MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

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

CALCULATION PACKAGE

May 12, 2025

Architectural Innovations

Attia Remodel
8555 85th Ave SE
Mercer Island, WA

MULHERN & KULP STRUCTURAL ENGINEERING, INC.

Prepared By:

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Nicholas J. Martignetti, P.E., S.E.	*Associate Owner + San Diego Office Director*

5/12/2025

Signature, Seal & Date

MULHERN+KULP
RESIDENTIAL STRUCTURAL ENGINEERING

PROJECT NAME: ATTIA REMODEL

M&K PROJECT #: 203-25006
ENGINEER: MCH
DATE: 28-APR-25

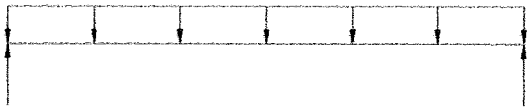
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: Roof FRM: SGD HDR @ Great Room

B1

PARAMETERS:

L = 8.00 FT
W = 0.620 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.48 K	V_D =	— K	< V_{ALL} =	5.33 K	☑ ADEQUATE
M_{MAX} =	4.96 K-FT	< M_{ALL} =	7.55 K-FT			☑ ADEQUATE
Δ_{TL} =	0.26 IN.	L/	369	< L/240		☑ ADEQUATE

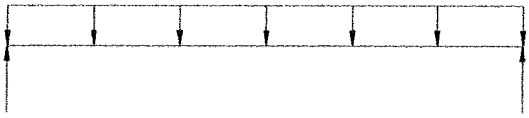
3½" x 7½" GLB

BEAM DESCRIPTION: Roof FRM: SGD HDR @ Dining Room

B2

PARAMETERS:

L = 8.00 FT
W = 0.410 KLF
P = — K



ANALYSIS:

R_{MAX} =	1.64 K	V_D =	— K	< V_{ALL} =	3.50 K	☑ ADEQUATE
M_{MAX} =	3.28 K-FT	< M_{ALL} =	3.44 K-FT			☑ ADEQUATE
Δ_{TL} =	0.21 IN.	L/	457	< L/240		☑ ADEQUATE

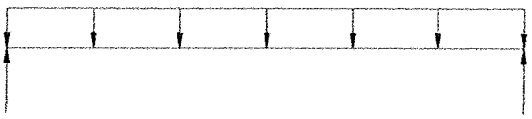
4x8 DF #2

BEAM DESCRIPTION: Roof FRM: CONT. Flush Bot. Bm @ Stairs

B3

PARAMETERS:

L = 14.5 FT
W = 0.410 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.97 K	V_D =	— K	< V_{ALL} =	8.53 K	☑ ADEQUATE
M_{MAX} =	10.8 K-FT	< M_{ALL} =	19.3 K-FT			☑ ADEQUATE
Δ_{TL} =	0.45 IN.	L/	387	< L/240		☑ ADEQUATE

3½" x 12" GLB (CONT.)

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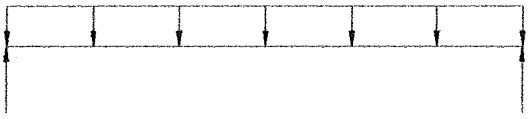
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: MFF: SGD HDR @ Bonus Room

B5

PARAMETERS:

L = 8.00 FT
W = 0.569 KLF
P = — K



ANALYSIS:

R_{MAX} =	2.28 K	V_D =	— K	< V_{ALL} =	5.92 K	✓ ADEQUATE
M_{MAX} =	4.55 K-FT	< M_{ALL} =	6.03 K-FT			✓ ADEQUATE
Δ_{TL} =	0.10 IN.	L/	960	< L/240		✓ ADEQUATE

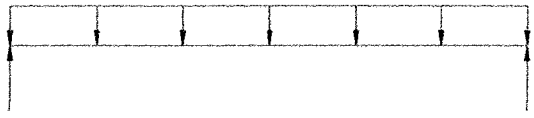
6x10 DF#2

BEAM DESCRIPTION: MFF: HDR Above New Office Doors

B6

PARAMETERS:

L = 6.00 FT
W = 0.194 KLF
P = — K



ANALYSIS:

R_{MAX} =	0.58 K	V_D =	— K	< V_{ALL} =	2.31 K	✓ ADEQUATE
M_{MAX} =	0.87 K-FT	< M_{ALL} =	1.72 K-FT			✓ ADEQUATE
Δ_{TL} =	0.10 IN.	L/	720	< L/240		✓ ADEQUATE

4x6 DF#2 (MIN.)

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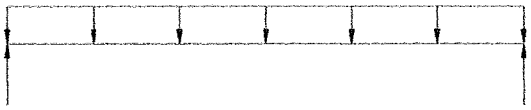
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: MFF: New Int. Laundry Door HDR (B7)

PARAMETERS:

L = 2.67 FT
W = 0.463 KLF
P = — K



ANALYSIS:

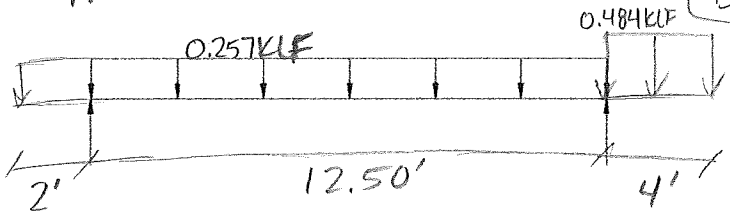
R_{MAX} =	0.62 K	V_D =	— K	< V_{ALL} =	2.31 K	☑ ADEQUATE
M_{MAX} =	0.41 K-FT	< M_{ALL} =	1.72 K-FT			☑ ADEQUATE
Δ_{TL} =	0.01 IN.	L/	999+	< L/240		☑ ADEQUATE

4x6 DF#2 (MIN.)

BEAM DESCRIPTION: MFF: New Dropped Bm @ New Deck (B8)

PARAMETERS:

L = 18.50 FT
W = SHOWN KLF
P = — K



ANALYSIS:

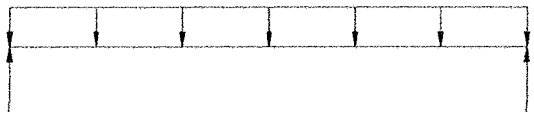
R_{MAX} =	3.81 K	V_D =	1.94 K	< V_{ALL} =	3.33 K	☑ ADEQUATE
M_{MAX} =	3.87 K-FT	< M_{ALL} =	4.60 K-FT			☑ ADEQUATE
Δ_{TL} =	0.19 IN.	L/	796	< L/240		☑ ADEQUATE

P.T. (3)2x10 HF#2

BEAM DESCRIPTION: MFF: 4' Window HDR @ New Office (B9)

PARAMETERS:

L = 4.00 FT
W = 0.388 KLF
P = — K



ANALYSIS:

R_{MAX} =	0.78 K	V_D =	— K	< V_{ALL} =	2.31 K	☑ ADEQUATE
M_{MAX} =	0.78 K-FT	< M_{ALL} =	1.72 K-FT			☑ ADEQUATE
Δ_{TL} =	0.03 IN.	L/	999+	< L/240		☑ ADEQUATE

4x6 DF#2

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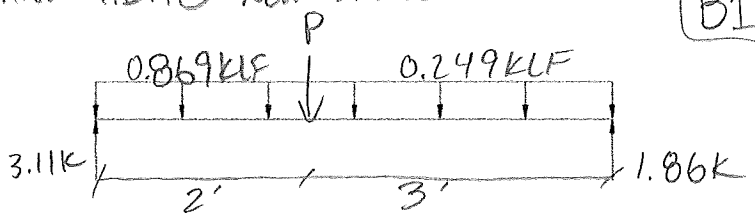
BEAM & HEADER CALCULATIONS

BEAM DESCRIPTION: MFF: 5' Window HDR @ New Office

B10

PARAMETERS:

L = 5.00 FT
W = SHOWN KLF
P = 2.48 K



ANALYSIS:

R_{MAX} =	3.11 K	V_D =	– K	< V_{ALL} =	3.89 K	✓ ADEQUATE
M_{MAX} =	4.48 K-FT	< M_{ALL} =	4.49 K-FT			✓ ADEQUATE
Δ_{TL} =	0.05 IN.	L/	1200	< L/240		✓ ADEQUATE

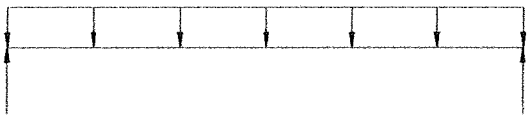
4x 10 DF#2

BEAM DESCRIPTION: Roof Framing: Existing Foyer/Porch Door HDR

B11

PARAMETERS:

L = 5.50 FT
W = 0.620 KLF
P = – K



ANALYSIS:

R_{MAX} =	1.71 K	V_D =	– K	< V_{ALL} =	3.50 K	✓ ADEQUATE
M_{MAX} =	2.34 K-FT	< M_{ALL} =	3.44 K-FT			✓ ADEQUATE
Δ_{TL} =	0.07 IN.	L/	943	< L/240		✓ ADEQUATE

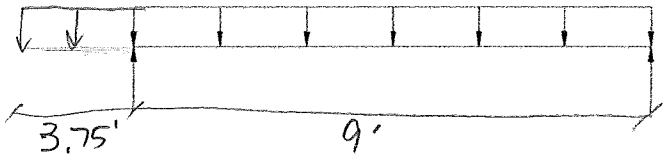
4x8 DF#2 HDR

BEAM DESCRIPTION: MFF: Existing Cantd Beam Below Edge of Great Room/FP

B12

PARAMETERS:

L = 12.75 FT
W = 0.72 KLF
P = – K



ANALYSIS:

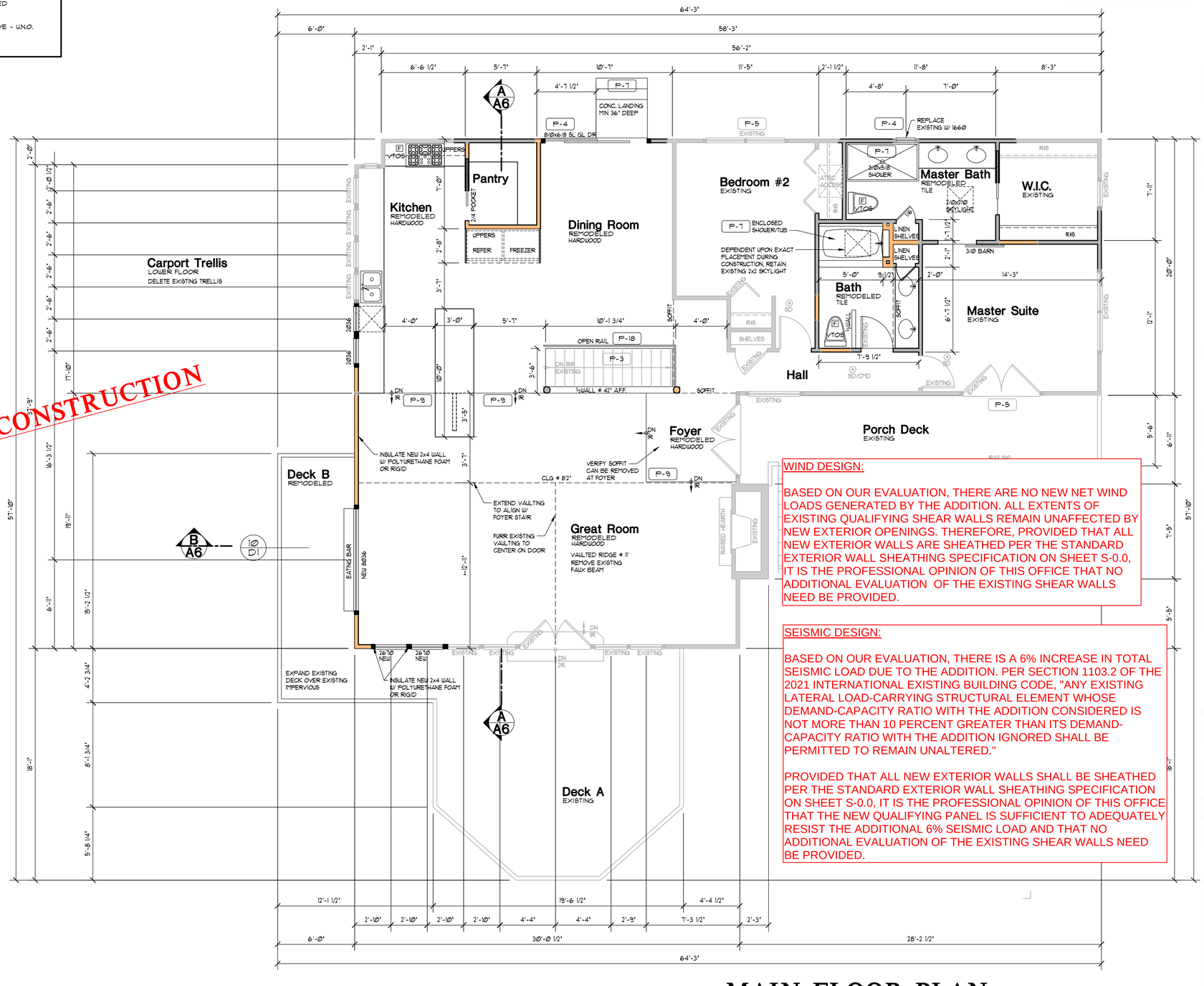
R_{MAX} =	5.50 K	V_D =	– K	< V_{ALL} =	7.90 K	✓ ADEQUATE
M_{MAX} =	4.28 K-FT	< M_{ALL} =	17.9 K-FT			✓ ADEQUATE
Δ_{TL} =	0.06 IN.	L/	999+	< L/240		✓ ADEQUATE

3 1/2" x 11 7/8" LVL FLUSH

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

ALL EXISTING DIMENSIONS AND FRAMING MUST BE FIELD VERIFIED PRIOR TO CONSTRUCTION.



MAIN FLOOR PLAN

Scale 1/4"=1'-0"

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.
- (WF) WHOLE-HOUSE FAN TO RUN CONTINUOUS & CONFORM TO IRC, M1505.4. FAN SIZE PER PLAN. FAN RATE TO BE ADJUSTED BY A FACTOR OF 1.5 FOR A NON BALANCED NON DISTRIBUTED SYSTEM. FRESH AIR TO BE PROVIDED BY THE FORCED AIR SYSTEM DUCTS PER SECTION M1505.4.1. FAN TO HAVE A SONE RATING OF 1.0 OR LESS MEASURED AT 0.1 INCHES WATER GAUGE
- (T) THERMOSTAT @ 50" ABOVE FLOOR
- (SD/CMD) 110V SMOKE ALARM PER I.R.C. R314 WITH BATTERY BACKUP INTERCONNECTED USE A COMBINATION SMOKE/CARBON MONOXIDE ALARM OR HEAT DETECTOR WHERE NOTED AND PER IRC R314.2.3
- (HD) HEAT DETECTOR OR HEAT ALARM RATED FOR THE AMBIENT OUTDOOR TEMPERATURES & HUMIDITY PER I.R.C. R314.

MECHANICAL, PLUMBING, AND ELECTRICAL SYSTEM FOR UNITS: PER DIV. 15.16 SEE SHEET A1

AIR HANDLER | HEAT PUMP | 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.

WIND DESIGN:

BASED ON OUR EVALUATION, THERE ARE NO NEW NET WIND LOADS GENERATED BY THE ADDITION. ALL EXTENTS OF EXISTING QUALIFYING SHEAR WALLS REMAIN UNAFFECTED BY NEW EXTERIOR OPENINGS. THEREFORE, PROVIDED THAT ALL NEW EXTERIOR WALLS ARE SHEATHED PER THE STANDARD EXTERIOR WALL SHEATHING SPECIFICATION ON SHEET S-0.0, IT IS THE PROFESSIONAL OPINION OF THIS OFFICE THAT NO ADDITIONAL EVALUATION OF THE EXISTING SHEAR WALLS NEED BE PROVIDED.

SEISMIC DESIGN:

BASED ON OUR EVALUATION, THERE IS A 6% INCREASE IN TOTAL SEISMIC LOAD DUE TO THE ADDITION. PER SECTION 1103.2 OF THE 2021 INTERNATIONAL EXISTING BUILDING CODE, "ANY EXISTING LATERAL LOAD-CARRYING STRUCTURAL ELEMENT WHOSE DEMAND-CAPACITY RATIO WITH THE ADDITION CONSIDERED IS NOT MORE THAN 10 PERCENT GREATER THAN ITS DEMAND-CAPACITY RATIO WITH THE ADDITION IGNORED SHALL BE PERMITTED TO REMAIN UNALTERED."

PROVIDED THAT ALL NEW EXTERIOR WALLS SHALL BE SHEATHED PER THE STANDARD EXTERIOR WALL SHEATHING SPECIFICATION ON SHEET S-0.0, IT IS THE PROFESSIONAL OPINION OF THIS OFFICE THAT THE NEW QUALIFYING PANEL IS SUFFICIENT TO ADEQUATELY RESIST THE ADDITIONAL 6% SEISMIC LOAD AND THAT NO ADDITIONAL EVALUATION OF THE EXISTING SHEAR WALLS NEED BE PROVIDED.

GENERAL PLAN NOTES

1. SEE SHEET A-1 FOR ALL GENERAL NOTES AND REQUIREMENTS.
2. ENERGY AND AIR QUALITY INFORMATION SEE DIV. 17 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. 01.0602.6.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. 01.0602.6.B. SHEET A-1
- P-3 STAIR ASSEMBLY NOTES: PER I.R.C. SECTION R311.7
  - 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 1 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 R303.7.

  SEE DIV. 01.0607.1 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. 08.0800 SHEET A-1
- P-5 EGRESS WINDOW PER I.R.C., SECTION R310 SEE DIV. 08.0600 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. 09.0930 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. 01.0602.7 SHEET A-1
- P-10 18"x24" CRAWL SPACE ACCESS, INSULATE AND WEATHER STRIP. SEE DIV. 01.0602.1 SHEET A-1
- P-11 22"x30" ATTIC SPACE ACCESS W/ 30" HEAD CLEARANCE. INSULATE AND WEATHER STRIP. SEE DIV. 01.0602.2 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, MUST BE LISTED, LABELED & INSTALLED PER MFG. SPECIFICATIONS, SHALL CONFORM TO I.R.C.REQUIREMENTS. SEE DIV. 01.0602.12 SHEET A-1
  - B. ZERO CLEARANCE FIREPLACES SHALL CONFORM TO I.R.C. REQUIREMENTS. SEE DIV. 01.0602.12 SHT. A-1
  - C. HEARTH SHALL CONFORM TO I.R.C REQUIREMENT SEE DIV. 01.0602.12
  - D. FIREBLOCK OPENINGS AROUND PENETRATIONS @ EACH FLOOR PER I.R.C. SECTION R1003.19.
  - E. FIREPLACE MUST COMPLY WITH UL 127 TESTING
- P-16 SEE SITE PLAN FOR EXTENT OF WALKS & 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 R302.11. 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/ INSULATION MIN. PER WSEC

SQUARE FOOTAGE

	EXISTING		PROPOSED
UPPER FLR	N/A SF		N/A SF
MAIN FLR	1,603 SF	(+167)	1,770 SF
LOWER FLR	924 SF	(+261)	1,185 SF
TOTAL	2,527 SF		2,955 SF
UNFINISHED	N/A SF		N/A SF
GARAGE	445 SF		379 SF
CVRD PORCH	158 SF		158 SF
DECKS	581 SF		459 SF

Date	By	Description
6/24/24	EGP	AS-BUILT DRAWINGS APPLIED
8/1/24	EGP	APPLY PRELIM DESIGN
8/23/24	EGP	CLIENT REVISIONS
10/4/24	EGP	DESIGN REVISIONS
12/31/24	EGP	CLIENT ALTERATIONS
2/20/25	EGP	CONSTRUCTION PLANS

Engi & Nabil Attia

Attia Remodel

8555 85th Ave SE — Mercer Island WA

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TITLE

JOB NO.: 24009.03
STARTING NO.: 24009.22

SHEET
A3