

**SIMMONS
ENGINEERING**

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January 13, 2020

[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]
[REDACTED]

RE: Roof Framing of ADU Addition

[REDACTED]
[REDACTED]

Dear [REDACTED],

Following a site visit on January 11, 2020, I submit the following review of the over-framing (“California framing”) portion of the roof for the property per subject line.

Assumptions & Exclusions

The area directly above the addition portion of the project is framed with engineered trusses by Compu-Tech Lumber Products, Inc. and they retain responsibility for this portion of the project.

Further exclusions from this report, for reasons of practicality due to my inability to observe them, include nail fasteners and diaphragm sheathing.

For purposes of this report, I will assume that the nailing is in accordance with 2016 CBC (“CBC”) Table 2304.10.1, that sheathing is installed per CBC 2308.7.10 and, as shown on the drawings, is at least ½” with 8d and 6:12 nailing. The roofing material is typical asphalt shingles, which yields a total roofing weight of less than 5psf (½” ply = 1.5psf, shingles = 3psf).

History & Code Approach

As a wood light-frame construction house built in 1950, the original structure was stick framed using the prescriptive provisions of conventional construction.

These “non-engineered” methods are found today in Section 2308 of the California Building Code (CBC). The California framing area of concern will be treated in accordance with this section.

Analysis

Since the existing and new portions of the roof are all steeper than 3:12 (actual is 4:12), none of the ridge boards, hips or valleys are treated as beams (CBC 2308.7). The old ridge board is 1x8 and the 2x4 rafter spans of the original house are approximately $19\frac{1}{2} = 9'-6"$, supported near their midspans with a 2x4 purlin with strut supports to bearing walls below. This meets the required spans shown in Table 2308.7.2(1). Thus, the load path for the original construction is as follows: **roofing - rafters - purlins - struts - walls - foundation.**

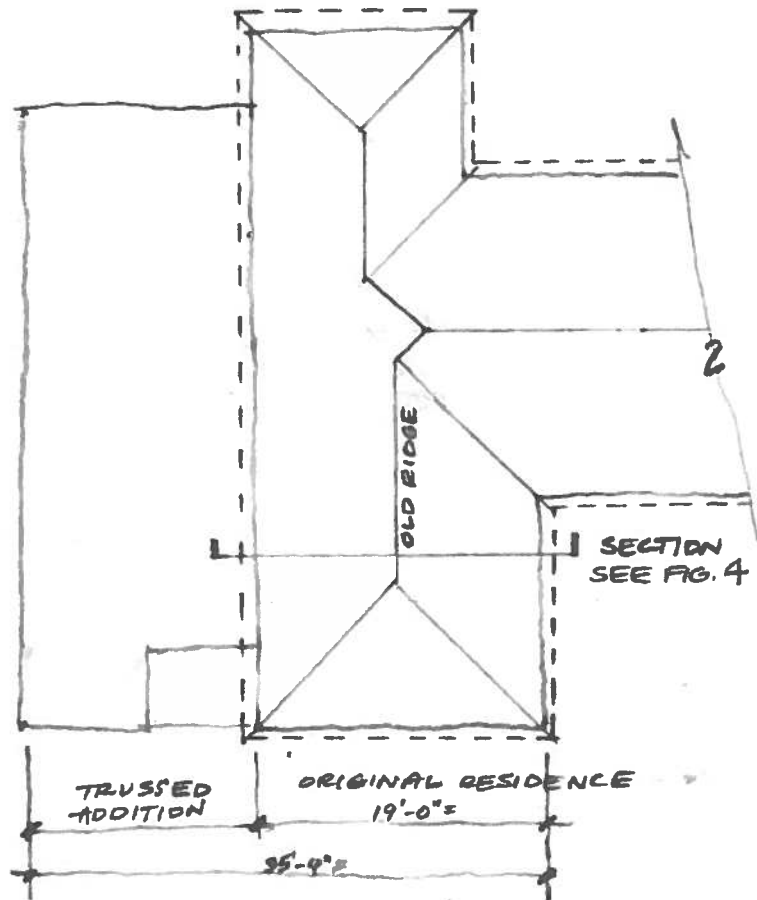


Figure 1: Original (Pre-Addition) Roof Plan

In order to raise the ridgeline of the roof to accommodate the widened ADU addition portion of the house, California framing technique was used, whereby a 2x plate was nailed to the existing roof sheathing and new 2x6 rafters were toe nailed into the plate and extended up to a new higher ridgeline (see Figure 2: Current Roof Plan w/ California Framing). Ridge and valleys are 2x8. The old ridgeline becomes a new purlin line, effectively dividing the span of the new lengthened rafter into two parts with one part original rafter and one part new rafter. The rafters opposite the new purlin line become struts, as defined in CBC 2308.7.7. Thus, the new load path becomes as follows: **roofing - (n) rafters - purlin (old ridgeline) - struts (old rafters) - walls or purlins - struts - walls - foundation**

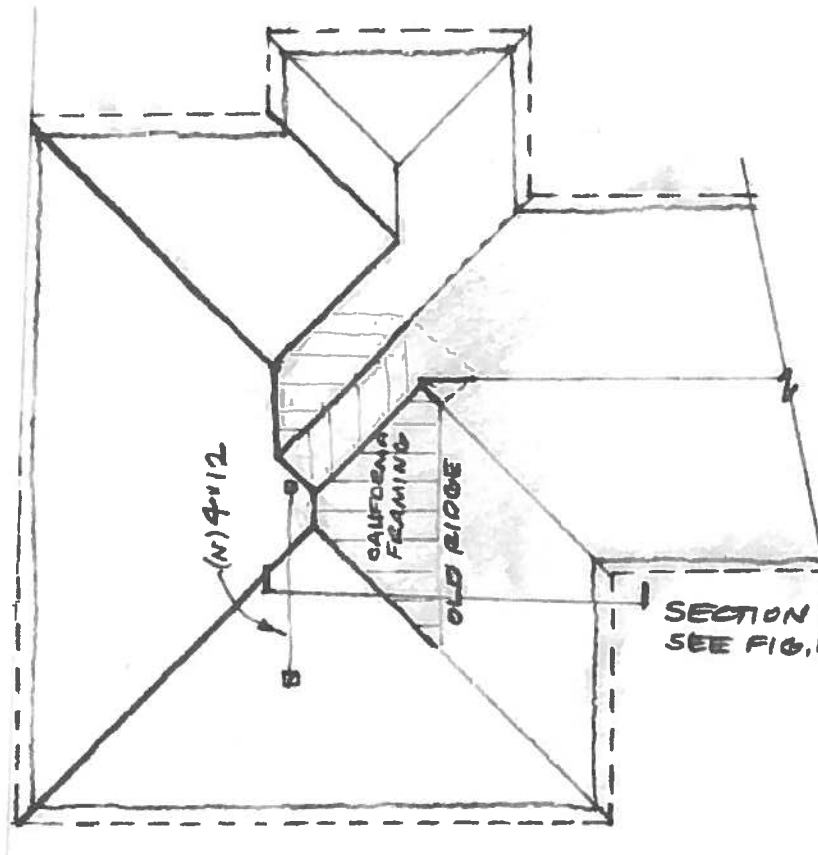


Figure 2: Current Roof Plan w/ California Framing

The support line for the original roof closest to the ADU addition changes from a bearing wall to a 4x12 flush-framed beam (see Figure 3: (N) 4x12 Calculation).

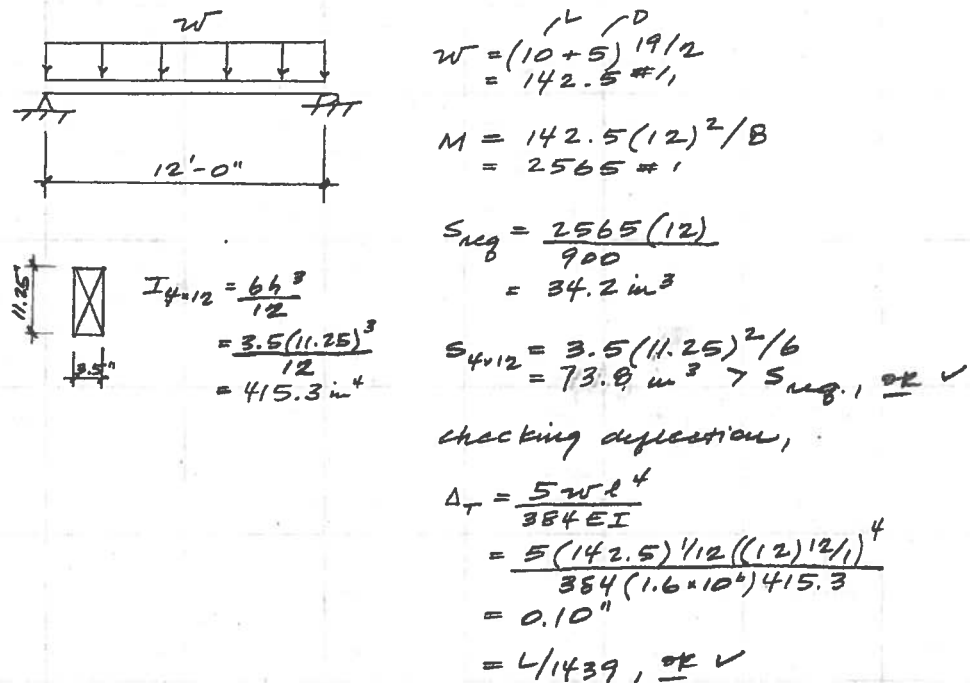


Figure 3: (N) 4x12 Calculation

However, since these struts need to be at least 45 degrees from horizontal (CBC 2308.7.7), and they are currently 3:12 (14 degrees), I recommend the introduction of new 2x struts coming down from the old ridgeline to bearing points below at no less than 45 degrees from horizontal. Furthermore, the unbraced length of these struts shall not exceed 8 feet (CBC 2308.7.7).

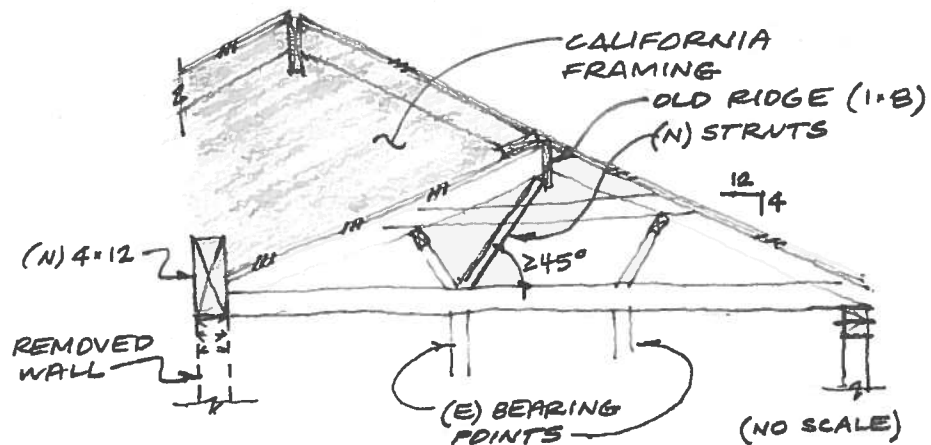


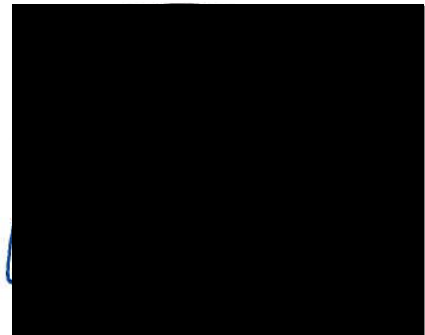
Figure 4: Proposed Roof Framing w/ Additional Struts

This will result in a California framed portion of roof that satisfactorily meets the intent of CBC 2308.

Should you have any questions, please feel free to contact me at your convenience.

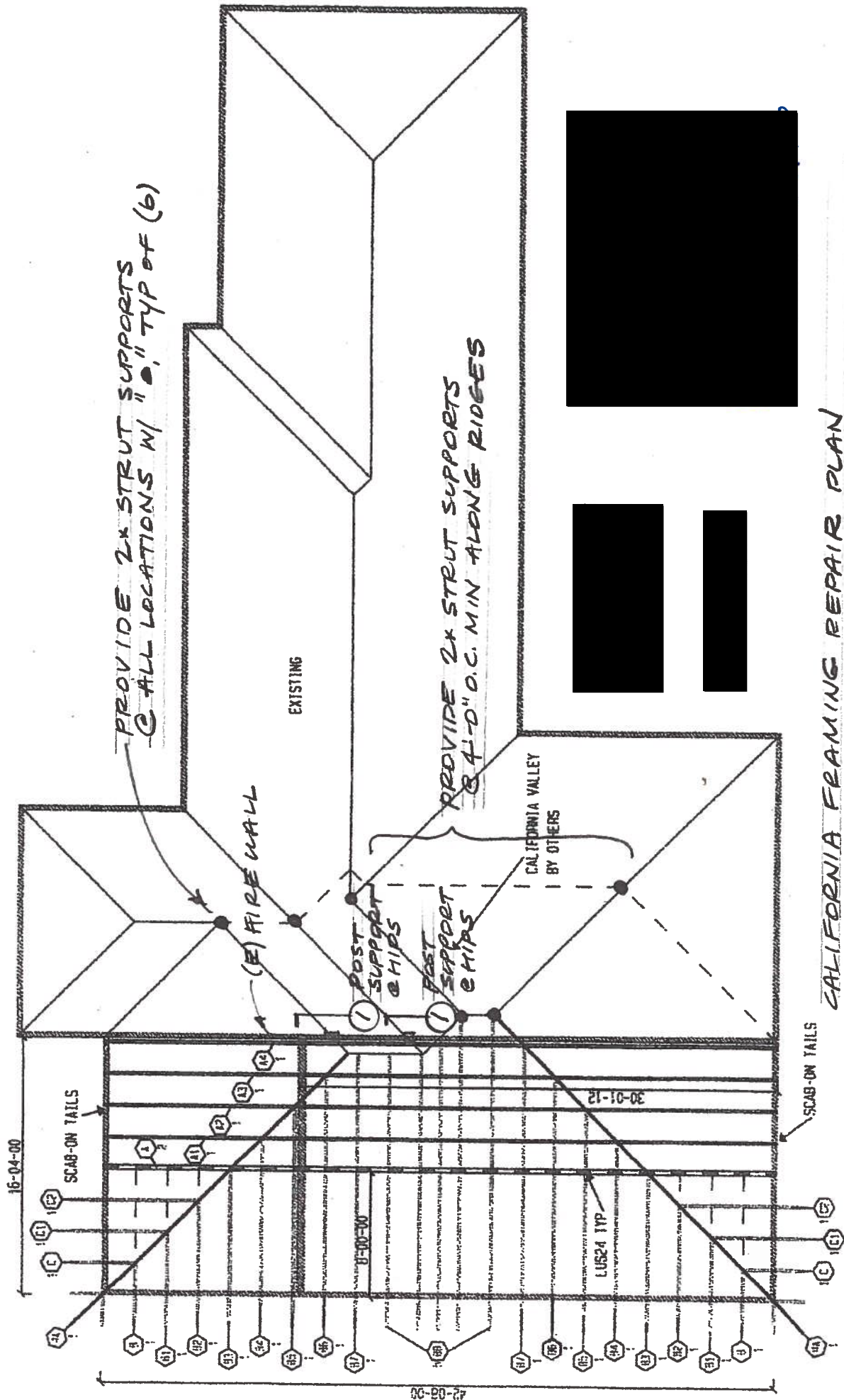
Sincerely,

Clay Simmons
CA PE 72749



Attachments:

SK-1 California Framing Repair Plan
SK-2 DETAIL-Post Support @ Rips

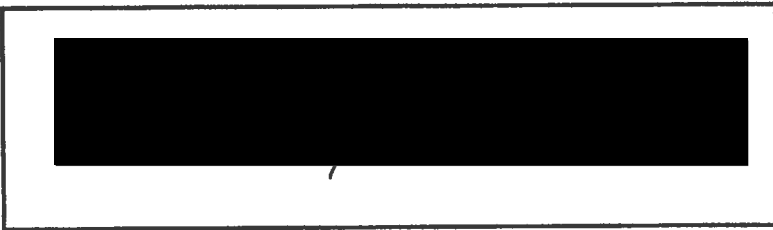


CALIFORNIA FRAMING REPAIR PLAN



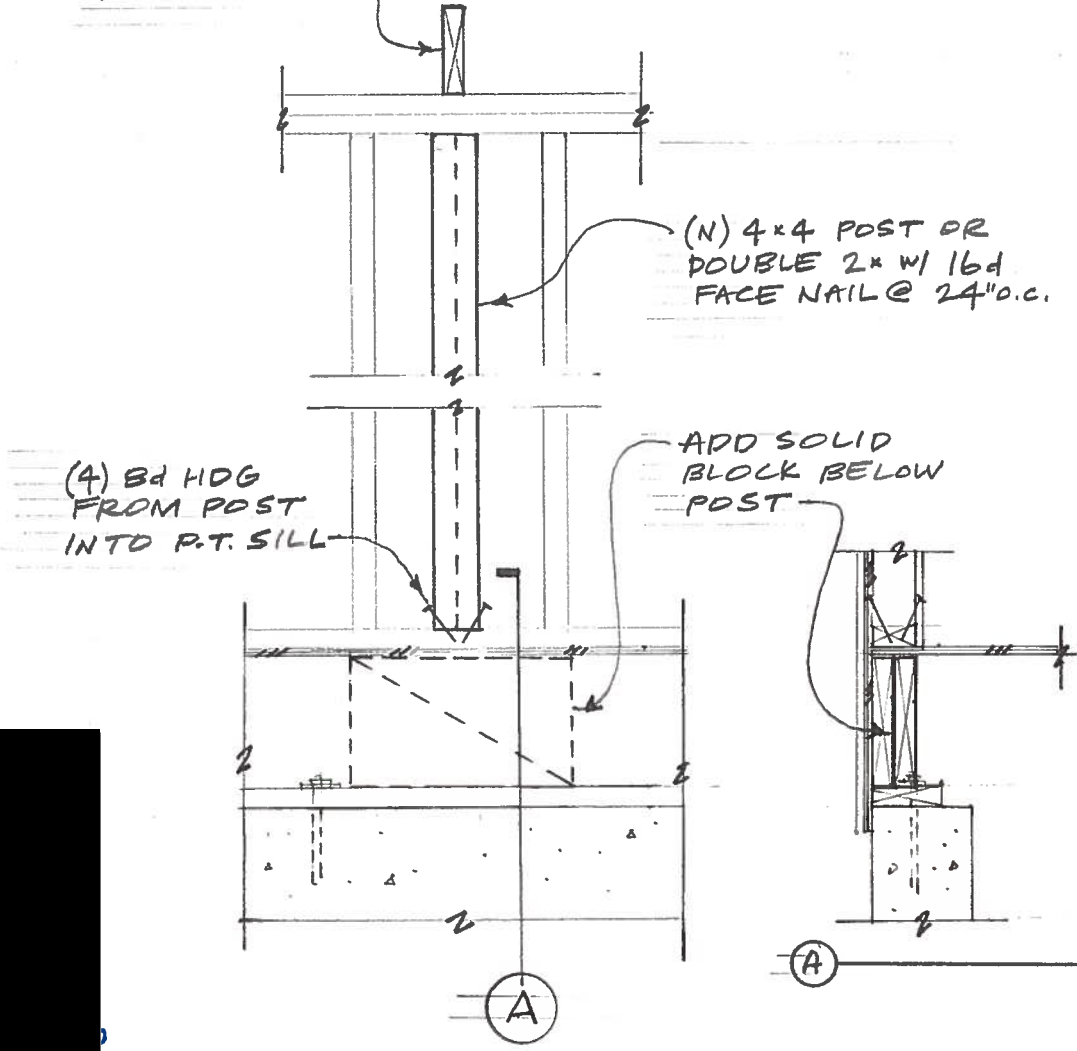


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Project Number 20002	
Date 1/14/2020	
PE [Signature]	Page SK-2

(E) 2x8 HIP



① POST SUPPORT @ (E) HIP (FIRE WALL)