Duct R-Value	Ducts Tested?	Status
EXISTING AREA	Ducted	Ducted	Attic, Ceiling Ins, vented	6.0	☐	New
pre-altered for above	Ducted	Ducted	Attic, Ceiling Ins, vented	4.2	☐	
ADDITION AREA	Ducted	Ducted	Attic, Ceiling Ins, vented	6.0	☐	New
					☐	
					☐	

WATER HEATING SYSTEMS

System Name	Qty.	Type	Distribution	Rated Input (Btuh)	Tank Cap. (gal)	Energy Factor or RE	Standby Loss or Pilot	Ext. Tank Insul. R-Value	Status
EXISTING WATER HEATE	1	Small Gas	All Pipes Ins	37,000	50	0.53	n/a	n/a	Existing

MULTI-FAMILY WATER HEATING DETAILS

Control	Qty.	HP	Eff. Premium	Hot Water Piping Length (ft) Plenum	Outside	Buried	Add 1/2" Insulation
			☐				☐
			☐				☐
			☐				☐
			☐				☐
			☐				☐

HYDRONIC HEATING SYSTEM PIPING

System Name	Pipe Length	Pipe Diameter	Insul. Thick.

MANDATORY MEASURES SUMMARY: Residential (Page 1 of 3) MF-1R

Project Name: SINGLE HOUSE ADDITION — Date: 10/12/2011

NOTE: Low-rise residential buildings subject to the Standards must comply with all applicable mandatory measures listed, regardless of the compliance approach used. More stringent energy measures listed on the Certificate of Compliance (CF-1R, CF-1R-ADD, or CF-1R-ALT Form) shall supersede the items marked with an asterisk (*) below. This Mandatory Measures Summary shall be incorporated into the permit documents, and the applicable features shall be considered by all parties as minimum component performance specifications whether they are shown elsewhere in the documents or in this summary. Submit all applicable sections of the MF-1R Form with plans.

Building Envelope Measures:

§116(a)1: Doors and windows between conditioned and unconditioned spaces are manufactured to limit air leakage.

§116(a)4: Fenestration products (except field-fabricated windows) have a label listing the certified U-Factor, certified Solar Heat Gain Coefficient (SHGC), and infiltration that meets the requirements of §10-111(a).

§117: Exterior doors and windows are weather-stripped; all joints and penetrations are caulked and sealed.

§118(a): Insulation specified or installed meets Standards for Insulating Material. Indicate type and include on CF-6R Form.

§118(i): The thermal emittance and solar reflectance values of the cool roofing material meets the requirements of §118(i) when the installation of a Cool Roof is specified on the CF-1R Form.

*§150(a): Minimum R-19 insulation in wood-frame ceiling or equivalent U-factor.

§150(b): Loose fill insulation shall conform with manufacturer's installed design labeled R-Value.

*§150(c): Minimum R-13 insulation in wood-frame wall or equivalent U-factor.

*§150(d): Minimum R-13 insulation in raised wood-frame floor or equivalent U-factor.

§150(f): Air retarding wrap is tested, labeled, and installed according to ASTM E1677-95(2000) when specified on the CF-1R Form.

§150(g): Mandatory Vapor barrier installed in Climate Zones 14 or 16.

§150(l): Water absorption rate for slab edge insulation material alone without facings is no greater than 0.3%; water vapor permeance rate is no greater than 2.0 perm/inch and shall be protected from physical damage and UV light deterioration.

Fireplaces, Decorative Gas Appliances and Gas Log Measures:

§150(e)1A: Masonry or factory-built fireplaces have a closable metal or glass door covering the entire opening of the firebox.

§150(e)1B: Masonry or factory-built fireplaces have a combustion outside air intake, which is at least six square inches in area and is equipped with a with a readily accessible, operable, and tight-fitting damper and or a combustion-air control device.

§150(e)2: Continuous burning pilot lights and the use of indoor air for cooling a firebox jacket, when that indoor air is vented to the outside of the building, are prohibited.

Space Conditioning, Water Heating and Plumbing System Measures:

§110-§113: HVAC equipment, water heaters, showerheads, faucets and all other regulated appliances are certified by the Energy Commission.

§113(c)5: Water heating recirculation loops serving multiple dwelling units and High-Rise residential occupancies meet the air release valve, backflow prevention, pump isolation valve, and recirculation loop connection requirements of §113(c)5.

§115: Continuously burning pilot lights are prohibited for natural gas: fan-type central furnaces, household cooking appliances (appliances with an electrical supply voltage connection with pilot lights that consume less than 150 Btu/hr are exempt), and pool and spa heaters.

§150(h): Heating and/or cooling loads are calculated in accordance with ASHRAE, SMACNA or ACCA.

§150(i): Heating systems are equipped with thermostats that meet the setback requirements of Section 112(c).

§150(j)1A: Storage gas water heaters rated with an Energy Factor no greater than the federal minimal standard are externally wrapped with insulation having an installed thermal resistance of R-12 or greater.

§150(j)1B: Unfired storage tanks, such as storage tanks or backup tanks for solar water-heating system, or other indirect hot water tanks have R-12 external insulation or R-16 internal insulation where the internal insulation R-value is indicated on the exterior of the tank.

§150(j)2: First 5 feet of hot and cold water pipes closest to water heater tank, non-recirculating systems, and entire length of recirculating sections of hot water pipes are insulated per Standards Table 150-B.

§150(j)2: Cooling system piping (suction, chilled water, or brine lines),and piping insulated between heating source and indirect hot water tank shall be insulated to Table 150-B and Equation 150-A.

§150(j)2: Pipe insulation for steam hydronic heating systems or hot water systems >15 psi, meets the requirements of Standards Table 123-A.

§150(j)3A: Insulation is protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind.

§150(j)3A: Insulation for chilled water piping and refrigerant suction lines includes a vapor retardant or is enclosed entirely in conditioned space.

§150(j)4: Solar water-heating systems and/or collectors are certified by the Solar Rating and Certification Corporation.

MANDATORY MEASURES SUMMARY: Residential (Page 2 of 3) MF-1R

Project Name: SINGLE HOUSE ADDITION — Date: 10/12/2011

§150(m)1: All air-distribution system ducts and plenums installed, are sealed and insulated to meet the requirements of CMC Sections 601, 602, 603, 604, 605 and Standard 6-5; supply-air and return-air ducts and plenums are insulated to a minimum installed level of R-4.2 or enclosed entirely in conditioned space. Openings shall be sealed with mastic, tape or other duct-closure system that meets the applicable requirements of UL 181, UL 181A, or UL 181B or aerosol sealant that meets the requirements of UL 723. If mastic or tape is used to seal openings greater than 1/4 inch, the combination of mastic and either mesh or tape shall be used

§150(m)1: Building cavities, support platforms for air handlers, and plenums defined or constructed with materials other than sealed sheet metal, duct board or flexible duct shall not be used for conveying conditioned air. Building cavities and support platforms may contain ducts. Ducts installed in cavities and support platforms shall not be compressed to cause reductions in the cross-sectional area of the ducts.

§150(m)2D: Joints and seams of duct systems and their components shall not be sealed with cloth back rubber adhesive duct tapes unless such tape is used in combination with mastic and draw bands.

§150(m)7: Exhaust fan systems have back draft or automatic dampers.

§150(m)8: Gravity ventilating systems serving conditioned space have either automatic or readily accessible, manually operated dampers.

§150(m)9: Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Cellular foam insulation shall be protected as above or painted with a coating that is water retardant and provides shielding from solar radiation that can cause degradation of the material.

§150(m)10: Flexible ducts cannot have porous inner cores.

§150(o): All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2-2007 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Pool and Spa Heating Systems and Equipment Measures:

§114(a): Any pool or spa heating system shall be certified to have: a thermal efficiency that complies with the Appliance Efficiency Regulations; an on-off switch mounted outside of the heater; a permanent weatherproof plate or card with operating instructions; and shall not use electric resistance heating or a pilot light.

§114(b)1: Any pool or spa heating equipment shall be installed with at least 36" of pipe between filter and heater, or dedicated suction and return lines, or built-up connections for future solar heating.

§114(b)2: Outdoor pools or spas that have a heat pump or gas heater shall have a cover.

§114(b)3: Pools shall have directional inlets that adequately mix the pool water, and a time switch that will allow all pumps to be set or programmed to run only during off-peak electric demand periods.

§150(p): Residential pool systems or equipment meet the pump sizing, flow rate, piping, filters, and valve requirements of §150(p).

Residential Lighting Measures:

§150(k)1: High efficacy luminaires or LED Light Engine with Integral Heat Sink has an efficacy that is no lower than the efficacies contained in Table 150-C and is not a low efficacy luminaire as specified by §150(k)2.

§150(k)3: The wattage of permanently installed luminaires shall be determined as specified by §130(d).

§150(k)4: Ballasts for fluorescent lamps rated 13 Watts or greater shall be electronic and shall have an output frequency no less than 20 kHz.

§150(k)5: Permanently installed night lights and night lights integral to a permanently installed luminaire or exhaust fan shall contain only high efficacy lamps meeting the minimum efficacies contained in Table 150-C and shall not contain a line-voltage socket or line-voltage lamp holder; OR shall be rated to consume no more than five watts of power as determined by §130(d), and shall not contain a medium screw-base socket.

§150(k)6: Lighting integral to exhaust fans, in rooms other than kitchens, shall meet the applicable requirements of §150(k).

§150(k)7: All switching devices and controls shall meet the requirements of §150(k)7.

§150(k)8: A minimum of 50 percent of the total rated wattage of permanently installed lighting in kitchens shall be high efficacy. EXCEPTION: Up to 50 watts for dwelling units less than or equal to 2,500 ft2 or 100 watts for dwelling units larger than 2,500 ft2 may be exempt from the 50% high efficacy requirement when: all low efficacy luminaires in the kitchen are controlled by a manual on occupant sensor, dimmer, energy management system (EMCS), or a multi-scene programmable control system; and all permanently installed luminaries in garages, laundry rooms, closets greater than 70 square feet, and utility rooms are high efficacy and controlled by a manual-on occupant sensor.

§150(k)9: Permanently installed lighting that is internal to cabinets shall use no more than 20 watts of power per linear foot of illuminated cabinet.

MANDATORY MEASURES SUMMARY: Residential (Page 3 of 3) MF-1R

Project Name: SINGLE HOUSE ADDITION — Date: 10/12/2011

§150(k)10: Permanently installed luminaires in bathrooms, attached and detached garages, laundry rooms, closets and utility rooms shall be high efficacy.
EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by a manual-on occupant sensor certified to comply with the applicable requirements of §119.
EXCEPTION 2: Permanently installed low efficacy luminaires in closets less than 70 square feet are not required to be controlled by a manual-on occupancy sensor.

§150(k)11: Permanently installed luminaires located in rooms or areas other than in kitchens, bathrooms, garages, laundry rooms, closets, and utility rooms shall be high efficacy luimnaires. EXCEPTION 1: Permanently installed low efficacy luminaires shall be allowed provided they are controlled by either a dimmer switch that complies with the applicable requirements of §119, or by a manual-on occupant sensor that complies with the applicable requirements of §119. EXCEPTION 2: Lighting in detached storage building less than 1000 square feet located on a residential site is not required to comply with §150(k)11.

§150(k)12: Luminaires recessed into insulated ceilings shall be listed for zero clearance insulation contact (IC) by Underwriters Laboratories or other nationally recognized testing/rating laboratory; and have a label that certifies the lumiunaire is airtight with air leakage less then 2.0 CFM at 75 Pascals when tested in accordance with ASTM E283; and be sealed with a gasket or caulk between the luminaire housing and ceiling.

§150(k)13: Luminaires providing outdoor lighting, including lighting for private patios in low-rise residential buildings with four or more dwelling units, entrances, balconies, and porches, which are permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy. EXCEPTION 1: Permanently installed outdoor low efficacy luminaires shall be allowed provided that they are controlled by a manual on/off switch, a motion sensor not having an override or bypass switch that disables the motion sensor, and one of the following controls: a photocontrol not having an override or bypass switch that disables the photocontrol; OR an astronomical time clock not having an override or bypass switch that disables the astronomical time clock; OR an energy management control system (EMCS) not having an override or bypass switch that allows the luminaire to be always on EXCEPTION 2: Outdoor luminaires used to comply with Exception1 to §150(k)13 may be controlled by a temporary override switch which bypasses the motion sensing function provided that the motion sensor is automatically reactivated within six hours. EXCEPTION 3: Permanently installed luminaires in or around swimming pool, water features, or other location subject to Article 680 of the California Electric Code need not be high efficacy luminaires.

§150(k)14: Internally illuminated address signs shall comply with Section 148; OR not contain a screw-base socket, and consume no more than five watts of power as determined according to §130(d).

§150(k)15: Lighting for parking lots and carports with a total of for 8 or more vehicles per site shall comply with the applicable requirements in Sections 130, 132, 134, and 147. Lighting for parking garages for 8 or more vehicles shall comply with the applicable requirements of Sections 130, 131, 134, and 146.

§150(k)16: Permanently installed lighting in the enclosed, non-dwelling spaces of low-rise residential buildings with four or more dwelling units shall be high efficacy luminaires. EXCEPTION: Permanently installed low efficacy luminaires shall be allowed provided that they are controlled by an occupant sensor(s) certified to comply with the applicable requirements of §119.

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name: SINGLE HOUSE ADDITION — Date: 10/12/2011
System Name: EXISTING AREA — Floor Area: 1,813

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	75,000
Total Output (Btuh)	75,000
Output (Btuh/sqft)	41.4
Cooling System	
Output per System	46,000
Total Output (Btuh)	46,000
Total Output (Tons)	3.8
Total Output (Btuh/sqft)	25.4
Total Output (sqft/Ton)	473.0
Air System	
CFM per System	1,600
Airflow (cfm)	1,600
Airflow (cfm/sqft)	0.88
Airflow (cfm/Ton)	417.4
Outside Air (%)	0.0 %
Outside Air (cfm/sqft)	0.00

Note: values above given at ARI conditions

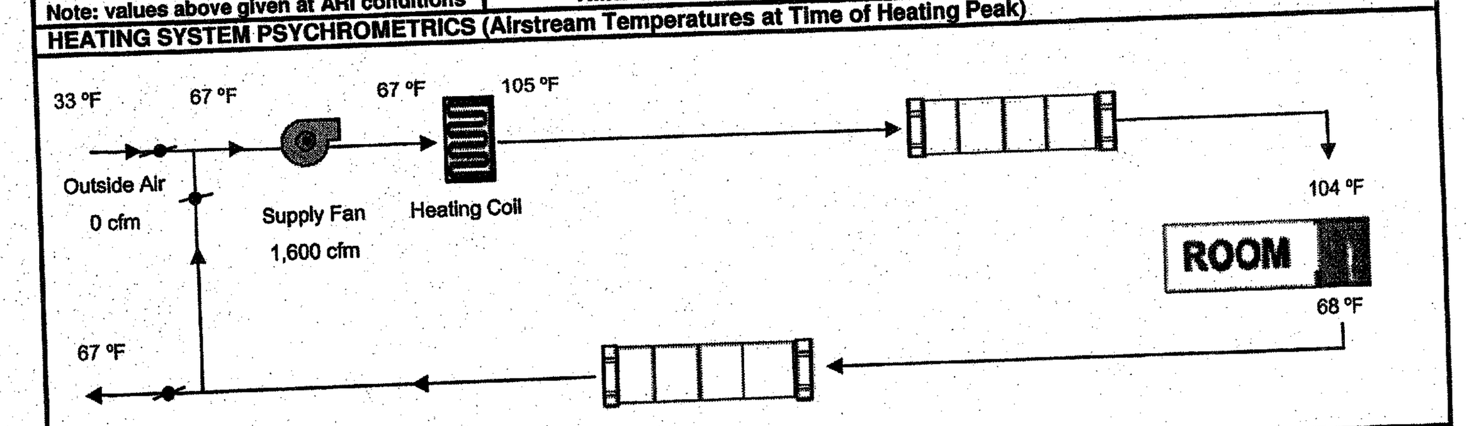
SYSTEM LOAD

	Coil Cooling Peak CFM	Sensible	Latent	Coil Htg. Peak CFM	Sensible
Total Room Loads	689	14,590	1,022	531	20,789
Return Vented Lighting		0			
Return Air Ducts		539			1,080
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		539			1,080
TOTAL SYSTEM LOAD		15,668	1,022		22,950

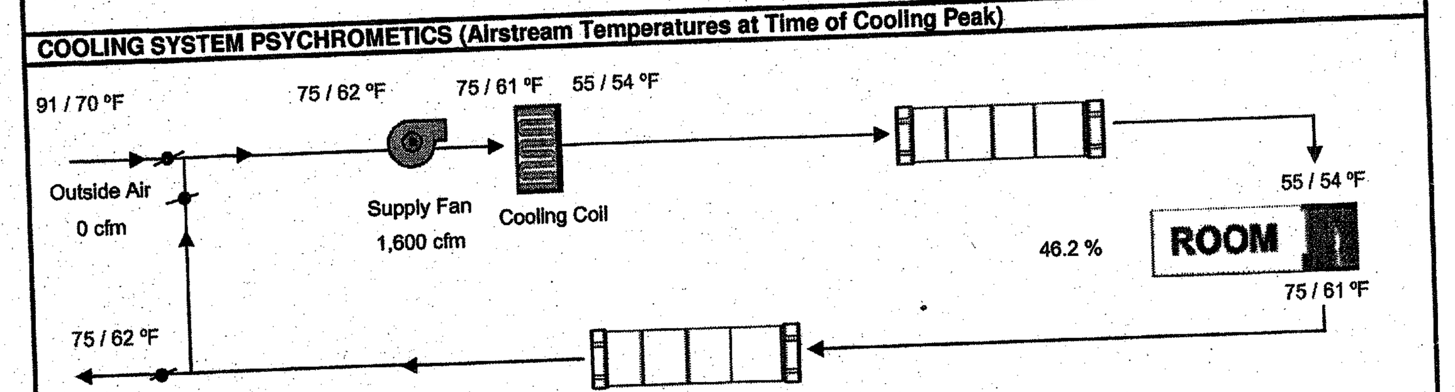
HVAC EQUIPMENT SELECTION

	Sensible	Latent	Heating
CARRIER 38TDB-048/58MVP-080-20	33,622	9,334	75,000
Total Adjusted System Output (Adjusted for Peak Design conditions)	33,622	9,334	75,000
TIME OF SYSTEM PEAK	Aug 3 PM		Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name: SINGLE HOUSE ADDITION — Date: 10/12/2011
System Name: ADDITION AREA — Floor Area: 381

ENGINEERING CHECKS

Number of Systems	1
Heating System	
Output per System	37,000
Total Output (Btuh)	37,000
Output (Btuh/sqft)	97.1
Cooling System	
Output per System	22,400
Total Output (Btuh)	22,400
Total Output (Tons)	1.9
Total Output (Btuh/sqft)	58.8
Total Output (sqft/Ton)	204.1
Air System	
CFM per System	800
Airflow (cfm)	800
Airflow (cfm/sqft)	2.10
Airflow (cfm/Ton)	428.6
Outside Air (%)	0.0 %
Outside Air (cfm/sqft)	0.00

Note: values above given at ARI conditions

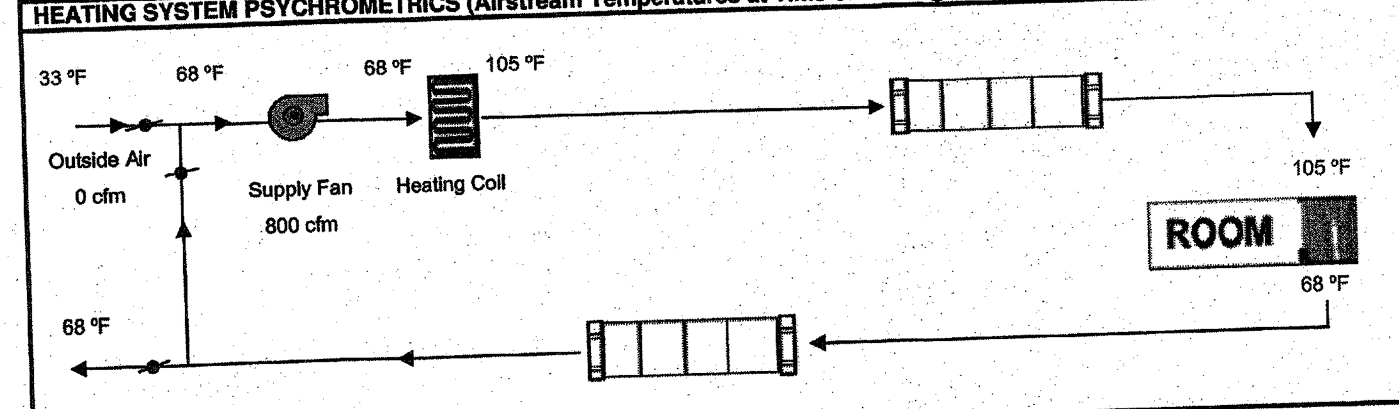
SYSTEM LOAD

	Coil Cooling Peak CFM	Sensible	Latent	Coil Htg. Peak CFM	Sensible
Total Room Loads	242	5,152	531	170	6,702
Return Vented Lighting		0			
Return Air Ducts		190			348
Return Fan		0			0
Ventilation	0	0	0	0	0
Supply Fan		0			0
Supply Air Ducts		190			348
TOTAL SYSTEM LOAD		5,533	531		7,399

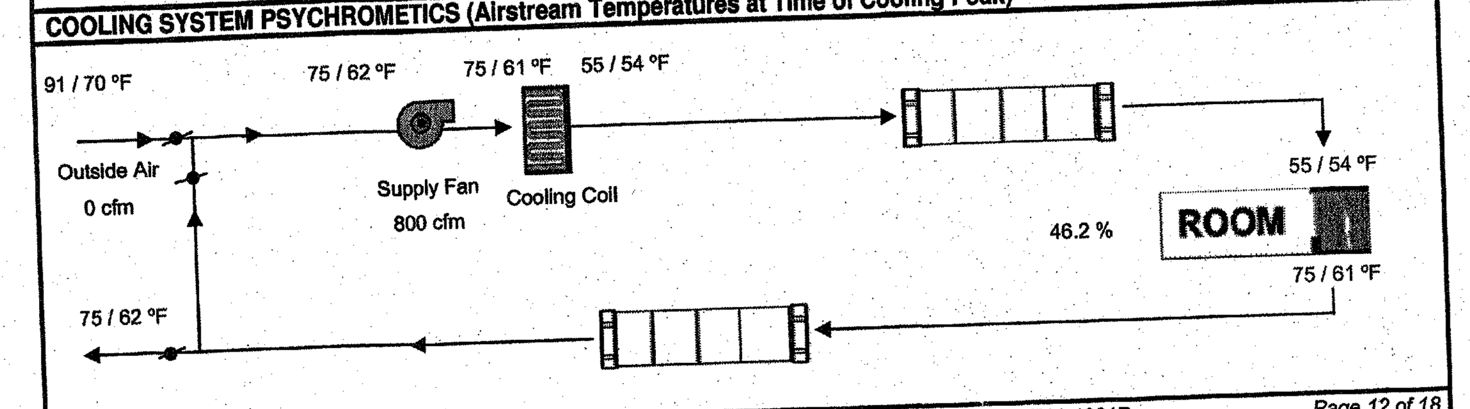
HVAC EQUIPMENT SELECTION

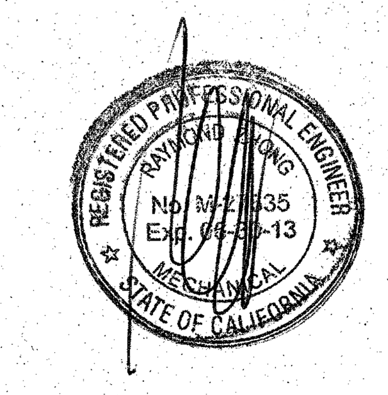
	Sensible	Latent	Heating
CARRIER 38TDB-024/58MVP-040-14	16,219	4,693	37,000
Total Adjusted System Output (Adjusted for Peak Design conditions)	16,219	4,693	37,000
TIME OF SYSTEM PEAK	Aug 3 PM		Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)





REVISIONS	BY

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SINGLE HOUSE ADDITION
923 CLEMENSEN
SANTA ANA, CA 92705

Date	10/12/2011
Scale	
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Job	F11-1001R
Sheet	2
CF-1R, MF-1R & MANDATORY REQUIREMENTS	
Of	2 Sheets