MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

7220 Trade Street, Suite 295, San Diego, CA 92121 ▸ p 619-650-0010 ▸ *mulhernkulp.com*

CALCULATION PACKAGE

August 20, 2024

Architectural Innovations

Lee Remodel
8904 SE 58th Street
Mercer Island, WA

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

Alex Van Reymersdal	*Staff Engineer*
Nicholas J. Dastalfo, P.E.	*Project Manager*
Nicholas J. Martignetti, P.E., S.E.	*Associate Owner + San Diego Office Director*

Signature, Seal & Date

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

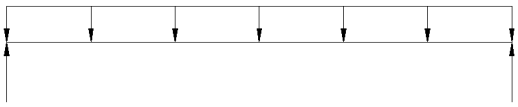
PROJECT NAME: LEE REMODEL
ARCH INNOV.
M&K PROJECT #: 203-24017
ENGINEER: AVR
DATE: 08-Aug-24

BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: ROOF FRMG - FLUSH BOT. BEAM @ MASTER BED — B1

PARAMETERS:

L =	10.45	FT
w =	0.257	KLF
P =	0	K



ANALYSIS:

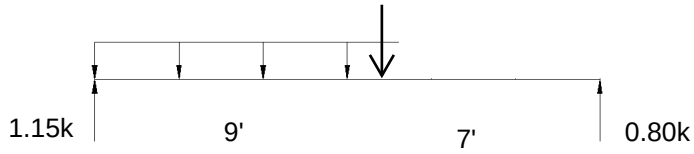
R_{MAX} =	1.34	K	V_D =		K	< V_{ALL} = 4.47 K	☑ ADEQUATE
M_{MAX} =	3.51	K-FT	< M_{ALL} =	5.17	K-FT		☑ ADEQUATE
Δ_{TL} =	0.187	IN.	L/	671	< L/240		☑ ADEQUATE

4x10 DF #2

BEAM DESCRIPTION: ROOF FRMG - GARAGE HEADER — B2

PARAMETERS:

L =	16	FT
w =	0.116	KLF
P =	0.90	K



ANALYSIS:

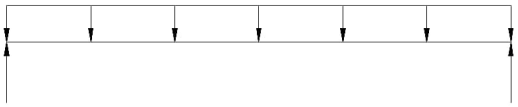
R_{MAX} =	1.15	K	V_D =		K	< V_{ALL} = 5.43 K	☑ ADEQUATE
M_{MAX} =	5.60	K-FT	< M_{ALL} =	7.00	K-FT		☑ ADEQUATE
Δ_{TL} =	0.388	IN.	L/	494	< L/240		☑ ADEQUATE

4x12 DF #2

BEAM DESCRIPTION: ROOF FRMG - 12' SGD FLUSH TOP BEAM @ KITCHEN — B3

PARAMETERS:

L =	12	FT
w =	0.219	KLF
P =	0	K



ANALYSIS:

R_{MAX} =	1.31	K	V_D =		K	< V_{ALL} = 7.47 K	☑ ADEQUATE
M_{MAX} =	3.94	K-FT	< M_{ALL} =	14.79	K-FT		☑ ADEQUATE
Δ_{TL} =	0.168	IN.	L/	857	< L/240		☑ ADEQUATE

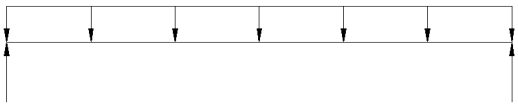
3 1/2"x10 1/2" GLB

BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: ROOF FRMG - RIDGE BEAM @ FAMILY ROOM — B4

PARAMETERS:

L =	33.39	FT
w =	0.450	KLF
P =	0	K



ANALYSIS:

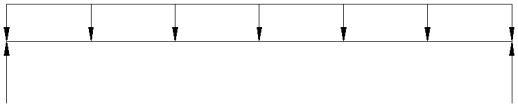
R_{MAX} =	7.51 K	V_D =		K	< V_{ALL} =	215.6 K	☑ ADEQUATE
M_{MAX} =	62.71 K-FT	< M_{ALL} =	253.5	K-FT			☑ ADEQUATE
Δ_{TL} =	0.744 IN.	L/	539	< L/240			☑ ADEQUATE

(2)C15x33.9

BEAM DESCRIPTION: ROOF FRMG - 9' SGD HEADER @ MASTER BED — B5

PARAMETERS:

L =	9	FT
w =	0.319	KLF
P =	0	K



ANALYSIS:

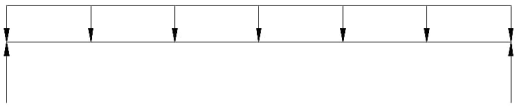
R_{MAX} =	1.44 K	V_D =		K	< V_{ALL} =	5.38 K	☑ ADEQUATE
M_{MAX} =	3.23 K-FT	< M_{ALL} =	4.32	K-FT			☑ ADEQUATE
Δ_{TL} =	0.169 IN.	L/	641	< L/240			☑ ADEQUATE

6x8 DF #2

BEAM DESCRIPTION: ROOF FRMG - WORST CASE HEADER — B6

PARAMETERS:

L =	5	FT
w =	0.263	KLF
P =	0	K



ANALYSIS:

R_{MAX} =	0.66 K	V_D =		K	< V_{ALL} =	2.66 K	☑ ADEQUATE
M_{MAX} =	0.82 K-FT	< M_{ALL} =	1.98	K-FT			☑ ADEQUATE
Δ_{TL} =	0.048 IN.	L/	999+	< L/240			☑ ADEQUATE

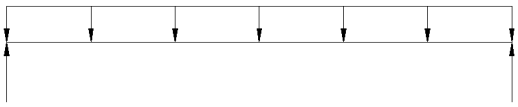
4x6 DF #2

BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: 1FF - WORST CASE CRAWL BEAM LINE — B7

PARAMETERS:

L = 4.5 FT
w = 1.128 KLF
P = 0 K



ANALYSIS:

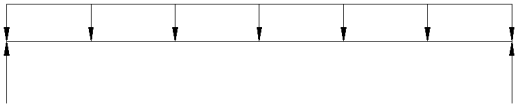
R_{MAX} =	2.54 K	V_D =		K	< V_{ALL} =	3.05 K	☑ ADEQUATE
M_{MAX} =	2.86 K-FT	< M_{ALL} =	2.99	K-FT			☑ ADEQUATE
Δ_{TL} =	0.059 IN.	L/	921	< L/240			☑ ADEQUATE

4x8 DF #2

BEAM DESCRIPTION: 1FF - FLUSH BEAM @ BACK OF GARAGE — B7

PARAMETERS:

L = 4 FT
w = 0.163 KLF
P = 0 K



ANALYSIS:

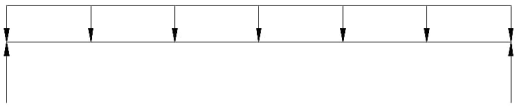
R_{MAX} =	0.33 K	V_D =		K	< V_{ALL} =	3.89 K	☑ ADEQUATE
M_{MAX} =	0.33 K-FT	< M_{ALL} =	4.49	K-FT			☑ ADEQUATE
Δ_{TL} =	0.005 IN.	L/	999+	< L/240			☑ ADEQUATE

4x10 DF #2

BEAM DESCRIPTION: 1FF - FLUSH BEAM @ TOWER EXTENTS — B8

PARAMETERS:

L = 12.25 FT
w = 0.250 KLF
P = 0 K



ANALYSIS:

R_{MAX} =	1.53 K	V_D =		K	< V_{ALL} =	6.15 K	☑ ADEQUATE
M_{MAX} =	4.69 K-FT	< M_{ALL} =	11.2	K-FT			☑ ADEQUATE
Δ_{TL} =	0.290 IN.	L/	507	< L/240			☑ ADEQUATE

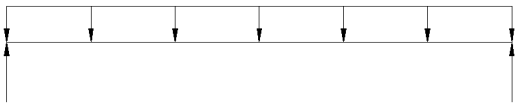
3 1/2"x9 1/4" LVL

BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: ROOF FRMG - FLUSH BEAM @ ROOF O.F. B10

PARAMETERS:

L =	3.58	FT
w =	0.257	KLF
P =	0	K



ANALYSIS:

R_{MAX} =	0.41	K	V_D =		K	< V_{ALL} = 2.66 K	☑ ADEQUATE
M_{MAX} =	0.46	K-FT	< M_{ALL} =	1.98	K-FT		☑ ADEQUATE
Δ_{TL} =	0.014	IN.	L/	999+	< L/240		☑ ADEQUATE

4x6 DF #2

MULHERN+KULP
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Shear Wall Calculations - Wind

Lee Remodel

8904 SE 58th St

Mercer Island, WA

Parameters:

Single Family Home

Design Wind Speed: 100 MPH

Wind Exposure Category: B

Seismic Design Category: D

Code & Design Standard: 2021 IBC Ch. 1609, ASCE 7-16 Ch. 26-30

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WIND DESIGN SUMMARY PER ASCE 7-16

M+K PROJECT #: 203-24017
ENGINEER: AVR

PARAMETERS:

WIND SPEED	100
EXPOSURE CATEGORY	B
RISK CATEGORY	II
WIND DIRECTIONALITY FACTOR, K_D	0.85
TOPOGRAPHIC FACTOR, K_{ZT}	1.30
GUST FACTOR, G	0.85
GROUND ELEV. ABOVE SEA LEVEL [FT]	326
DESIGN TYPE	ASD

0.60

ROOF GEOMETRY:

TRANS. ROOF PITCH	2.0	:12
LONG. ROOF PITCH	2.0	:12
MEAN ROOF HEIGHT, H	10.45	FT

BUILDING GEOMETRY:

LENGTH	70	FT
WIDTH	51	FT
NUMBER OF STORIES	1	

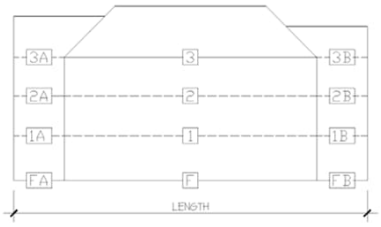
TRANSVERSE DIRECTION (PERPENDICULAR TO MAIN RIDGE LINE)

TRIBUTARY DESIGN AREAS:

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
1	8.1 FT	ROOF SURFACE	0	90	0	SQ FT
		WALL SURFACE	0	469	0	SQ FT
FND		ROOF SURFACE	0	0	0	SQ FT
		WALL SURFACE	0	319	0	SQ FT

TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION B	
STORY SHEAR	0.00	5.00	0.00	KIPS
TOTAL SHEAR	0.00	5.00	0.00	KIPS
	5.00			KIPS
STORY SHEAR	0.00	3.40	0.00	KIPS
TOTAL SHEAR	0.00	8.39	0.00	KIPS
	8.39			KIPS



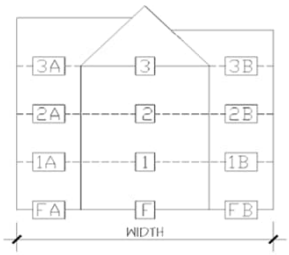
LONGITUDINAL DIRECTION (PARALLEL TO MAIN RIDGE LINE)

TRIBUTARY DESIGN AREAS:

DIAPHRAGM LEVEL	FLOOR-TO-FLOOR HEIGHT		SECTION A	SECTION O	SECTION B	
1	8.1 FT	ROOF SURFACE	0	90	0	SQ FT
		WALL SURFACE	0	268	0	SQ FT
FND		ROOF SURFACE	0	0	0	SQ FT
		WALL SURFACE	0	112	0	SQ FT

TRIBUTARY DESIGN LOADS: (0.6W)

	SECTION A	SECTION O	SECTION B	
STORY SHEAR	0.00	3.00	0.00	KIPS
TOTAL SHEAR	0.00	3.00	0.00	KIPS
	3.00			KIPS
STORY SHEAR	0.00	1.13	0.00	KIPS
TOTAL SHEAR	0.00	4.08	0.00	KIPS
	4.08			KIPS



MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 203-24017
ENGINEER: AVR

SHEARWALL 101.1: 1ST - SIDE EXT. WALL @ MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	20.5	FT.	QUALIFYING WALL LENGTH, L	20.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1350 LBS	<	6884 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	10.9	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	24.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 101.2: 1ST - SIDE EXT. WALL @ BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	16.1	FT.	QUALIFYING WALL LENGTH, L	16.1	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1150 LBS	<	3240 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	110	PLF	OVERTURNING MOMENT	9.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	14.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shearwall Design Summary

M+K Project #: 203-24017
Engineer: AVR

Shearwall 102.1: 1st - Rear Ext. Wall @ Baths

Shearwall Properties:

Wall height, H	8.1	ft.	Max wall opening ht, H_o	5.0	ft.		
Wall Length, L	39.3	ft.	Qualifying Wall Length, L	15.4	ft.	Shearwall Assembly	P0

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
750 lbs	<	3099 lbs

Shearwall Assembly Specification

P0 - 1-side 7/16" OSB
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - UNBLOCKED
ADEQUATE

Overturning Evaluation:

Resistive DL	150	plf	Overturning Moment	6.1	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	100	lbs	Resistive Moment	108.0	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

Shearwall 102.2: 1st - Rear Ext. Wall @ Kitchen

Shearwall Properties:

Wall height, H	8.1	ft.	Max wall opening ht, Hc	3.8	ft.		
Wall Length, L	18.1	ft.	Qualifying Wall Length, L	9.6	ft.	Shearwall Assembly	P0

Capacity Evaluation:

Total Shear load on Wall		Allowable Shearwall Capacity
750 lbs	<	1930 lbs

Shearwall Assembly Specification

P0 - 1-side 7/16" OSB
fastened w/ 8d nails at 6"o.c. panel edges & 12"o.c. panel field - UNBLOCKED
ADEQUATE

Overturning Evaluation:

Resistive DL	150	plf	Overturning Moment	6.1	k-ft	Hold Down Design Load	0	lbs
DL at ends of wall	100	lbs	Resistive Moment	23.7	k-ft	Holdown Capacity	0	lbs

Hold-down Specification

No Holdown Required

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RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 203-24017
ENGINEER: AVR

SHEARWALL 103.1: 1ST - SIDE EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	20.8	FT.	QUALIFYING WALL LENGTH, L	20.8	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1250 LBS	<	4181 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	110	PLF	OVERTURNING MOMENT	10.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	23.2	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 103.2: 1ST - SIDE EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, Hc	2.3	FT.		
WALL LENGTH, L	27.8	FT.	QUALIFYING WALL LENGTH, L	22.8	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1250 LBS	<	4600 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	10.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	43.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 203-24017
ENGINEER: AVR

SHEARWALL 104.1: 1ST - FRONT EXT. WALL @ MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	6.9	FT.	QUALIFYING WALL LENGTH, L	6.9	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
255 LBS	<	2324 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	2.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	3.1	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 104.2: 1ST - FRONT EXT. WALL @ MASTER BATH CORNER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	3.5	FT.	QUALIFYING WALL LENGTH, L	3.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
75 LBS	<	1129 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	0.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	1.0	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

Shear Wall Calculations - Seismic

Lee Remodel

8904 SE 58th St

Mercer Island, WA

Parameters:

Single Family Home

Design Wind Speed: 100 MPH

Wind Exposure Category: B

Seismic Design Category: D

Code & Design Standard: 2021 IBC Ch. 1609, ASCE 7-16 Ch. 26-30

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SEISMIC CALCULATION - ASCE 7-16

M+K PROJECT #: 203-24017
ENGINEER: AVR

SEISMIC DESIGN CATEGORY:

USER INPUTS:

SITE CLASS	D
SPECTRAL RESPONSE ACCELERATION 0.2 SEC, **Ss**	1.455
SPECTRAL RESPONSE ACCELERATION 1.0 SEC, **S1**	0.505
OCCUPANCY CATEGORY	II

VARIABLES:

SITE COEFFICIENT, Fa	1.20
SITE COEFFICIENT, Fv	1.80

CALCULATED VALUES:

MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{MS}	1.746
MAXIMUM SPECTRAL RESPONSE ACCELERATION, S_{M1}	1.360
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{DS}	1.164
DESIGN SPECTRAL RESPONSE ACCELERATION, S_{D1}	0.906
SEISMIC DESIGN CATEGORY (SHORT TERM)	D
SEISMIC DESIGN CATEGORY (1.0 SECOND TERM)	D

BUILDING PERIOD DETERMINATION:

USER INPUTS:

BUILDING PERIOD COEFFICIENT, C_T	0.020
LONG-PERIOD TRANS PERIOD, T_L (SEC)	6
HT. ABV BASE TO HIGHEST LEVEL, h_N	8

CALCULATED VALUES:

APPROXIMATE FUNDAMENTAL PERIOD, T_A	0.096
T_0	0.156
T_S	0.779
SPECTRAL RESPONSE ACC., S_A (g)	0.896

SITE CLASS ASSUMPTION

YES — PER ASCE 7-16 SECTION 11.4.3 THE SITE CLASS MAY BE ASSUMED TO BE D

EQUIVALENT LATERAL FORCE PROCEDURE

DEAD LOAD CALCULATION:

LEVEL	STORY HT. (FT.)	AREA (FT^2)	DEAD LOAD (PSF)	DL OF EXT WALL TRIB. TO LEVEL (KIPS)	TOTAL LEVEL DL
1	8.1	3163	14	4.1	48 K
2	0.0	0	0	0.0	0 K
3	0.0	0	0	0.0	0 K
4	0.0	0	0	0.0	0 K
5	0.0	0	0	0.0	0 K
6	0.0	0	0	0.0	0 K
7	0.0	0	0	0.0	0 K
8	0.0	0	0	0.0	0 K
9	0.0	0	0	0.0	0 K
10	0.0	0	0	0.0	0 K
11	0.0	0	0	0.0	0 K
12	0.0	0	0	0.0	0 K
13	0.0	0	0	0.0	0 K
14	0.0	0	0	0.0	0 K
15	0.0	0	0	0.0	0 K

TOTAL DEAD LOAD OF STRUCTURE 48 KIPS

SEISMIC RESPONSE COEFFICIENT:

	TRANSVERSE	LONGITUDINAL
RESPONSE MODIFICATION FACTOR, **R**	6.5	6.5
OCCUPANCY IMPORTANCE FACTOR, I_E	1.00	1.00
SEISMIC RESPONSE COEFFICIENT, C_s	0.179	0.179

BASE SHEARS:

ULTIMATE LOADS		x 0.7 =	ALLOWABLE LOADS	
TRANSVERSE	LONGITUDINAL		TRANSVERSE	LONGITUDINAL
9 K	9 K		6.1 K	6.1 K

STORY SHEAR CALCULATION:

DISTRIBUTION EXPONENT, k: 1.00

LEVEL	VERT. DIST. FACTOR, C_{vx}	ULTIMATE LOADS: TRANSVERSE STORY SHEAR, F_x	ULTIMATE LOADS: LONGITUDINAL STORY SHEAR, F_x	x 0.7 = ALLOWABLE LOADS: TRANSVERSE STORY SHEAR, F_x	TRANSVERSE Σ STORY SHEAR	ALLOWABLE LOADS: LONGITUDINAL STORY SHEAR, F_x	LONGITUDINAL Σ STORY SHEAR
1	1.000	8.7 K	8.7 K	6.1 K	6.1 K	6.1 K	6.1 K
2	0.000	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
3	0.000	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
4	0.000	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
5	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
6	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
7	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
8	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
9	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
10	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
11	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
12	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
13	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
14	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K
15	0.00	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K	0.0 K

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 203-24017
ENGINEER: AVR

SHEARWALL 101.1: 1ST - SIDE EXT. WALL @ MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	20.5	FT.	QUALIFYING WALL LENGTH, L	20.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1900 LBS	<	4917 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	15.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	15.8	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 101.2: 1ST - SIDE EXT. WALL @ BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	16.1	FT.	QUALIFYING WALL LENGTH, L	16.1	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1150 LBS	<	2314 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	110	PLF	OVERTURNING MOMENT	9.3	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	9.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 203-24017
ENGINEER: AVR

SHEARWALL 102.1: 1ST - REAR EXT. WALL @ BATHS

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, H_c	5.0	FT.		
WALL LENGTH, L	39.3	FT.	QUALIFYING WALL LENGTH, L	15.4	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
2200 LBS	<	2213 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	150	PLF	OVERTURNING MOMENT	17.8	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	71.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 102.2: 1ST - REAR EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, Hc	3.8	FT.		
WALL LENGTH, L	18.1	FT.	QUALIFYING WALL LENGTH, L	9.6	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
850 LBS	<	1379 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	150	PLF	OVERTURNING MOMENT	6.9	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	15.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 203-24017
ENGINEER: AVR

SHEARWALL 103.1: 1ST - SIDE EXT. WALL @ KITCHEN

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, H_c	0.0	FT.		
WALL LENGTH, L	20.8	FT.	QUALIFYING WALL LENGTH, L	20.8	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1525 LBS	<	2986 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	110	PLF	OVERTURNING MOMENT	12.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	15.3	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 103.2: 1ST - SIDE EXT. WALL @ GARAGE

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, Hc	2.3	FT.		
WALL LENGTH, L	27.8	FT.	QUALIFYING WALL LENGTH, L	22.8	FT.	SHEARWALL ASSEMBLY	P0

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
1525 LBS	<	3286 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P0 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - UNBLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	12.4	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	28.4	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

SHEARWALL DESIGN SUMMARY

M+K PROJECT #: 203-24017
ENGINEER: AVR

SHEARWALL 104.1: 1ST - FRONT EXT. WALL @ MASTER BATH

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, H_o	0.0	FT.		
WALL LENGTH, L	6.9	FT.	QUALIFYING WALL LENGTH, L	6.9	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
255 LBS	<	1660 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	2.1	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	2.1	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SHEARWALL 104.2: 1ST - FRONT EXT. WALL @ MASTER BATH CORNER

SHEARWALL PROPERTIES:

WALL HEIGHT, H	8.1	FT.	MAX WALL OPENING HT, Hc	0.0	FT.		
WALL LENGTH, L	3.5	FT.	QUALIFYING WALL LENGTH, L	3.5	FT.	SHEARWALL ASSEMBLY	P1

CAPACITY EVALUATION:

TOTAL SHEAR LOAD ON WALL		ALLOWABLE SHEARWALL CAPACITY
75 LBS	<	807 LBS

SHEARWALL ASSEMBLY SPECIFICATION

P1 - 1-SIDE 7/16" OSB
FASTENED W/ 8D NAILS AT 6"O.C. PANEL EDGES & 12"O.C. PANEL FIELD - EDGES BLOCKED
ADEQUATE

OVERTURNING EVALUATION:

RESISTIVE DL	117	PLF	OVERTURNING MOMENT	0.6	K-FT	HOLD DOWN DESIGN LOAD	0	LBS
DL AT ENDS OF WALL	100	LBS	RESISTIVE MOMENT	0.6	K-FT	HOLDOWN CAPACITY	0	LBS

HOLD-DOWN SPECIFICATION

NO HOLDOWN REQUIRED

SYMBOLS AND LEGEND

- (F) FAN- DIRECT VENT TO OUTSIDE
  - -BATHROOMS/LAUNDRY 50 CFM MIN.
  - -KITCHEN EXHAUST HOOD TO BE MIN. OF 100CFM. IF EXHAUST HOOD EXCEEDS 400CFM MAKE UP AIR MUST BE PROVIDED PER SECTION M1503.6.
- (UF) CONTINUOUS WHOLE-HOUSE VENTILATION SHALL OPERATE CONTINUOUSLY. SYSTEMS MUST CONFORM TO I.R.C. M1505 & SIZED PER TABLE M1505.4.3(1) CONTROLS TO BE LOCATED AT FORCED AIR UNIT
- (T) THERMOSTAT @ 5'0" ABOVE FLOOR
- (SD) R314.2.3. A HEAT DETECTOR OR HEAT ALARM RATED FOR THE AMBIENT OUTDOOR TEMPERATURES AND HUMIDITY SHALL BE INSTALLED IN NEW GARAGES THAT ARE ATTACHED TO OR LOCATED UNDER NEW AND EXISTING DWELLINGS PER SECTION R314.2.3
- (⊙) 110v SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED. USE A COMBINATION SMOKE/ CARBON MONOXIDE ALARM WHERE NOTED

MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS: PER DIV. 15,16 SEE SHEET A1

FURN | WH

A. PROVIDE 6" DIAMETER FRESH AIR INTAKE FROM OUTSIDE TO RETURN PLENUM AT FURNACE WITH MOTORIZED FLOW DAMPERS.
B. PROVIDE THERMAL EXPANSION TANK AT WATER HEATER.
C. STRAP WATER HEATER TO FRAMING TOP AND BOTTOM.
D. PROVIDE PRESSURE RELIEF LINE PLUMBED TO OUTSIDE.

WALL LEGEND

- EXISTING WALLS
- EXISTING WALLS TO BE REMOVED
- NEW WALLS
- EXISTING AND NEW WALLS ABOVE - U.N.O.
- EXISTING FOUND. WALLS
- NEW FOUND. WALLS

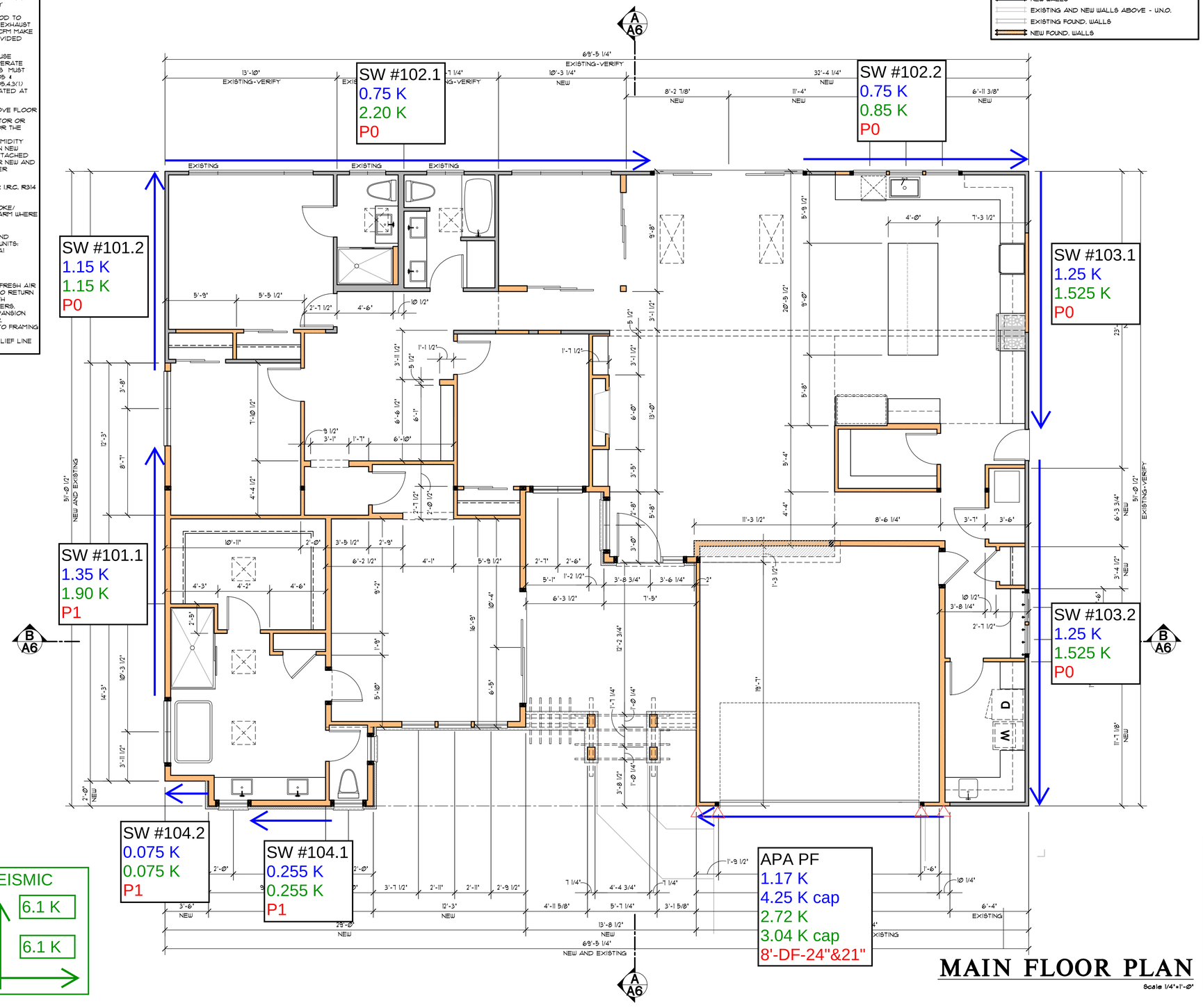
GENERAL PLAN NOTES

1. SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
2. ENERGY AND AIR QUALITY INFORMATION SEE DIV. 11 SHEET A-1
3. SEE BUILDING ELEVATION FOR WINDOW OPERATION SEE DIV. 8 SHEET A-1
4. SEE TYP. MATERIALS LIST ON SECTION SHEET
5. SEE SHEET A-1 FOR ALL NOTES AND REQUIREMENTS CONCERNING MECHANICAL, PLUMBING, AND ELECTRICAL.

FLOOR PLAN KEY NOTES

- P-1 OCCUPANCY SEPARATION: APPLY (1) LAYER OF ½" GWB. TO GARAGE SIDE OF RESIDENCE, ATTIC SPACES, AND TO ALL BEAMS AND POSTS SUPPORTING A FLOOR-CEILING ASSEMBLY. APPLY (1) LAYER OF ⅝" TYPE 'X' GWB. TO GARAGE CEILING WHEN UNDER HABITABLE ROOMS. DUCTS THROUGH WALL OR CEILING COMMON TO HOUSE SHALL HAVE MINIMUM 26 GAUGE STEEL SEE DIV. 01@02.6.A SHEET A-1.
- P-2 1⅜" MIN. SELF CLOSING SOLID WOOD CORE, HONEY-COMB CORE STEEL, OR 20-MINUTE FIRE RATED DOOR SEE DIV. 01@02.6.B. SHEET A-1
- P-3 STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R311.5 AND DETAIL 12/D2.
  - A. HEADROOM MIN. 6'-8", WIDTH MIN. 3'-0".
  - B. TREADS 10" MIN. DEPTH AND MIN. WIDTH OF 36" ABOVE HANDRAIL HEIGHT. RISERS 7¾" MAX. HT. TREAD NOSING TO BE MINIMUM 3/4" AND A MAXIMUM OF 1 1/4" ON STAIRS WITH SOLID RISERS.
  - C. HANDRAIL MIN. 34" TO MAX 38" ABOVE TREAD NOSING. HANDRAIL TYPE I CIRCULAR TO HAVE 1¼" MIN. TO 2" MAX. CROSS SECTION DIMENSION AND 1 1/2" MIN. CLEAR FROM WALL. RETURN RAIL ENDS. HANDRAILS SHALL BE STRONG ENOUGH TO RESIST A 200 POUND POINT LOAD IN ANY DIRECTION PER I.R.C. TABLE R301.5
  - D. INSTALL FIRE BLOCKING BETWEEN STRINGERS AT THE TOP AND BOTTOM OF EACH RUN PER I.R.C. SECTION R302.11.
  - E. COVER USABLE SPACE UNDER STAIR W/ ½" GWB. PER I.R.C. SECTION R302.7.
  - F. INTERMEDIATE BALUSTERS SHALL BE SPACED W/ LESS THAN 4" BETWEEN BALUSTERS.
  - G. PROVIDE STAIRWAY ILLUMINATION PER I.R.C. SECTION R303.6.

  SEE DIV. 01@02.7 SHEET A-1.
- P-4 SAFETY GLAZING PER I.R.C. SECTION R308
  - A. WINDOWS WITHIN 18" OF FLOOR
  - B. WINDOWS WITHIN A 24" ARC OF DOORS
  - C. WINDOWS AT TUBS AND SHOWERS
  - D. GLAZING IN DOORS
  - E. LESS THAN 60" HORIZ. FROM THE BOT. STAIR TREAD NOSING & BOT. EDGE OF GLAZING IS LESS THAN 36" ABV. LANDING/WALKING SURFACE SEE DIV. 08@00 SHEET A-1
- P-5 EGRESS WINDOW PER I.R.C., SECTION R310 SEE DIV. 08@00 SHEET A-1
- P-6 IGNITERS FOR GAS FIRED APPLIANCES IN GARAGE TO BE 18" MIN. ABOVE TOP OF SLAB. SEE DIV. 15 SHEET A-1
- P-7 COVER WALLS ADJACENT TO TUBS AND SHOWERS WITH NON-ABSORBENT MATERIAL TO 72" ABOVE DRAIN INLETS, PER I.R.C. SECTION 307.2. SEE DIV. 09250 SHEET A-1
- P-8 (2) LAYERS OF FLOOR SHEATHING OVER FRAMING.
- P-9 7¾" MAX. RISER WITH 10" MIN. RUN. IF MORE THAN (3) RISERS, HANDRAIL REQUIRED PER I.R.C. SECTION R311.7.8. SEE DIV. 01@02.7 SHEET A-1
- P-10 18"x24" CRAWL SPACE ACCESS, INSULATE AND WEATHER STRIP. SEE DIV. 01@02.1 SHEET A-1
- P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 01@02.2 SHEET A-1
- P-12 FLOOR MATERIAL BREAK LINE
- P-13 WALL LINE ABOVE
- P-14 WALL LINE BELOW
- P-15 FIREPLACE ASSEMBLY NOTES:
  - A. DIRECT VENT GAS FIREPLACES, INSTALL PER MFG. SPECIFICATIONS, SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01@02.12 SHEET A-1
  - B. ZERO CLEARANCE FIREPLACES SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01@02.12 SHEET A-1
  - C. HEARTH SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01@02.12
  - D. FIREBLOCK OPENINGS AROUND PENETRATIONS AT EACH FLOOR PER I.R.C. SECTION R1003.13.
- P-16 SEE SITE PLAN FOR EXTENT OF WALKS AND DRIVEWAYS
- P-17 3" DIAMETER STEEL POST
- P-18 36" GUARDRAIL PER I.R.C. SECTION R312 & TABLE R301.5 CONTRACTOR TO VERIFY TO INSPECTOR THAT ALL GUARDS & RAILINGS ARE CAPABLE OF RESISTING 200lb LOAD ON TOP RAIL ACTING IN ANY DIRECTION.
- P-19 'B' VENT FOR MECHANICAL, 1" CLEARANCE ALL SIDES PER I.R.C. SECTION R1005.3. SEE DIV. 15 SHEET A-1
- P-20 PLANT SHELF
- P-21 UPPER AND LOWER LINEN CABINETS
- P-22 SOFFIT AREA
- P-23 INTEGRATED MAKE UP AIR
- P-24 2x6 STUDS W/ R-21 INSULATION MIN.



WIND: 5.00 K, 3.00 K

SEISMIC: 6.1 K, 6.1 K

MAIN FLOOR PLAN

Scale 1/4"=1'-0"

SQUARE FOOTAGE

	EXISTING	PROPOSED	
UPPER FLR	N/A SF	N/A SF	
MAIN FLR	1854 SF	2748 SF	(+894)
LOWER FLR	N/A SF	N/A SF	
TOTAL	1854 SF	2748 SF	(+894)
UNFINISHED	N/A SF	N/A SF	
GARAGE	459 SF	407 SF	(-52)
CVRD PORCH	SF	SF	
CVRD PATIO	SF	SF	

Date	By	Description
7/2024	REY	STRUCTURAL PLAN SET

Lee Remodel

8904 SE 58th St — Mercer Island, WA

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TITLE

JOB NO.: 24000.05
STARTING NO.: 24000.03

SHEET
A3