

February 20, 2023

Walker Custom Homes, LLC  
Attn: Jason Walker & Robert Lindsey

Re: 2111 SW Red Barn Lane, Lee's Summit, MO (Permit # PRRES2022-3032)  
**Lot 80, The Retreat at Hook Farms**

Vista Structural Engineering, LLC, was asked to address the following city inspection comment for the house being built at 2111 SW Red Barn Lane, in Lee's Summit, MO:

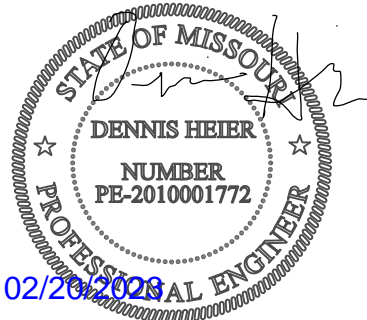
- **Address holes drilled through triple floor joist in unfinished area closer than 2" to top of joist.**
  - **Vista Structural's response:** *Per the attached calculations, no further action needs to be taken (no repair required). The applied design bending stress at the location of the hole is 1,020 psi, while the allowable bending stress per NDS code is 1,138 psi. We recommend approval of the existing joist in its current condition. A screenshot of the joist in question is included on the following page.*
- **Address floor joist drilled through at top closer than 2" in bedroom #4**
  - **Vista Structural's response:** *Per the attached calculations, no further action needs to be taken (no repair required). The applied design bending stress at the location of the hole is 491 psi, while the allowable bending stress per NDS code is 1,138 psi. We recommend approval of the existing joist in its current condition. A screenshot of the joist in question is included on the third page of this report.*
- **Address holes drilled closer than 2" to bottom of floor joist above bedroom #4 closet**
  - **Vista Structural's response:** *Per the attached calculations, no further action needs to be taken (no repair required). The applied design bending stress at the location of the hole is 1,107 psi, while the allowable bending stress per NDS code is 1,138 psi. We recommend approval of the existing joist in its current condition. A screenshot of the joist in question is included on the fourth page of this report.*

Our firm appreciates the opportunity to serve you. If you have any questions or if you need anything further, please feel free to contact us.

Sincerely,

Vista Structural Engineering, LLC

Dennis Heier, P.E.



# VISTA STRUCTURAL ENGINEERING, LLC

14718 NW DELIA STREET  
PORTLAND, OREGON 97229

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PHONE: 971.233.6099  
VISTASTRUCTURAL.COM



Location of joist above unfinished area

# VISTA STRUCTURAL ENGINEERING, LLC

14718 NW DELIA STREET  
 PORTLAND, OREGON 97229

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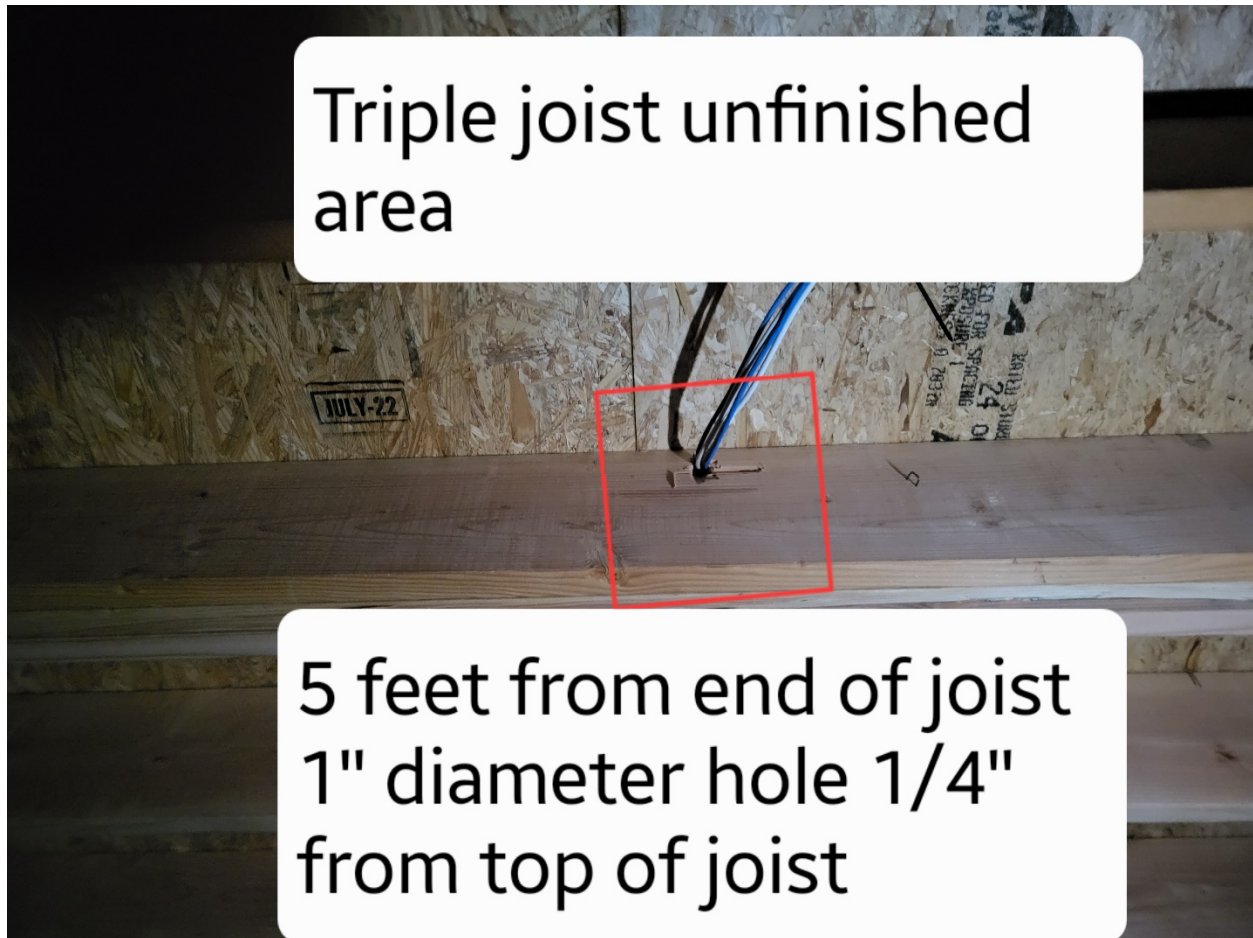
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 VISTASTRUCTURAL.COM



Location of joists in question above bedroom #4 & closet

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*Picture of joist above unfinished area*

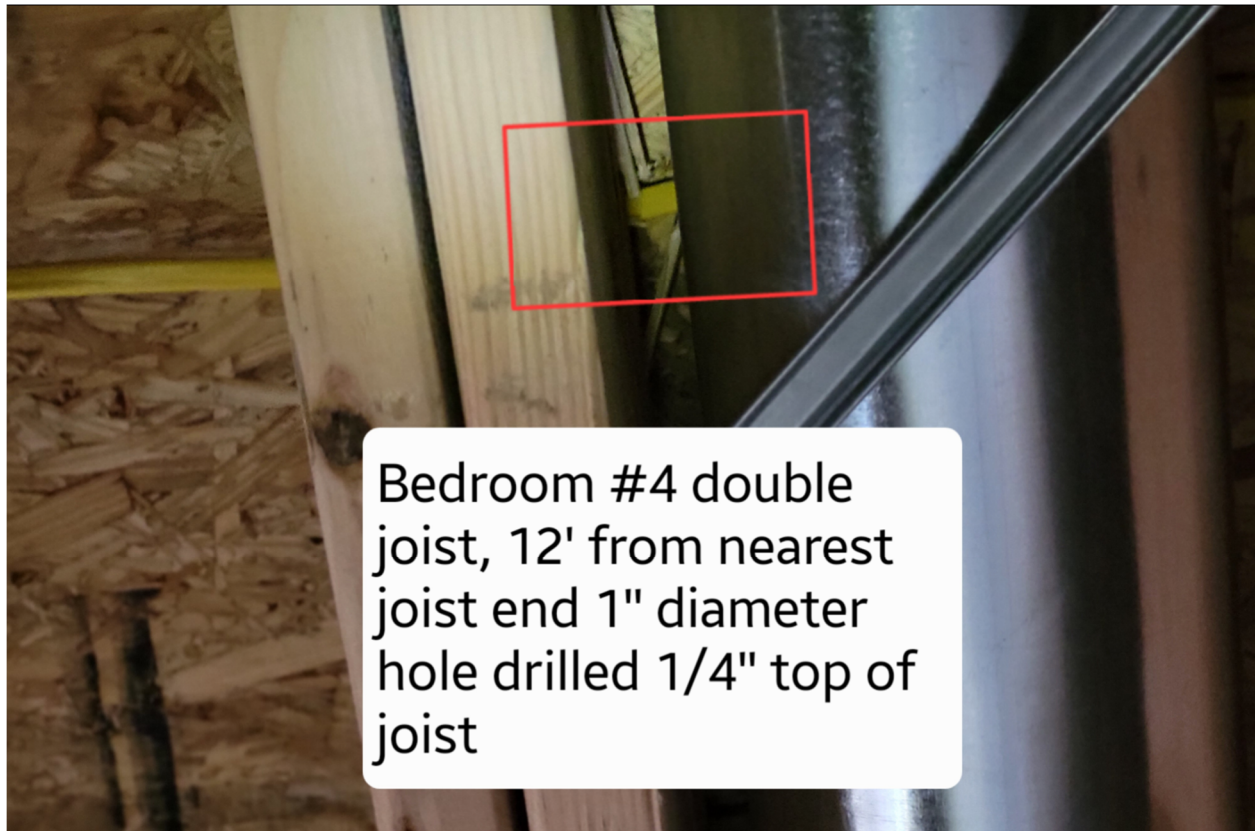
## VISTA STRUCTURAL ENGINEERING, LLC

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VISTASTRUCTURAL.COM

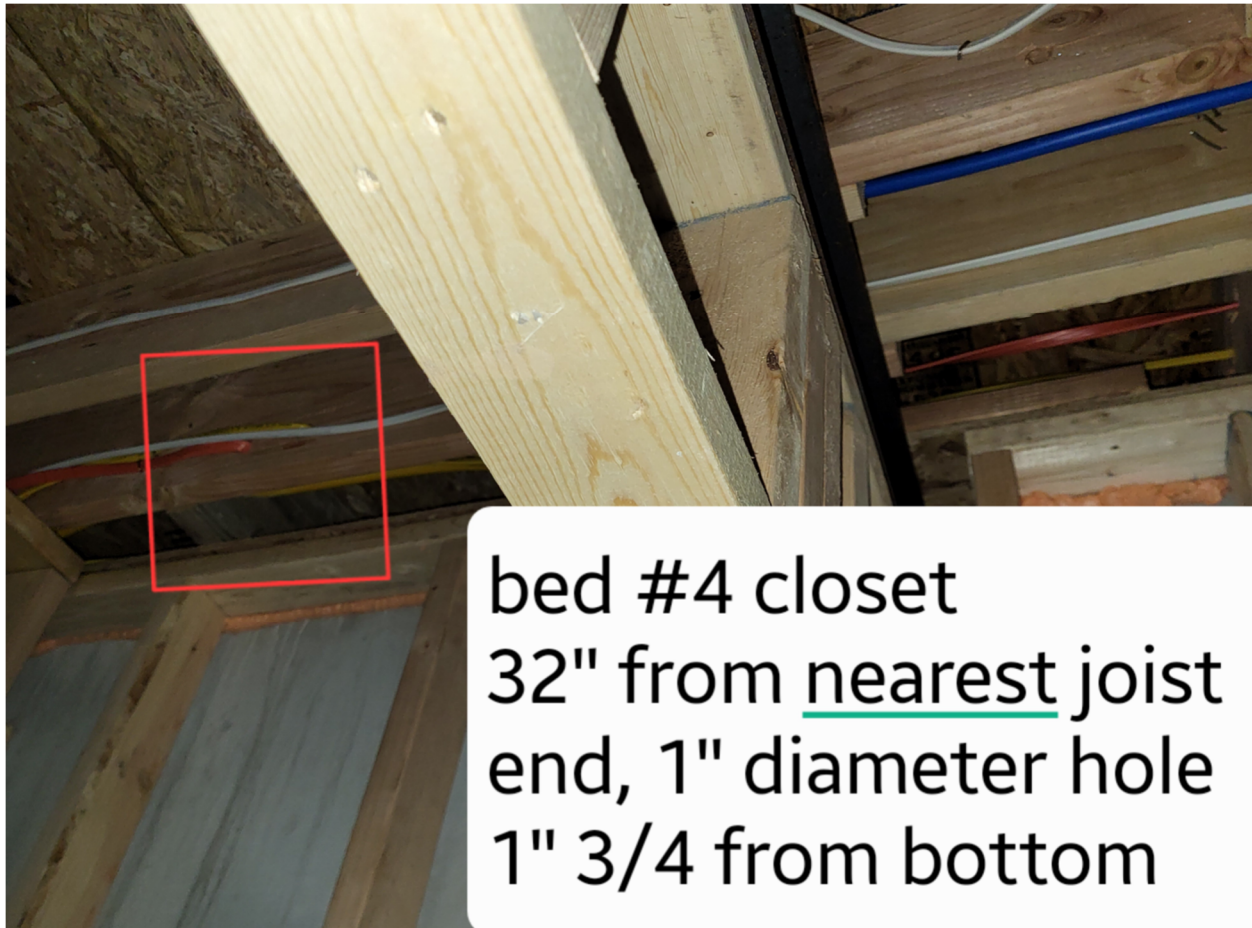




*Picture of joist above bedroom #4*

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*Picture of joist above closet of bed #4*

## VISTA STRUCTURAL ENGINEERING, LLC

14718 NW DELIA STREET  
PORTLAND, OREGON 97229

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PHONE: 971.233.6099  
VISTASTRUCTURAL.COM

PROJ:

2111 SW RED BARN LN

DATE:

2/20/2023

CLIENT:

WALKER CUST. HOMES

ENGR:

DMH



**VISTA**  
— STRUCTURAL —  
ENGINEERING, LLC

JOIST ABOVE UNFINISHED AREA

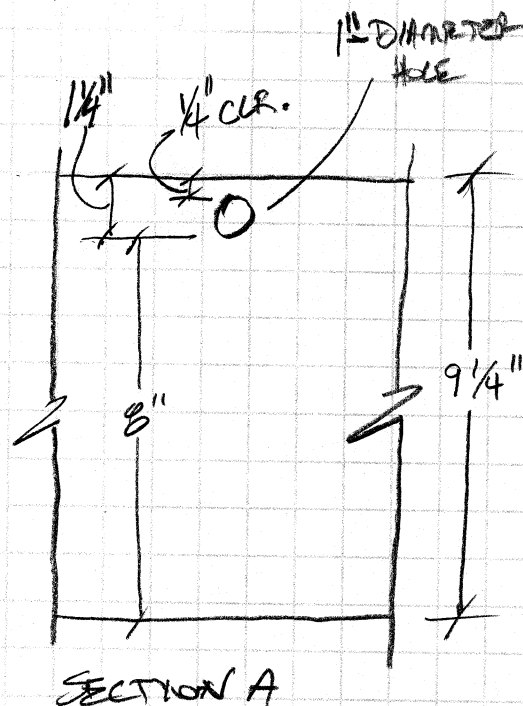
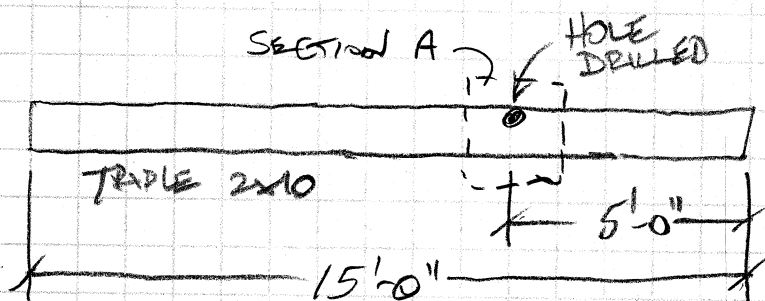
$$l = 15'-0" \quad (180")$$

$$x = 5'-0" \quad (60")$$

$$W = 1.33' \times \frac{1}{12}" \times 55 \text{ psf} + 3' \times 30 \text{ psf} \times \frac{1}{12}"$$

$$= 6.10 \text{ #/IN} + 7.5 \text{ #/IN}$$

$$= 13.6 \text{ #/IN}$$



MOMENT @ HOLE LOCATION:

$$M_{5'} = \frac{Wx}{2} (l-x) = \frac{(13.6 \text{ #/IN})(60 \text{ IN})}{2} (180 - 60)$$

$$= 48,960 \text{ IN-#}$$

REMAINING SECTION @ 5':  $b = 4.5"$   $h = 8"$

$$S = \frac{bh^2}{6} = 48 \text{ IN}^3$$

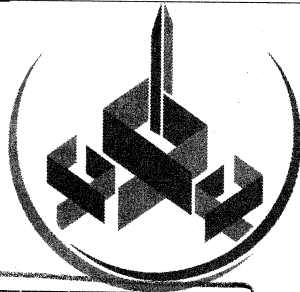
$$f_b = \frac{48,960 \text{ IN-#}}{48 \text{ IN}^3} = 1,020 \text{ psi}$$

$$F'_b = (F_b \text{ SIZE FOR CR})$$

$$= (800 \text{ psi})(1.1)(1.15)$$

$$= 1,138 \text{ psi} > f_b \quad \text{OK}$$

PROJ:  
2111 SW RED BARN LN.  
DATE:  
2/20/2023  
CLIENT:  
ENGR:  
DMH



**VISTA**  
—STRUCTURAL—  
ENGINEERING, LLC

JOIST ABOVE BEDROOM #4

$$l = 158" \quad x = 66" \quad w = 1.33' \times \frac{1}{2}" \times 70 \text{ psf} = 7.77 \text{ \#/IN}$$

$$M_{ss'} = \frac{wx}{2} (l-x) = \frac{(7.77 \text{ \#/IN})(66 \text{ IN})}{2} (158" - 66")$$

$$= 23,590 \text{ IN-}\#$$

REMAINING SECTION @ HOLE:  $b = 3"$ ,  $h = 8"$

$$S = \frac{bh^2}{6} = 48 \text{ IN}^3$$

$$f_b = \frac{23,590 \text{ IN-}\#}{48 \text{ IN}^3} = 491 \text{ psi}$$

$$F'_b = (900 \text{ psi})(1.1)(1.15) = 1,138 \text{ psi} > f_b \quad \underline{\underline{\text{OK}}}$$

JOIST ABOVE CLOSET (BED #4)

$$l = 152" \quad x = 32" \quad w = 1.33' \times \frac{1}{2}" \times 55 \text{ psf} = 6.10 \text{ \#/IN}$$

$$M_{z67'} = \frac{wx}{2} (l-x) = \frac{(6.10 \text{ \#/IN})(32 \text{ IN})}{2} (152" - 32")$$

$$= 11,730 \text{ IN-}\#$$

REMAINING SECTION @ HOLE:  $b = 1.5"$ ,  $h = 6.5"$

$$S = \frac{bh^2}{6} = 10.6 \text{ IN}^3$$

$$f_b = \frac{M}{S} = \frac{11,730 \text{ IN-}\#}{10.6 \text{ IN}^3} = 1,107 \text{ psi}$$

$$F'_b = (900)(1.1)(1.15) = 1,138 \text{ psi} > f_b \quad \underline{\underline{\text{OK}}}$$