



Re-submittal Form

Case Name/ Number: Hernandez Vehicle Storage CUP / RCU2021-00029

Case Manager: Ella Gleason

Re-submitted Items:

- ☐ Development Plan/ Site Plan
- ☐ Plat
- ☒ Parking/ Landscape Plan
- ☒ Engineering Documents
- ☐ Subdivision Improvements Agreement
- ☒ Other: Trip Generation

*** All re-submittals must have this cover sheet and a cover letter addressing review comments.**

Please note the re-submittal review period is 21 days.

The cover letter must include the following information:

- Restate each comment that requires a response
- Provide a response below the comment with a description of the revisions
- Identify any additional changes made to the original document

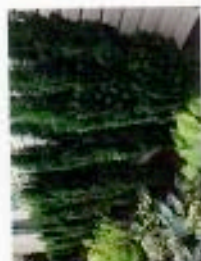
For County Use Only:

Date Accepted:

Staff (accepting intake):

Resubmittal Active: ~~Addressing, Building Safety, Neighborhood Services,~~

Engineering, ~~Environmental, Parks, Planner, ROW, SIA - Finance, SIA - Attorney~~



3



January 24, 2022

Raul Hernandez
13895 Powhatan Road
Brighton, CO 80601

**RE: Structural Observation Report and Repair Recommendations For Two
Agricultural Structures Located At 13895 Powhatan Road, Brighton**

HPE&C Job # 21-3022

To Whom It May Concern:

This letter is in reference to the site observation performed on January 20, 2022 at the above referenced property. This site observation was performed by High Plains Engineering & Consulting, LLC (HPEC) at the request of the property owner to certify and provide framing recommendations to bring two existing agricultural structures up to 2018 International Building Code compliance in order to obtain the proper building permits. Please reference Appendix A for site photographs. Please reference Appendix B for engineering calculations. Please reference Appendix C for sketches.

Existing Conditions

The first observed structure is an approximately 58'-0" x 39'-0" horse stable building. The structure is a single-story stick framed building with a gable roof with a pitch break on each side. The roof framing was covered with OSB and not visible at the time of the site visit. The property owner provided HPEC with a photograph showing the roof structure prior to installing the OSB (see Photograph #3). The roof framing appears to consist of pressure treated 2x6 roof rafters and a 2x6 collar tie @ 24" o.c. The middle roof pitch is 6:12 and the outside roof pitch is 3:12 on both sides. The roof framing overhangs the exterior stud walls by 4'-0". The roof is fully sheathed with 7/16" OSB. Hurricane clips were not observed at the time of the site visit. There was no ridge board visible in the photograph.

There are a total of (4) load bearing stud walls running the length of the stable and supporting the roof rafters. Each wall consists of 2x4 studs at 24" o.c. Pressure treated Hem-Fir #2 lumber can be reasonably assumed based on project location and lumber availability. The exterior walls have a plate height of 8'-0" and the interior walls have a plate height of approximately 9'-0". Both sides of the stud walls were covered with either 7/16" OSB or vertical wood planks, thus sill plate anchors into the slab-on-grade were also not visible at the time of the site visit. Existing door and window headers within load bearing walls were also not visible.

The second observed structure is a 24'-0" x 24'-0" stick framed structure with a gable roof. The roof framing consists of pressure treated 2x4 roof rafters @ 24" o.c. and a 3:12 roof pitch. The roof framing overhangs the exterior stud walls by 4'-0". The roof is fully sheathed with 7/16" OSB. Hurricane clips were not observed at the time of the site visit.

There are three 2x4 @ 24" o.c. load bearing stud walls supporting the roof framing, two exterior walls and one interior wall. The exterior walls have a plate height of 8'-0". All walls are sheathed with 7/16" OSB.

This report was prepared for the exclusive use of our client and is not intended for any other purpose. Our report is based on the information made available to us at this time. Should additional information become available, we reserve the right to determine the impact, if any, of the new information on our opinions and conclusions, and to revise our opinions and conclusions if necessary and warranted by the discovery of additional information.



Design Criteria

- Hem-Fir #2 lumber (pressure treated where comes into contact with ground or concrete)
- Roof dead load = 15psf
- Snow load, $P_0 = 30\text{psf}$; $P_r = 26\text{psf}$ (Risk Category I; Importance Factor = 0.8; $C_s = 0.9$; $C_t = 1.2$)
- Wind Load = 105mph, Exp. C (Risk Category I)

Conclusions & Recommendations

From what could be seen at the initial observation and from what we have determined from the calculations, the following conclusions and recommendations have been made:

- The existing 2x4 @ 24" o.c. studs are structurally acceptable for both structures.
- The 6:12 pitched roof joists of the 58'x39' horse stable are structurally acceptable, except for the unknown presence of hurricane tie downs at each joist. If no hurricane ties are present, Simpson Strong-Tie H2.5A clips must be installed per manufacturer recommendations at every joist bearing location.
- The 3:12 pitched roof joists of the 58'x39' horse stable are NOT structurally acceptable. These 2x6 members must be sistered with an additional 2x6, providing a total of (2)2x6 @ 24" o.c. roof joists. See Appendix C for detail. Simpson Strong-Tie H2.5A clips must also be installed per manufacturer recommendations at every bearing location.
- 2x6 blocking must be installed between each roof joist at the ridge line.
- See the attached sketch in Appendix C for all required modifications to the 58'x39' stable. Structurally acceptable members are shown in green. Structurally required modifications are shown in red.
- The existing 2x4 roof joists of the 24'x24' structure are NOT structurally acceptable. These members must be replaced with pressure treated 2x8 @ 24" o.c. Simpson Strong-Tie H2.5A ties must be installed at every joist bearing location.
- The slab-on-grade of both structures appears to be in adequate condition with no major visible cracking. Proper drainage away from the slabs-on-grade shall be provided. The owners are advised to immediately fill any settled areas to eliminate water accumulation near the base of the structures. A minimum slope of 12 inches in the first 10 feet away from the perimeter of the buildings is recommended. Sprinkler systems should not be installed or direct water to be within 10 feet of the foundation. The owner is also advised that irrigation lines can leak and/or break, resulting in release of excessive amounts of water near the foundation. This can cause damage to slabs. Water accumulation around foundation elements, including slabs-on-grade, is the main cause of distressed foundations.

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HIGH PLAINS ENGINEERING & CONSULTING, LLC

555 MAIN STREET, HUDSON, CO 80642

www.hp-eng.com

PHONE: (303) 857-9280

High Plains Engineering & Consulting, LLC takes no responsibility for existing conditions that were not visible at the time of the initial site observation. We reserve the right to modify these recommendations should additional information become available.

Please call if you have any questions or concerns.

Sincerely,


Megan K. Seacrist, PE 48926



Appendix A – Photographs
Appendix B – Structural Calculations
Appendix C – Sketches

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Appendix A – Photographs

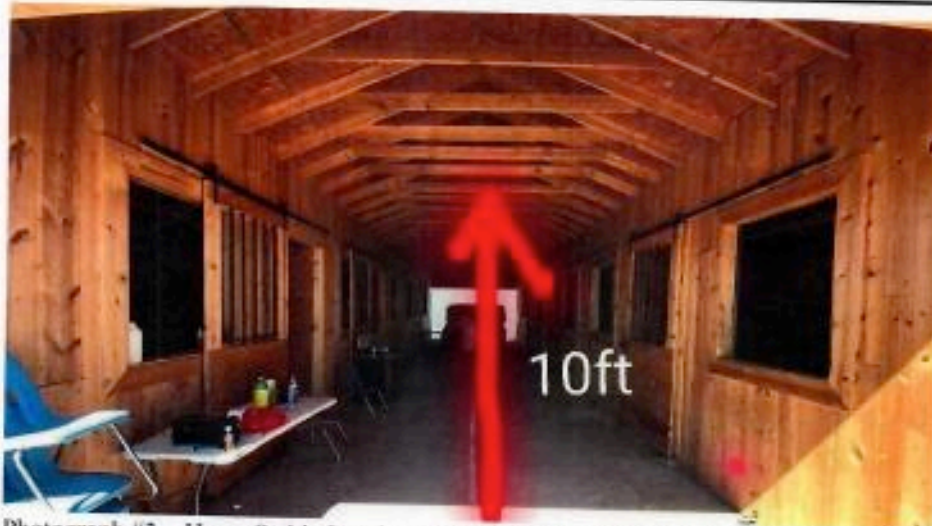


Photograph #1 – 58x39 Horse Stable

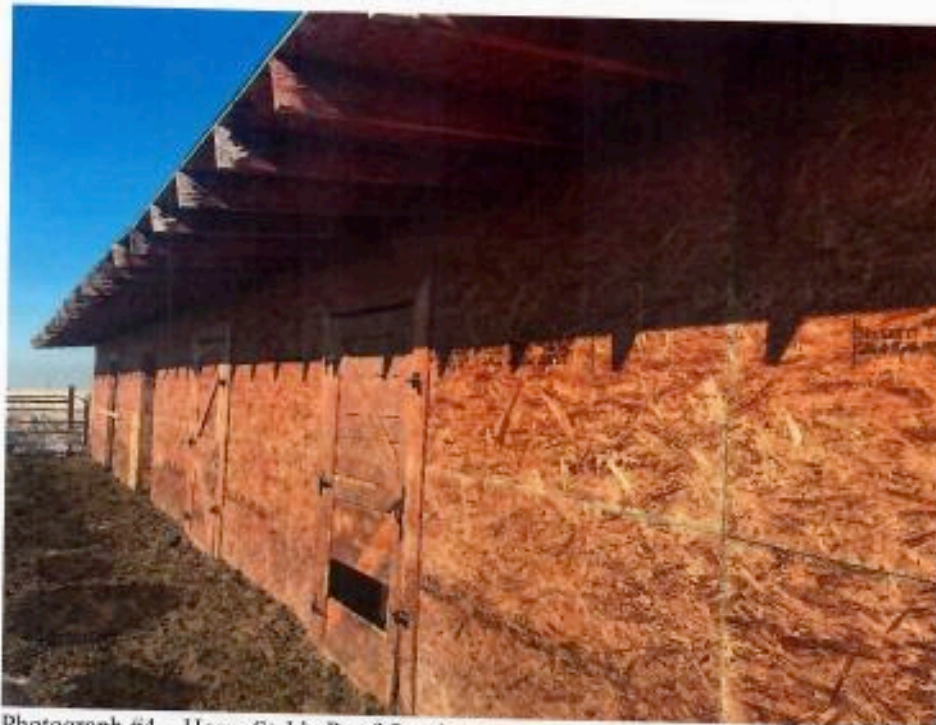


Photograph #2 – Horse Stable Interior Hallway (Current Condition)

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Photograph #3 – Horse Stable Interior Hallway Prior to OSB Install (Provided by Client)



Photograph #4 – Horse Stable Roof Overhang

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Photograph #5 – 24x24 Outbuilding



Photograph #6 – 24x24 Outbuilding Roof Framing

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Appendix B – Structural Calculations

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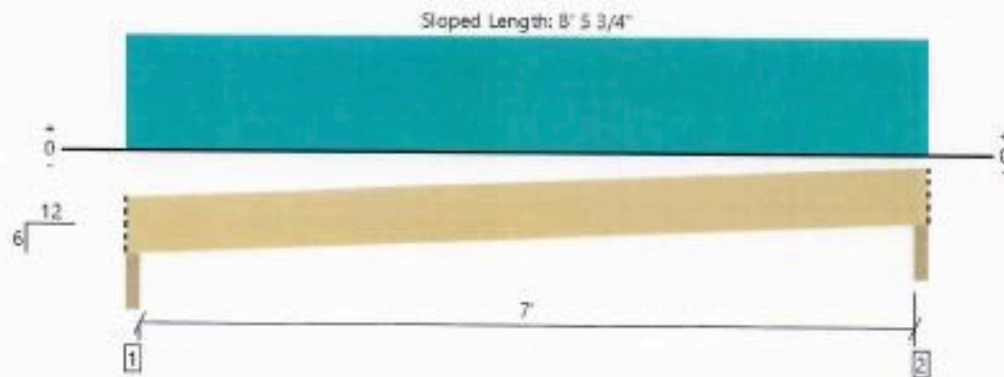
Horse Stable			
Member Name	Results	Current Solution	Comments
6:12 Roof: Joist	Passed	1 piece(s) 2 x 6 HF No.2 @ 24" OC	
3:12 Roof: Joist	Passed	2 piece(s) 2 x 6 HF No.2 @ 24" OC	
Wall: Stud	Passed	1 piece(s) 2 x 4 HF No.2 @ 24" OC	
24x24 Bldg			
Member Name	Results	Current Solution	Comments
3:12 Roof: Joist	Passed	1 piece(s) 2 x 8 HF No.2 @ 24" OC	
Wall: Stud	Passed	1 piece(s) 2 x 4 HF No.2 @ 24" OC	

FortaWEB Software Operator	Job Notes
Megan Seacrist High Plains Engineering & Consulting LLC (303) 862-0770	



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FortaWEB v3.2
File Name: Hernandez Horse Stable

Horse Stable, 6:12 Roof: Joist
1 piece(s) 2 x 6 HF No.2 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Member Length : 8' 8 1/2"

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	324 @ 2' 1/2"	2126 (3.50")	Passed (15%)	—	1.0 D + 1.0 S (All Spans)
Shear (lbs)	264 @ 8' 7/16"	949	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	549 @ 3' 9 1/2"	921	Passed (60%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.143 @ 3' 9 1/2"	0.401	Passed (L/674)	—	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.235 @ 3' 9 1/2"	0.534	Passed (L/410)	—	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Applicable calculations are based on NDS.

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 6/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - HF	3.50"	3.50"	1.50"	127	197	324	Blocking
2 - Beveled Plate - HF	3.50"	3.50"	1.50"	127	197	324	Blocking

• Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	8' 6" o/c	
Bottom Edge (Lu)	8' 6" o/c	

•Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 7' 7"	24"	15.0	25.0	Default Load

Weyerhaeuser Notes

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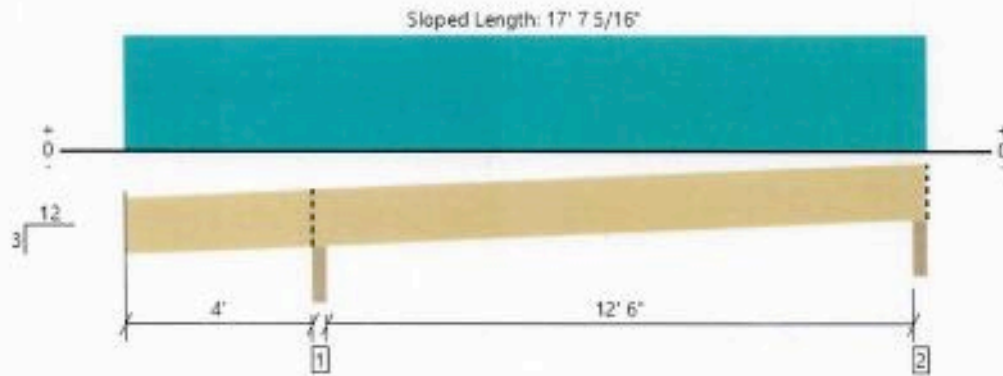
The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
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File Name: Hernandez Horse Stable
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Horse Stable, 3:12 Roof: Joist
2 piece(s) 2 x 6 HF No.2 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Member Length : 17' 8 11/16"

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	928 @ 4' 1 3/4"	4383 (3.50")	Passed (21%)	—	1.0 D + 1.0 S (All Spans)
Shear (lbs)	535 @ 4' 8 13/16"	1898	Passed (28%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1444 @ 10' 11 11/16"	1842	Passed (78%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.527 @ 10' 7 5/8"	0.656	Passed (L/299)	—	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.795 @ 10' 8 5/16"	0.875	Passed (L/198)	—	1.0 D + 1.0 S (All Spans)

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IBC 2018
Design Methodology : ASD
Member Pitch : 3/12

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180). Upward deflection on left cantilever exceeds overhang deflection criteria.
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Upward deflection on left cantilever exceeds 0.4".
- Applicable calculations are based on NDS.

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - HF	3.50"	3.50"	1.50"	346	582	928	Blocking
2 - Beveled Plate - HF	3.50"	3.50"	1.50"	182	324	506	Blocking

*Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	12' 3" o/c	
Bottom Edge (Lu)	17' 7" o/c	

*Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 17' 1"	24"	15.0	26.0	Default Load

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The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

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File Name: Hernandez Horse Stable

Horse Stable, Wall: Stud

1 piece(s) 2 x 4 HF No.2 @ 24" OC

Wall Height: 8'

Member Height: 7' 7 1/2"

O. C. Spacing: 24.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	722	2731	Passed (26%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	722	2658	Passed (27%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	97	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	90	840	Passed (11%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	185 @ mid-span	593	Passed (31%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.21 @ mid-span	0.76	Passed (L/435)	--	1.0 D + 0.6 W
Bending/Compression	0.42	1	Passed (42%)	1.60	1.0 D + 0.45 W + 0.75 L + 0.75 S

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- A bearing area factor of 1.25 has been applied to base plate bearing capacity.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

Supports	Type	Material
Top	Dbf 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Stud
Building Code : IBC 2018
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections				
Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d x 2.5" Box (Toe)	2	N/A
Base	Nails	8d x 2.5" Box (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	346	376	Roof Joist Ren

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	24.00"	21.2	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (105), Risk Category(I), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

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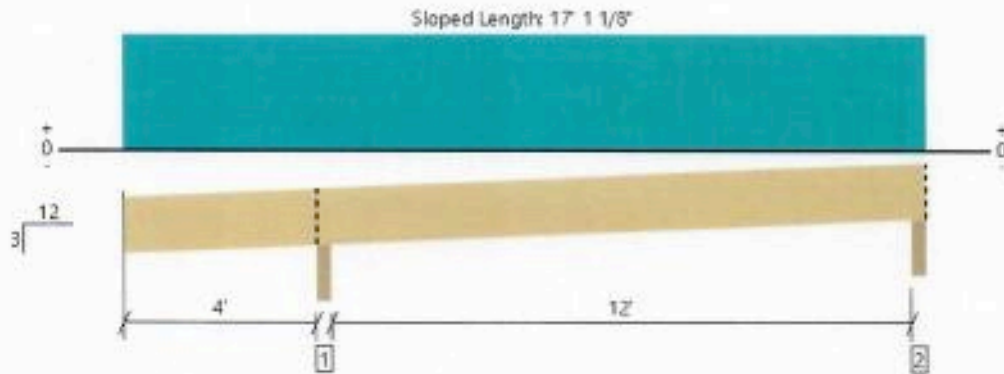
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24x24 Bldg, 3:12 Roof: Joist
1 piece(s) 2 x 8 HF No.2 @ 24" OC



All locations are measured from the outside face of left support (or left cantilever end). All dimensions are horizontal.

Member Length : 17' 2 15/16"

Design Results	Actual @ Location	Allowed	Result	LDF	Load: Combination (Pattern)
Member Reaction (lbs)	909 @ 4' 1 3/4"	2192 (3.50")	Passed (41%)	--	1.0 D + 1.0 S (All Spans)
Shear (lbs)	505 @ 4' 10 9/16"	1251	Passed (40%)	1.15	1.0 D + 1.0 S (All Spans)
Moment (Ft-lbs)	1315 @ 10' 8 15/16"	1477	Passed (89%)	1.15	1.0 D + 1.0 S (All Spans)
Live Load Defl. (in)	0.387 @ 10' 4 5/8"	0.630	Passed (L/391)	--	1.0 D + 1.0 S (All Spans)
Total Load Defl. (in)	0.581 @ 10' 5 5/16"	0.840	Passed (L/260)	--	1.0 D + 1.0 S (All Spans)

- Deflection criteria: LL (L/240) and TL (L/180).
- Overhang deflection criteria: LL (2L/240) and TL (2L/180).
- Allowed moment does not reflect the adjustment for the beam stability factor.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.
- Upward deflection on left cantilever exceeds 0.4".
- Applicable calculations are based on NDS.

System : Roof
Member Type : Joist
Building Use : Residential
Building Code : IRC 2018
Design Methodology : ASD
Member Pitch : 3/12

Supports	Bearing Length			Loads to Supports (lbs)			Accessories
	Total	Available	Required	Dead	Snow	Total	
1 - Beveled Plate - HF	3.50"	3.50"	1.50"	339	570	909	Blocking
2 - Beveled Plate - HF	3.50"	3.50"	1.50"	174	311	485	Blocking

- Blocking Panels are assumed to carry no loads applied directly above them and the full load is applied to the member being designed.

Lateral Bracing	Bracing Intervals	Comments
Top Edge (Lu)	4' 2" o/c	
Bottom Edge (Lu)	11' 8" o/c	

- Maximum allowable bracing intervals based on applied load.

Vertical Load	Location (Side)	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Uniform (PSF)	0 to 16' 7"	24"	15.0	25.0	Default Load

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ForteWEB Software Operator	Job Notes
Megan Seacrist High Plains Engineering & Consulting LLC (303) 862-0770	



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24x24 Bldg, Wall: Stud
1 piece(s) 2 x 4 HF No.2 @ 24" OC

Wall Height: 8'

Member Height: 7' 7 1/2"

O. C. Spacing: 24.00"



Drawing is Conceptual

Design Results	Actual	Allowed	Result	LDF	Load: Combination
Slenderness	26	50	Passed (52%)	--	--
Compression (lbs)	354	2731	Passed (13%)	1.15	1.0 D + 1.0 S
Plate Bearing (lbs)	354	2658	Passed (13%)	--	1.0 D + 1.0 S
Lateral Reaction (lbs)	97	--	--	1.60	1.0 D + 0.6 W
Lateral Shear (lbs)	90	840	Passed (11%)	1.60	1.0 D + 0.6 W
Lateral Moment (ft-lbs)	185 @ mid-span	593	Passed (31%)	1.60	1.0 D + 0.6 W
Total Deflection (in)	0.20 @ mid-span	0.76	Passed (L/452)	--	1.0 D + 0.6 W
Bending/Compression	0.35	1	Passed (35%)	1.60	1.0 D + 0.6 W

- Lateral deflection criteria: Wind (L/120)
- Input axial load eccentricity for this design is 16.67% of applicable member side dimension.
- Applicable calculations are based on NDS.
- A bearing area factor of 1.25 has been applied to base plate bearing capacity.
- A 15% increase in the moment capacity has been added to account for repetitive member usage.

Supports	Type	Material
Top	Dbil 2X	Hem Fir
Base	2X	Hem Fir

System : Wall
Member Type : Stud
Building Code : IBC 2018
Design Methodology : ASD

Max Unbraced Length	Comments
1'	

Lateral Connections

Supports	Connector	Type/Model	Quantity	Connector Nailing
Top	Nails	8d x 2.5" Box (Toe)	2	N/A
Base	Nails	8d x 2.5" Box (Toe)	2	N/A

- Nailed connection at the top of the member is assumed to be nailed through the bottom 2x plate prior to placement of the top 2x of the double top plate assembly.

Vertical Load	Spacing	Dead (0.90)	Snow (1.15)	Comments
1 - Point (lb)	N/A	170	184	Roof Joist Ron

Lateral Load	Location	Spacing	Wind (1.60)	Comments
1 - Uniform (PSF)	Full Length	24.00"	21.2	

- ASCE/SEI 7 Sec. 30.4: Exposure Category (B), Mean Roof Height (33'), Topographic Factor (1.0), Wind Directionality Factor (0.85), Basic Wind Speed (105), Risk Category(I), Effective Wind Area determined using full member span and trib. width.
- IBC Table 1604.3, footnote f: Deflection checks are performed using 42% of this lateral wind load.

Weyerhaeuser Notes

Weyerhaeuser warrants that the sizing of its products will be in accordance with Weyerhaeuser product design criteria and published design values. Weyerhaeuser expressly disclaims any other warranties related to the software. Use of this software is not intended to circumvent the need for a design professional as determined by the authority having jurisdiction. The designer of record, builder or framer is responsible to assure that this calculation is compatible with the overall project. Accessories (Rim Board, Blocking Panels and Squash Blocks) are not designed by this software. Products manufactured at Weyerhaeuser facilities are third-party certified to sustainable forestry standards. Weyerhaeuser Engineered Lumber Products have been evaluated by ICC-ES under evaluation reports ESR-1153 and ESR-1387 and/or tested in accordance with applicable ASTM standards. For current code evaluation reports, Weyerhaeuser product literature and installation details refer to www.weyerhaeuser.com/woodproducts/document-library.

The product application, input design loads, dimensions and support information have been provided by ForteWEB Software Operator

ForteWEB Software Operator	Job Notes
Megan Seacrist High Plains Engineering & Consulting LLC (303) 862-0770	

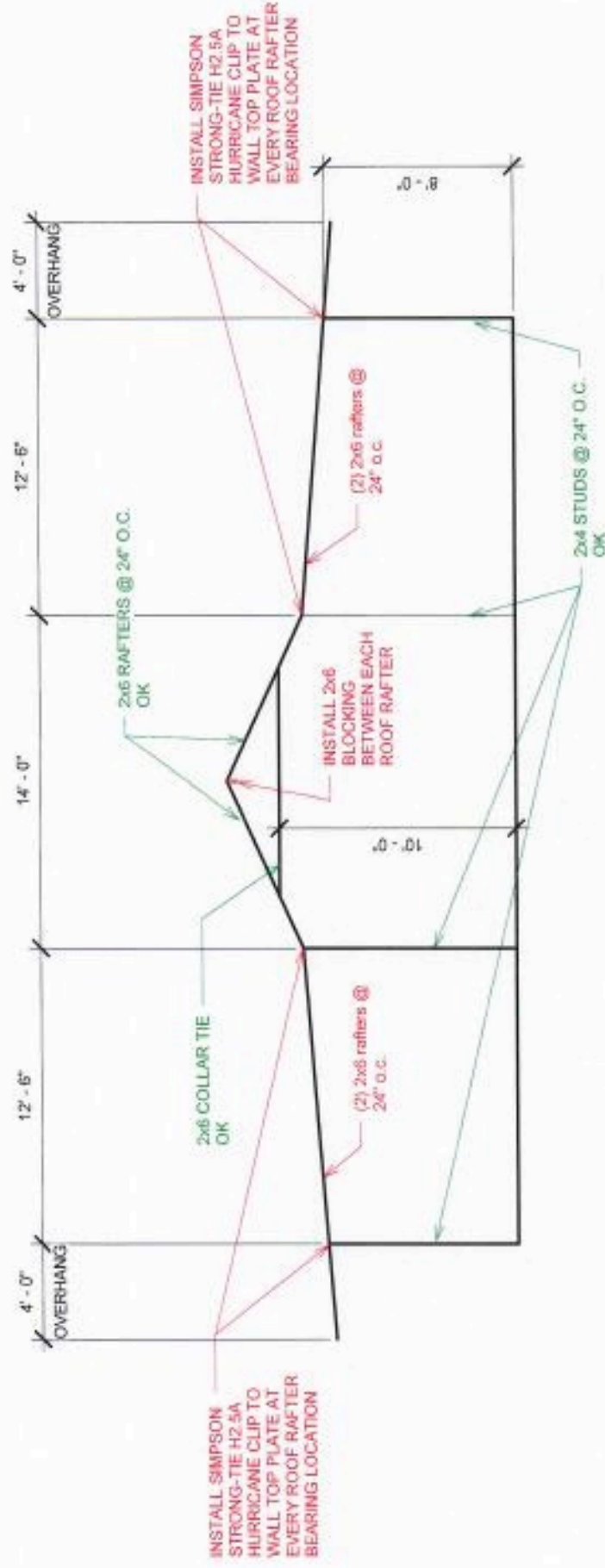


1/24/2022 7:16:03 PM UTC
ForteWEB v3.2, Engine: V8.2.0.17, Data: V8.1.0.16
File Name: Hernandez Horse Stable
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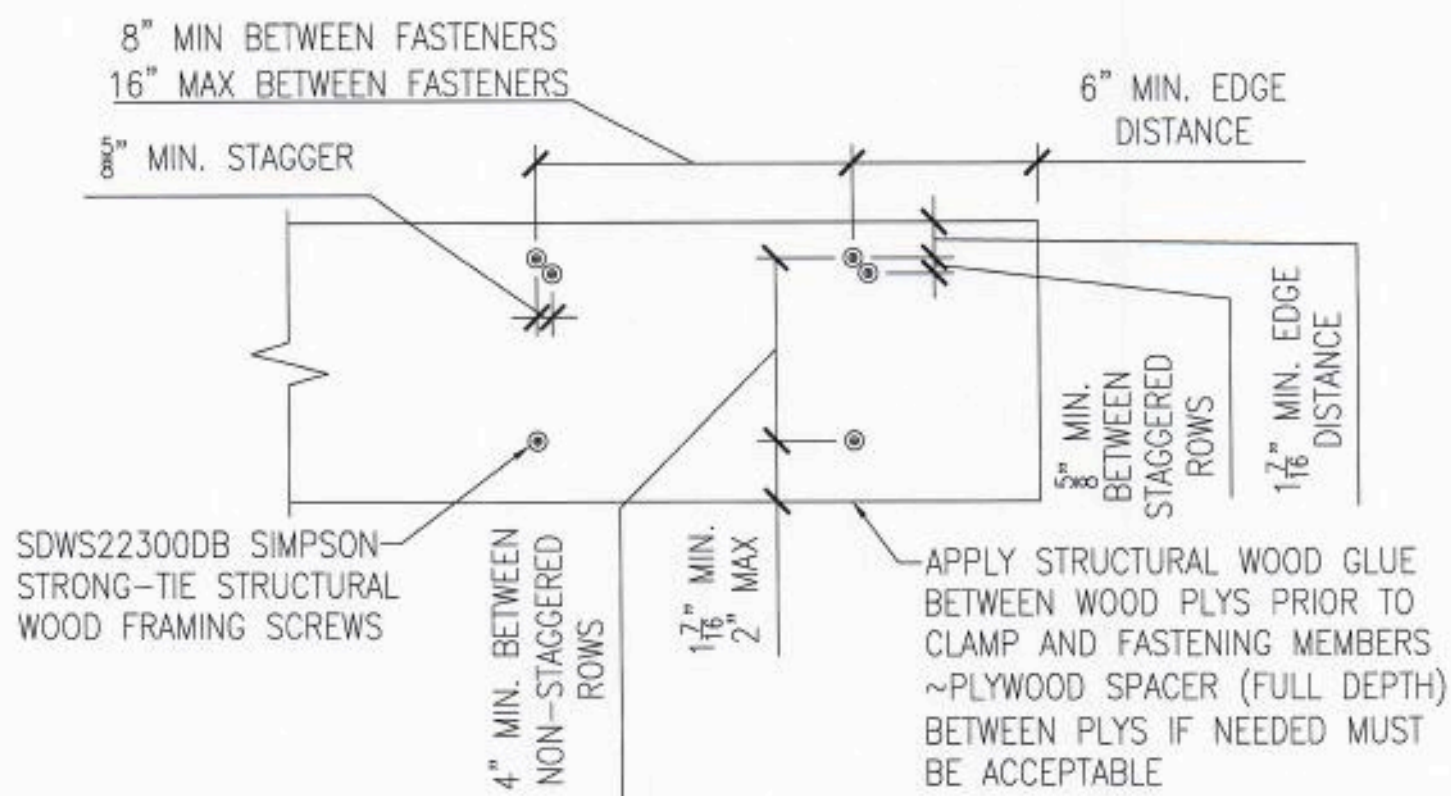


Appendix C – Sketches

This report was prepared for the exclusive use of our client and is not intended for any other purpose. Our report is based on the information made available to us at this time. Should additional information become available, we reserve the right to determine the impact, if any, of the new information on our opinions and conclusions, and to revise our opinions and conclusions if necessary and warranted by the discovery of additional information.



HORSE STABLE STRUCTURAL MODIFICATIONS



SISTERING DETAIL

3/4"=1'-0"



Sustainable Traffic Solutions

Joseph L. Henderson PE, PTOE
Traffic Engineer / Principal

January 21, 2022

Raul Hernandez
Outlaw Transport, LLC
13895 Powhattan Road
Brighton, CO 80603

RE: Outlaw Transport Trip Generation Letter (Case Number RCU2021-00029)

Dear Raul,

Based on your request, I have prepared this trip generation letter to document the volume of traffic that is being generated by the vehicle / heavy truck parking at 13895 Powhattan Road in Adams County. As we discussed, there are five trucks and trailers that park on the property for one to two days per week. The balance of the time, the trucks and trailers are being driven on multiday trips to deliver goods. The following table is a weekly estimate of the traffic that is resulting from parking the trucks and trailers on the property. It assumes that the drivers don't live where the trucks and trailers are parked, so they drive from their home, leave their personal vehicle, take the truck and trailer, return a few days later, and take their personal vehicle home. The conservative estimate shows that parking the trucks and trailers at this property results in 20 trips per week.

Vehicle Type	Inbound	Outbound	Total
Truck + Trailer	5	5	10
Passenger Vehicle	5	5	10
Total	10	10	20

Please contact me with questions about the contents of this letter.

Sincerely,

Joseph L. Henderson, PE, PTOE
Project Manager / Principal
Outlaw Transport Trip Generation Letter