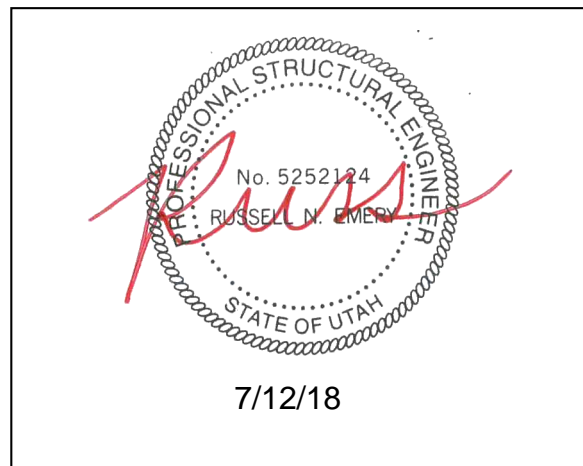




STRUCTURAL CALCULATIONS
for
RIDGE NEST 14

at
SUMMIT POWDER MOUNTAIN
EDEN, UT 84310
for
CIPRIAN MORAR



BY: **RUSSELL N. EMERY, S.E.**
PROJECT ENGINEER

PROJECT #: **U2784-001-181**

DATE: **July 12, 2018**

DESIGNED BY JBA; CHECKED BY RNE

Note:

The calculations presented in this package are intended for a single use at the location indicated above, for the client listed above. These calculations shall not be reproduced, reused, "card filed", sold to a third party, or altered in any way without the written authorization of Vector Structural Engineering, LLC and Ciprian Morar.

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PROJECT: Ridge Nest 14

PROJECT NO.: U2784-001-181 SUBJECT: CRITERIA

Design Criteria:

General:

Code: Structural design is based upon the International Building Code, 2015 Edition
Risk Category: II

Wind Criteria:

Analysis Procedure: ASCE 7-10, Chapter 28 - Envelope Procedure - Part 2
Basic Wind Speed - Ultimate (mph): 115 (3-sec gust)
Wind Exposure: C

Seismic Criteria:

Analysis Procedure: ASCE 7-10, Equivalent Lateral Force Procedure
Site Class: D
Seismic Importance Factor, I_E : 1.0
Mapped Spectral Response Accelerations:
 $S_S = 0.811$ $S_1 = 0.269$
 $S_{DS} = 0.636$ $S_{D1} = 0.334$
Seismic Design Category: D
Seismic Force Resisting System: Light-frame wood shear walls
Seismic Response Coefficient, C_s : 0.1
Seismic Base Shear, V (k): 16.2

Snow Load:

Ground Snow Load, p_g (psf): 264.9624549
Snow Importance Factor, I_S : 1
Flat Roof Snow Load, p_f (psf): 185
Sloped Roof Snow Load, p_s (psf): 185

Live Loads:

Roof Live Load (psf): 20
Floor Live Load (psf): 40

General Notes:

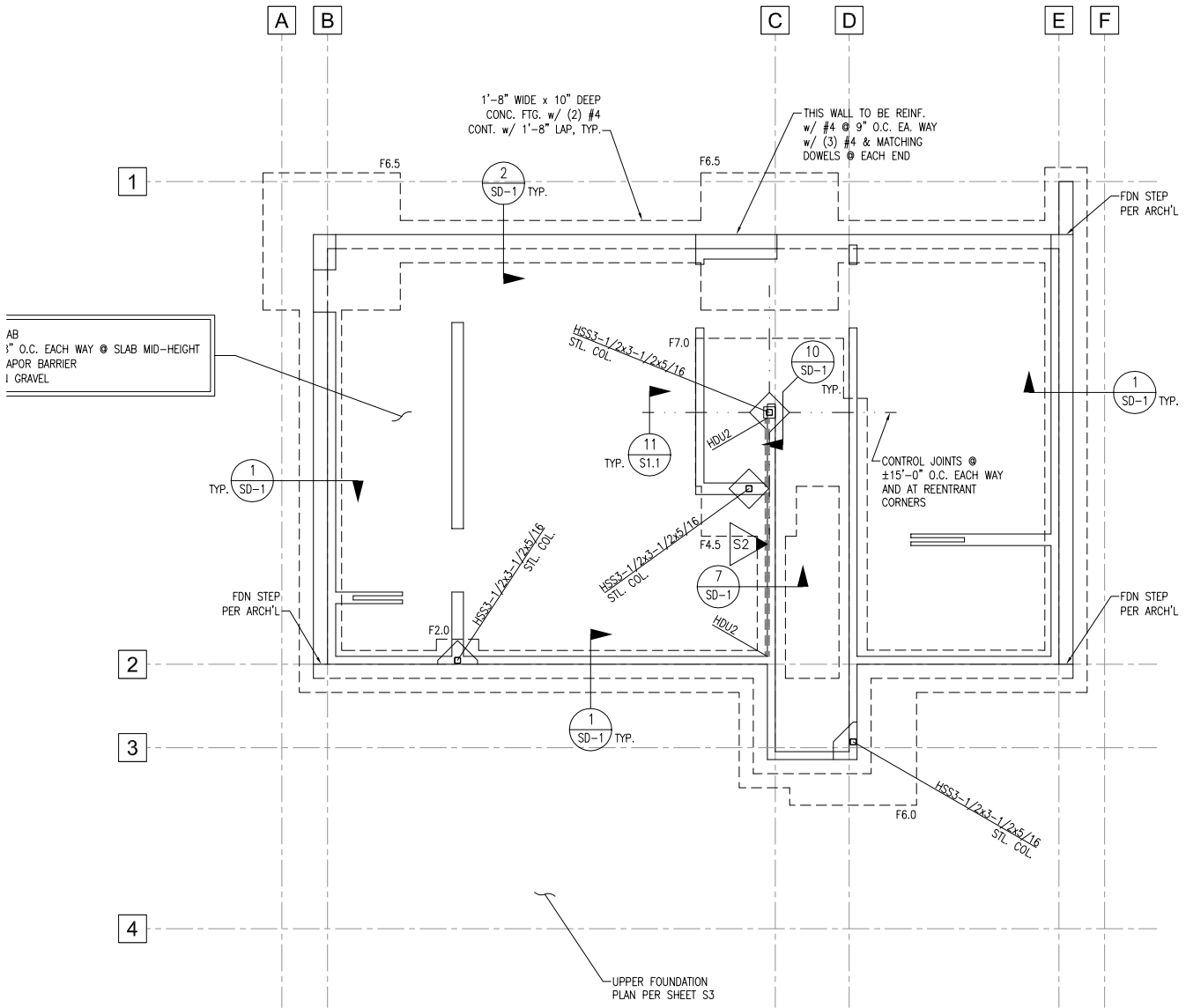
- The contractor shall verify dimensions, conditions and elevations before starting work. The engineer shall be notified immediately if any discrepancies are found.
- The typical notes and details shall apply in all cases unless specifically detailed elsewhere. Where no detail is shown, the construction shall be as shown for other similar work and as required by the building code.
- These calculations are limited to the structural members shown in these calculations only. The connection of the members shown in these calculations to any existing structure shall be by others.
- The contractor shall be responsible for compliance with local construction safety orders. Approval of shop drawings by the architect or structural engineer shall not be construed as accepting this responsibility.
- All structural framing members shall be adequately shored and braced during erection and until full lateral and vertical support is provided by adjoining members.

Structural Steel:

- All structural steel code checks based on the AISC 360-10 and AISC 341-10.
- All steel pipe shall be per ASTM A53 Gr B.
- All steel rectangular tubes (HSS) shall be per ASTM A500 GR. B (46 KSI), U.N.O.
- All steel wide flange shapes shall be per ASTM A992 (50 KSI), U.N.O.
- All other structural steel shapes & plates shall be per ASTM A36, U.N.O.
- All bolts for steel-to-steel connections shall be per ASTM A325N, U.N.O.
- All bolted connections shall be tightened to "snug tight" condition as defined by AISC, U.N.O.
- All welding shall be performed by certified welders in accordance with American Welding Society (AWS) D1.1, latest applicable edition.

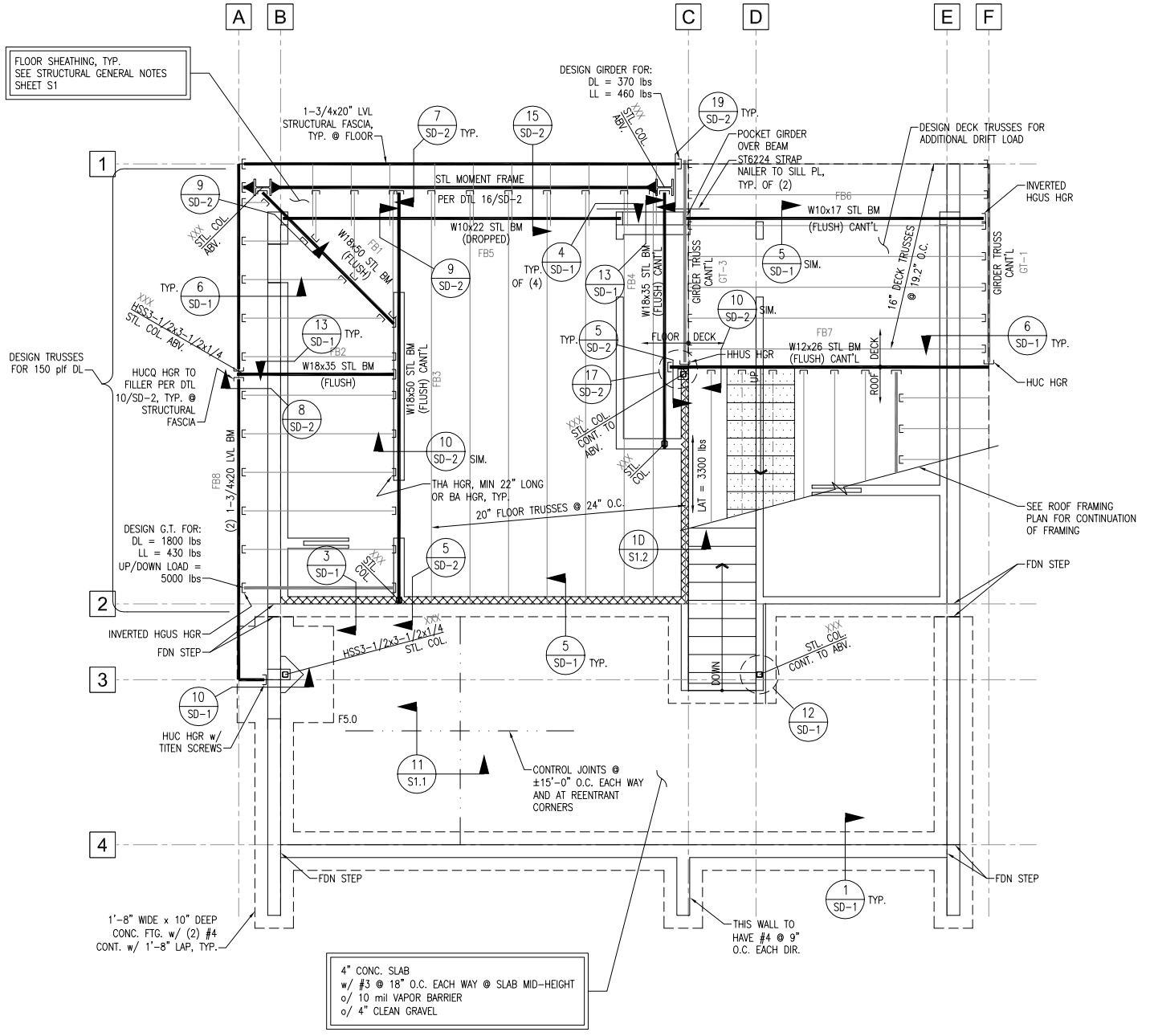
Foundation / Concrete:

- All concrete mixing, placement, forming, and reinforcing installation shall be performed in accordance with the requirements of "Building Code Requirements for Reinforced Concrete", ACI 318, latest applicable edition.
- Foundation concrete shall have a minimum compressive strength of 3000 psi at 28 days.
- Cement for all concrete shall be Type I or II with a minimum of 6% entrained air. Maximum aggregate size shall be 3/4".
- Reinforcing steel shall be per ASTM A615 Gr. 60, U.N.O.
- Foundation design is based upon presumptive soil capacities. Vector Structural Engineering, LLC strongly recommends independent soils testing be performed by a licensed geotechnical engineer to verify soil capacities, slope stability, and any other related soil parameters.



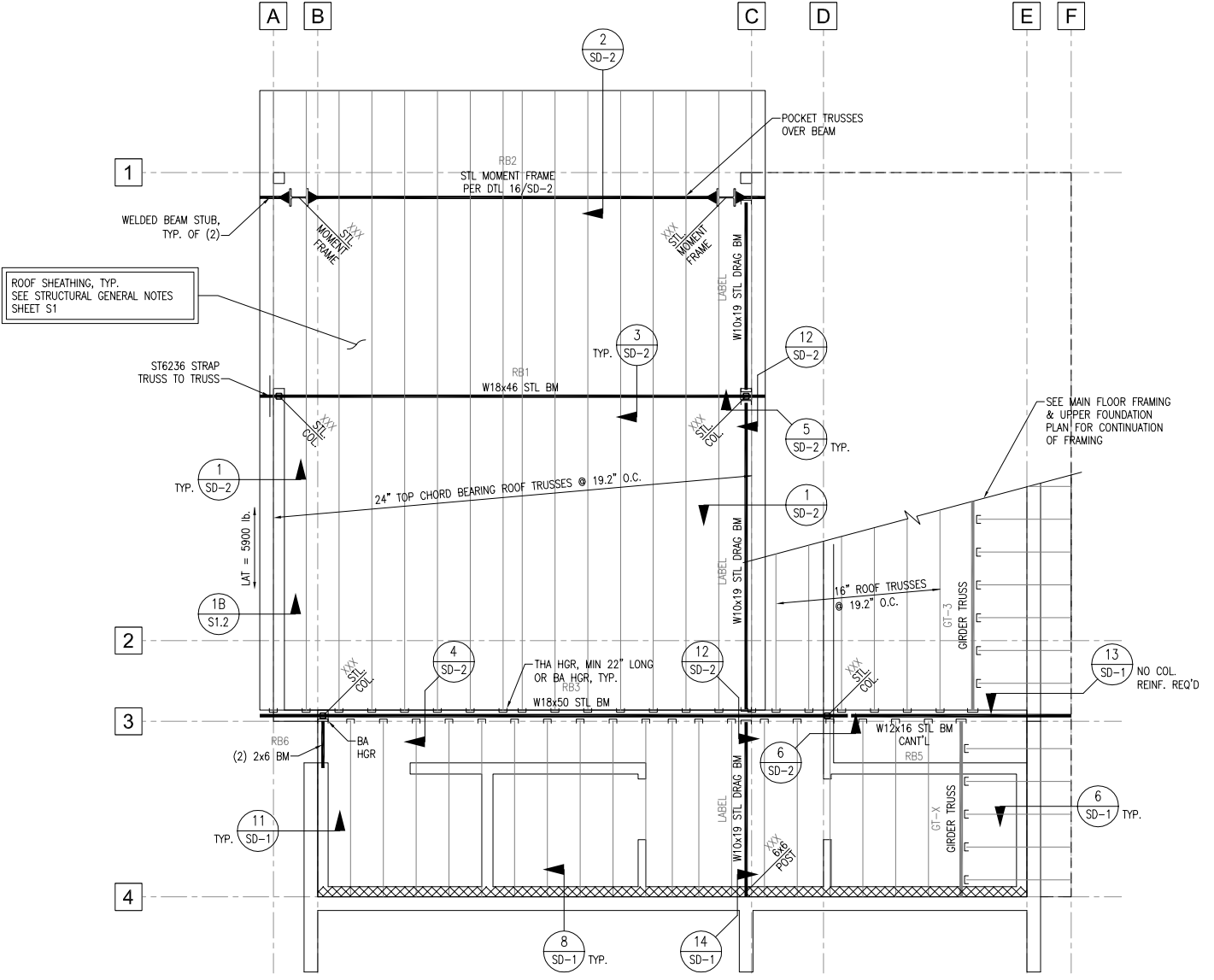
LOW FOUNDATION PLAN

1/8" = 1'-0"



MAIN FLOOR FRAMING & UPPER FOUNDATION PLAN

1/8" = 1'-0"



ROOF FRAMING PLAN

1/8" = 1'-0"



Snow Load - State of Utah Building Code Amendments - Utah Code 15A-3-107

| | | | | | | |
|-----------------|-------|------|----|----|-----|-------|
| County | Weber | A | Po | S | Ao | Pg |
| Site Elevation: | 8650 | 8.65 | 43 | 63 | 4.5 | 265.0 |

Ground Snow Load, Pg: psf

Exposure Factor, Ce:
 Thermal Factor, Ct:
 Importance Factor, I:

Flat Roof Snow Load, Pf: psf
 Seismic Snow Load: psf Per item (2)

Roof Slope Factor, Cs:

Sloped Roof Snow Load, Ps: psf

| TABLE NO. 1608.1.2(B) | | | | |
|---|---|-------------|------------------------|----------------------|
| REQUIRED SNOW LOADS FOR SELECTED UTAH CITIES AND TOWNS ^{1,2} | | | | |
| The following jurisdictions require design snow load values that differ from the equation | | | | |
| County | City | Elevation | Ground Snow Load (psf) | Roof Snow Load (psf) |
| Carbon | Price ³ | 5550 | 43 | 30 |
| | All other county locations ⁵ | -- | -- | -- |
| Davis | Fruit Heights ³ | 4500 - 4850 | 57 | 40 |
| Emery | Green River ³ | 4070 | 36 | 25 |
| Garfield | Panguitch ³ | 6600 | 43 | 30 |
| Rich | Woodruff ³ | 6315 | 57 | 40 |
| | Laketown ⁴ | 6000 | 57 | 40 |
| | Garden City ⁵ | -- | -- | -- |
| | Randolph ⁴ | 6300 | 57 | 40 |
| San Juan | Monticello ³ | 6820 | 50 | 35 |
| Summit | Coalville ³ | 5600 | 86 | 60 |
| | Kamas ⁴ | 6500 | 114 | 80 |
| Tooele | Tooele ³ | 5100 | 43 | 30 |
| Utah | Orem ³ | 4650 | 43 | 30 |
| | Pleasant Grove ⁴ | 5000 | 43 | 30 |
| | Provo ⁵ | -- | -- | -- |
| Wasatch | Heber ⁵ | -- | -- | -- |
| Washington | Leeds ³ | 3460 | 29 | 20 |
| | Santa Clara ³ | 2850 | 21 | 15 |
| | St. George ³ | 2750 | 21 | 15 |
| | All other county locations ⁵ | -- | -- | -- |
| Wayne | Loa ³ | 7080 | 43 | 30 |

1. The IBC requires a minimum live load - See 1607.11.2.
2. This table is informational only in that actual site elevations may vary. Table is only valid if site elevation is within 100 feet of the listed elevation. Otherwise, contact the local Building Official.
3. Values adopted from Table VII of the Utah Snow Load Study.
4. Values based on site-specific study. Contact local Building Official for additional information.
5. Contact local Building Official.
6. Based on Ce =1.0, Ct =1.0 and Is =1.0



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PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: GRAVITY LOADS

| | | Increase due to pitch | Original loading |
|--------------------------|------|-----------------------------|---------------------|
| ROOF | | | |
| ROOF PITCH/12 | | 3 | |
| MEMBRANE | | 1.55 | 1.03 |
| 19/32" PLYWOOD | | 1.96 | 1.03 |
| FRAMING | | 3.00 | |
| INSULATION | | 2.00 | |
| 1/2" GYPSUM CLG. | | 2.20 | |
| M, E & MISC | | 2.30 | |
| GREEN ROOF SYSTEM | | 30.00 | |
| | DL | 43.00 | |
| | LL | 20.00 | |
| | SNOW | 185.00 | |
| SNOW INCLUDED IN LATERAL | | 54.0 | |

2ND FLOOR (WHERE OCCURS)

| | | |
|---------------------------|----|-------|
| FLOOR COVERING W/GYPCRETE | | 17.00 |
| 3/4" T&G PLYWOOD | | 2.30 |
| MFG TRUSSES / FRAMING | | 2.00 |
| INSULATION | | 1.00 |
| 1/2" GYPSUM CEILING | | 2.20 |
| PARTITION | | 2.00 |
| M, E & MISC. | | 1.50 |
| OTHER | | 0.00 |
| | DL | 28.00 |
| | LL | 40.00 |

EXTERIOR WALLS

| | | |
|------------------------|----|-------|
| STUCCO/SIDING | | 3.50 |
| 2x6 FRAMING W/3 PLATES | | 1.30 |
| INSULATION | | 1.00 |
| 1/2" GYPSUM | | 2.20 |
| 1/2" PLYWOOD | | 1.50 |
| OTHER | | 0.50 |
| | DL | 10.00 |

OVERFILL

| | | |
|------------------|----|-------|
| ASPHALT SHINGLES | | 4.00 |
| 1/2" PLYWOOD | | 1.50 |
| RAFTERS & MISC | | 3.50 |
| OTHER | | 0.00 |
| | DL | 9.00 |
| | LL | 20.00 |

TYPICAL ROOF OVERBUILD MAX SPAN TABLE

| Grade | Size | Spacing (ft) | L _{max} (ft) |
|-------|------|-----------------|-----------------------|
| DFL#2 | 2X4 | 2 | 2.50 |
| DFL#2 | 2X6 | 2 | 3.40 |
| DFL#2 | 2X8 | 2 | 4.40 |
| DFL#2 | 2X10 | 2 | 5.80 |

| C _r | C _D | C _{F,V} | M _{allow} (ft-lb) | V _{allow} (lb) | Ctrl'g factor |
|----------------|----------------|------------------|-------------------------------|----------------------------|------------------|
| 1.15 | 1.00 | 1.50 | 385 | 382 | Moment |
| 1.15 | 1.00 | 1.30 | 824 | 601 | LL def |
| 1.15 | 1.00 | 1.20 | 1322 | 792 | LL def |
| 1.15 | 1.00 | 1.10 | 1973 | 1011 | Moment |



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PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: BEAMS

| DESIGN LOADS: | Load Types: | Snow ¹ s | Live | Dead |
|---------------|-------------|---------------------|------|------|
| | Roof | 185 | 20 | 48 |
| | Floor | | 40 | 32 |
| | Wall | | | 11 |

Add .2*S_{DS} to dead load? Yes 0.12712 =.2*S_{DS}

| CRITERIA (L) | D _{TL} | D _{LL} | D _{DL} |
|----------------------|-----------------|-----------------|-----------------|
| A _(BLANK) | 240 | 360 | |
| B | 240 | 480 | |
| C | 600 | | 800 |

| Abbrev | GRADES | F _{bxx} (psi) | F _{vxx} (psi) | E _{xx} (psi) | g (lb/ft ³) |
|-----------|----------------------------------|------------------------|------------------------|-----------------------|-------------------------|
| DFL#1 | DOUGLAS FIR LARCH #1 | 1,000 | 180 | 1700000 | 31.2 |
| DFL#2 | DOUGLAS FIR LARCH #2 | 875 | 180 | 1600000 | 31.2 |
| DF1 (5x) | Douglas Fir Larch #1 5x & Larger | 1,350 | 170 | 1700000 | 31.2 |
| 24F-V4 | Glue Laminated Timber 24F-V4 | 2,400 | 265 | 1800000 | 39.9 |
| 24F-V8 | Glue Laminated Timber 24F-V8 | 2,400 | 265 | 1800000 | 39.9 |
| LVL (1.9) | MICROLLAM LVL (1.9E) | 2,600 | 285 | 1900000 | 41.8 |
| LVL (2.0) | VERSA-LAM (2.0E) | 2,800 | 285 | 2000000 | 41.8 |
| LSL | TIMBERSTRAND LSL (1.3E) | 1,700 | 400 | 1300000 | 41.8 |
| PSL | PARALLAM PSL (2.0E) | 2,900 | 290 | 2000000 | 41.8 |
| STL36 | GRADE 36 STEEL | 21,600 | 14,400 | 29,000,000 | 490 |
| STL46 | GRADE 46 STEEL | 27,700 | 16,500 | 29,000,000 | 490 |
| STL50 | GRADE 50 STEEL | 30,000 | 20,000 | 29,000,000 | 490 |

| Label | Length 'L' (ft) | Roof Trib (ft) | Floor Trib (ft) | Wall Trib (ft) | Add'l Live Load (plf) | Add'l Dead Load (plf) | Point Load From | React (A/B) | Dist 'a' (ft) | Point Live Load 'P _{LL} ' (lb) | Point Dead Load 'P _{DL} ' (lb) | # PILES | Grade | Size | B _{M/H/DR} | D CRITERIA | C _r | C _D | C _{FV} | R _s (lb) | R _b (lb) | M _{max} (ft-lb) | M _{allow} (ft-lb) | V _{max} (lb) | V _{allow} (lb) | D _{TL} (in) | D _{TLallow} (in) | D _{LL} (in) (SEE COND 'C') | D _{LLallow} (in) (SEE COND 'C') | 1.5DL GLB Camb | Check | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|---------------------------|--------------------------------------|-----------------|----------------|-----------------------|-----------------------|-----------------|-------------|---------------|---|---|---------|-------|--------|---------------------|------------|----------------|----------------|-----------------|---------------------|---------------------|--------------------------|----------------------------|-----------------------|-------------------------|----------------------|---------------------------|-------------------------------------|--|----------------|-------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| RB1 | 22.33 | 13 | | | | | | | | | | | STL50 | W18x46 | B | | 1.00 | 1.00 | 1.00 | 34401 | 34401 | 192042 | 226750 | 29764 | 130320 | 0.835 | 1.117 | 0.652 | 0.744 | 0.88 D | | | | | | | | | | | | | | | | | | | | | |
| RB2 | 22.33 | 10.5 | | | | | | | | | | | STL50 | W10x88 | B | | 1.00 | 1.00 | 1.00 | 28353 | 28353 | 158280 | 282500 | 26059 | 130680 | 0.917 | 1.117 | 0.702 | 0.744 | 0.94 D | | | | | | | | | | | | | | | | | | | | | |
| RB3 | 24.5 | 12.3 | | | | | | | | | | | STL50 | W18x50 | B | | 1.00 | 1.00 | 1.00 | 35648 | 35648 | 218343 | 252500 | 31285 | 127800 | 1.017 | 1.225 | 0.792 | 0.817 | 0.97 D | | | | | | | | | | | | | | | | | | | | | |
| RB4 | Not Used | | | | | | | | | | | | | | | | 1.00 | #### | 1.00 | ##### | ##### | ##### | | | | ##### | ##### | ##### | | | | | | | | | | | | | | | | | | | | | | | |
| RB5 | 10 | 13 | | | | | | | 2 | | | | STL50 | W14x22 | B | | 1.00 | 1.00 | 1.00 | 14674 | 22011 | 35218 | 83000 | 12397 | 63020 | 0.108 | 0.500 | 0.009 | 0.333 | 0.42 M | | | | | | | | | | | | | | | | | | | | | |
| Cantilevered end conditions | | | | | | | | | | | | | | | | | | | | | | @ Support | -6114 | -83000 | @ end | -0.012 | 0.200 | 0.001 | 0.133 | | | | | | | | | | | | | | | | | | | | | | |
| RB5 | 10 | SEE ATTACHED FOR LOADING INFORMATION | | | | | | | | | | | STL50 | W14x22 | B | | 1.00 | 1.00 | 1.00 | 8282 | 8282 | 20704 | 83000 | 6385 | 63020 | 0.065 | 0.500 | 0.005 | 0.333 | 0.25 M | | | | | | | | | | | | | | | | | | | | | |
| RB6 | 2 | 2 | | | | | | | | | | (2) | DFL#2 | 2X6 | B | | 1.00 | 1.00 | 1.30 | 471 | 471 | 235 | 1434 | 255 | 1980 | 0.003 | 0.100 | 0.002 | 0.067 | 0.16 M | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FB1 | SEE ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | STL50 | W18x50 | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FB2 | SEE ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | STL50 | W18x35 | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FB3 | SEE ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | STL50 | W18x50 | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FB4 | SEE ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | STL50 | W18x35 | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FB5 | SEE ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | STL50 | W10x22 | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FB6 | 13.75 | 1 | | | | | | | | | | | STL50 | W10x17 | B | | 1.00 | 1.00 | 1.00 | 594 | 10856 | -1674 | 46750 | 7795 | 48480 | -0.048 | 0.688 | -0.095 | 0.458 | 0.68 D | | | | | | | | | | | | | | | | | | | | | |
| Cantilevered end conditions | | | | | | | | | | | | | | | | | | | | | | @ Support | -15510 | -46750 | @ end | 0.106 | 0.200 | 0.091 | 0.133 | | | | | | | | | | | | | | | | | | | | | | |
| FB7 | SEE ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | STL50 | W12x26 | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| FB8 | SEE ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | STL50 | W18x35 | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GT1 | 7.66 | 1 | | | | | | | 1.5 | 4126 | 1081 | | | | | | 1.00 | 1.00 | 1.00 | -160 | 7505 | -2171 | | | | | 0.383 | | 0.255 | | | | | | | | | | | | | | | | | | | | | | |
| Cantilevered end conditions | | | | | | | | | | | | | | | | | | | | | | @ Support | -8072 | | @ end | 0.150 | | 0.100 | | | | | | | | | | | | | | | | | | | | | | | |
| GT2 | 16 | 2.4 | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | 4483 | 4483 | 17931 | | | | | 0.800 | | 0.533 | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Deck Tru | 15.5 | 1.6 | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | 2895 | 2895 | 11218 | | | | | 0.775 | | 0.517 | | | | | | | | | | | | | | | | | | | | | | |
| Roof trus | 12 | 1.6 | | | | | | | | | | | | | | | 1.00 | 1.00 | 1.00 | 2241 | 2241 | 6724 | | | | | 0.600 | | 0.400 | | | | | | | | | | | | | | | | | | | | | | |



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PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: COLUMNS

NOTE: COLUMN CAPACITIES LISTED ARE INTENDED AS GENERAL REFERENCE ONLY AND MAY
 NOT CORRELATE WITH SPECIFIC CALL-OUTS ON PLANS.

| GRADES | c | COV _E | F _c (psi) | E _{xx} (psi) |
|----------------------------|-----|------------------|----------------------|-----------------------|
| DF1 (5x) Douglas Fir Larch | 0.8 | 0.25 | 1,000 | 1,700,000 |
| DFL#1 DOUGLAS FIR LARCH | 0.8 | 0.25 | 1,450 | 1,700,000 |
| DFL#2 DOUGLAS FIR LARCH | 0.8 | 0.25 | 1,300 | 1,600,000 |
| DFLSTUD Douglas Fir Larch | 0.8 | 0.25 | 825 | 1,400,000 |
| 24F-V4 | 0.9 | 0.10 | 1,650 | 1,800,000 |
| 24F-V8 | 0.9 | 0.10 | 1,650 | 1,800,000 |
| LSL | 0.9 | 0.10 | 1,400 | 1,300,000 |
| LVL (1.9) | 0.9 | 0.10 | 2,510 | 1,900,000 |
| PSL | 0.9 | 0.10 | 2,500 | 2,000,000 |
| LVL (2.0) | 0.9 | 0.10 | 2,510 | 2,000,000 |

| Effect Length strong dir 'l _z ' (ft) | Effect Length weak dir 'l _z ' (ft) | Grade | Size | C _m | C _D | C _F | l _z /d | l _z /b | l _d control | K _f | K _{CE} | F _{cE} (psi) | F _c * (psi) | c | C _P | Column Area 'A' (in ²) | F _c ' (psi) | Max allowable load 'P' (lb) | notes |
|---|---|----------|--------|----------------|----------------|----------------|-------------------|-------------------|------------------------|----------------|-----------------|-----------------------|------------------------|-----|----------------|------------------------------------|------------------------|-----------------------------|-------|
| 10 | 2 | DFLSTUD | (2)2X4 | 1.00 | 1.00 | 1.15 | 34.29 | 8.00 | 34.29 | 1 | 0.3 | 358 | 949 | 0.8 | 0.34 | 10.5 | 323.99 | 3,402 | |
| 10 | 2 | DFLSTUD | (3)2X4 | 1.00 | 1.00 | 1.15 | 34.29 | 5.33 | 34.29 | 1 | 0.3 | 358 | 949 | 0.8 | 0.34 | 15.75 | 323.99 | 5,103 | |
| 10 | 2 | DFLSTUD | (4)2X4 | 1.00 | 1.00 | 1.15 | 34.29 | 4.00 | 34.29 | 1 | 0.3 | 358 | 949 | 0.8 | 0.34 | 21 | 323.99 | 6,804 | |
| 10 | 2 | DFLSTUD | (5)2X4 | 1.00 | 1.00 | 1.15 | 34.29 | 3.20 | 34.29 | 1 | 0.3 | 358 | 949 | 0.8 | 0.34 | 26.25 | 323.99 | 8,505 | |
| 10 | 2 | DFLSTUD | (2)2X6 | 1.00 | 1.00 | 1.10 | 21.82 | 8.00 | 21.82 | 1 | 0.3 | 883 | 908 | 0.8 | 0.68 | 16.5 | 618.42 | 10,204 | |
| 10 | 2 | DFLSTUD | (3)2X6 | 1.00 | 1.00 | 1.10 | 21.82 | 5.33 | 21.82 | 1 | 0.3 | 883 | 908 | 0.8 | 0.68 | 24.75 | 618.42 | 15,306 | |
| 10 | 2 | DFLSTUD | (4)2X6 | 1.00 | 1.00 | 1.10 | 21.82 | 4.00 | 21.82 | 1 | 0.3 | 883 | 908 | 0.8 | 0.68 | 33 | 618.42 | 20,408 | |
| 10 | 2 | DFLSTUD | (5)2X6 | 1.00 | 1.00 | 1.10 | 21.82 | 3.20 | 21.82 | 1 | 0.3 | 883 | 908 | 0.8 | 0.68 | 41.25 | 618.42 | 25,510 | |
| 10 | 10 | DFL#2 | 4X4 | 1.00 | 1.00 | 1.15 | 34.29 | 34.29 | 34.29 | 1 | 0.3 | 409 | 1495 | 0.8 | 0.26 | 12.25 | 382.39 | 4,684 | |
| 10 | 10 | DFL#2 | 4X6 | 1.00 | 1.00 | 1.10 | 21.82 | 34.29 | 34.29 | 1 | 0.3 | 409 | 1430 | 0.8 | 0.27 | 19.25 | 381 | 7,334 | |
| 10 | 10 | DFL#2 | 4X8 | 1.00 | 1.00 | 1.05 | 16.55 | 34.29 | 34.29 | 1 | 0.3 | 409 | 1365 | 0.8 | 0.28 | 25.375 | 379.45 | 9,629 | |
| 10 | 10 | DFL#2 | 4X10 | 1.00 | 1.00 | 1.00 | 12.97 | 34.29 | 34.29 | 1 | 0.3 | 409 | 1300 | 0.8 | 0.29 | 32.375 | 377.73 | 12,229 | |
| 10 | 10 | DFL#2 | 4X12 | 1.00 | 1.00 | 1.00 | 10.67 | 34.29 | 34.29 | 1 | 0.3 | 409 | 1300 | 0.8 | 0.29 | 39.375 | 377.73 | 14,873 | |
| 10 | 10 | DF1 (5x) | 6X4 | 1.00 | 1.00 | 1.00 | 34.29 | 21.82 | 34.29 | 1 | 0.3 | 434 | 1000 | 0.8 | 0.39 | 19.25 | 385.76 | 7,426 | |
| 10 | 10 | DF1 (5x) | 6X6 | 1.00 | 1.00 | 1.00 | 21.82 | 21.82 | 21.82 | 1 | 0.3 | 1072 | 1000 | 0.8 | 0.71 | 30.25 | 714.54 | 21,615 | |
| 10 | 10 | DF1 (5x) | 6X8 | 1.00 | 1.00 | 1.00 | 16.00 | 21.82 | 21.82 | 1 | 0.3 | 1072 | 1000 | 0.8 | 0.71 | 41.25 | 714.54 | 29,475 | |
| 10 | 10 | DF1 (5x) | 6X10 | 1.00 | 1.00 | 1.00 | 12.63 | 21.82 | 21.82 | 1 | 0.3 | 1072 | 1000 | 0.8 | 0.71 | 52.25 | 714.54 | 37,335 | |
| 10 | 10 | DF1 (5x) | 6X12 | 1.00 | 1.00 | 1.00 | 10.43 | 21.82 | 21.82 | 1 | 0.3 | 1072 | 1000 | 0.8 | 0.71 | 63.25 | 714.54 | 45,194 | |



PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: STUDS & OTHER MEMBERS

DESIGN LOADS (psf)

| | Dead | Live | Snow |
|---------------|------|------|------|
| Roof | 43 | 20 | 185 |
| Floor | 28 | 40 | |
| Exterior Wall | 10 | | |
| Interior Wall | 8 | | |

LOADING PARAMETERS

| Label: | Typical Ext. |
|----------------------------------|--------------|
| Wind/Wall Tributary (ft) | 1.33 |
| Bending Axis | Strong |
| Roof Tributary 1 (ft) | 2 |
| Roof Tributary 2 (ft) | 1.33 |
| Floor Tributary 1 (ft) | |
| Floor Tributary 2 (ft) | 1.33 |
| Additional Dead Load (lbs) | |
| Additional Floor Live Load (lbs) | |
| Additional Roof Live Load (lbs) | |
| Additional Snow Load (lbs) | |
| Location for Wind Loading | C&C Zone 5 |
| Mean Roof Height (ft) | 20 |
| Axial Loads (lbs): | |
| Dead | 189 |
| Floor Live | 0 |
| Roof Live | 53 |
| Snow | 492 |
| Bending Load (plf): | |
| Wind | 51.0 |

MEMBER PROPERTIES

| | |
|--|---------|
| Strong-Axis Unbraced Length, l_1 (ft) | 11.25 |
| Weak-Axis Unbraced Length, l_2 (ft) | 1 |
| Compression Edge Unbraced Length, l_u (ft) | 1 |
| Grade | DFLSTUD |
| Size | 2x6 |
| Quantity of Members | 1 |

SPECIAL CONDITIONS

| | |
|----------------------------|------------------|
| Moisture Category | Normal |
| Temperature Category | $\leq 100^\circ$ |
| Incising? | No |
| Repetitive Member Category | Rep. (Special) |
| Finish Type | Brittle |

SECTION PROPERTIES

| | |
|---|-----------|
| Width, b (in) | 1.5 |
| Depth, d (in) | 5.5 |
| Moment of Inertia, I (in ⁴) | 20.796875 |
| Section Modulus, S (in ³) | 7.5625 |

DESIGN VALUES

| | |
|-------------------|---------|
| F_{bx} (psi) | 675 |
| F_{by} (psi) | 675 |
| F_c (psi) | 825 |
| E_{xx} (psi) | 1400000 |
| E_{yy} (psi) | 1400000 |
| E_{minxx} (psi) | 510000 |
| E_{minyy} (psi) | 510000 |

RESULTS

| | |
|-----------------------------|------------|
| D+L | 4% |
| D+Lr | 5% |
| D+S | 15% |
| D+0.75L+0.75Lr | 5% |
| D+0.75L+0.75S | 12% |
| D+0.6W | 55% |
| D+0.75L+0.42W+0.75Lr | 39% |
| D+0.75L+0.42W+0.75S | 42% |
| Deflection Limit (L/) | 240 |
| Deflection (L/) | 688 |
| Column Slenderness, l_e/d | 24.5 |
| Beam Slenderness, R_B | 7.8 |
| Unity Check | 55% |



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PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: FOOTINGS AND FOUNDATIONS

FOUNDATION WALLS

$$Mu = 1.7M_{max}$$

$$a = \frac{A_s F_y}{.85 f'_c} = 2.3529 A_s$$

$$\Phi M_n = \Phi A_s f_y \left[d - \frac{a}{2} \right]$$

| | | | |
|-----|--|-------|-----|
| EFP | | 35 | psf |
| f'c | | 2500 | psi |
| f_y | | 60000 | psi |

Note: bars are assumed to be located in center of wall.

VERTICAL REINFORCEMENT

| Wall Height (ft) | Backfill Height 'H' (ft) | Top React 'w' (plf) | M _{max} (ft lb) | M _u (in k) | Bar Size | Spacing (in) | Wall "t" (in) | d (in) | A _s (in ² /ft) | a (in) | ΦM _n (in k) |
|------------------|--------------------------|---------------------|--------------------------|-----------------------|----------|--------------|---------------|--------|--------------------------------------|--------|------------------------|
| 8 | 7 | 250.1 | 880.4 | 18.0 | 4 | 24 | 8 | 4 | 0.10 | 0.23 | 20.6 |
| 9 | 8 | 331.9 | 1295.3 | 26.4 | 4 | 18 | 8 | 4 | 0.13 | 0.31 | 27.2 |
| 10 | 7 | 200.1 | 1051.3 | 21.4 | 4 | 12 | 8 | 4 | 0.20 | 0.46 | 40.0 |
| 11 | 10 | 530.3 | 2476.4 | 50.5 | 5 | 12 | 8 | 4 | 0.31 | 0.72 | 60.3 |
| 12 | 11 | 647.0 | 3269.8 | 66.7 | 5 | 9 | 8 | 4 | 0.41 | 0.96 | 77.7 |

FOOTINGS

Assumed Soil Bearing Pressure

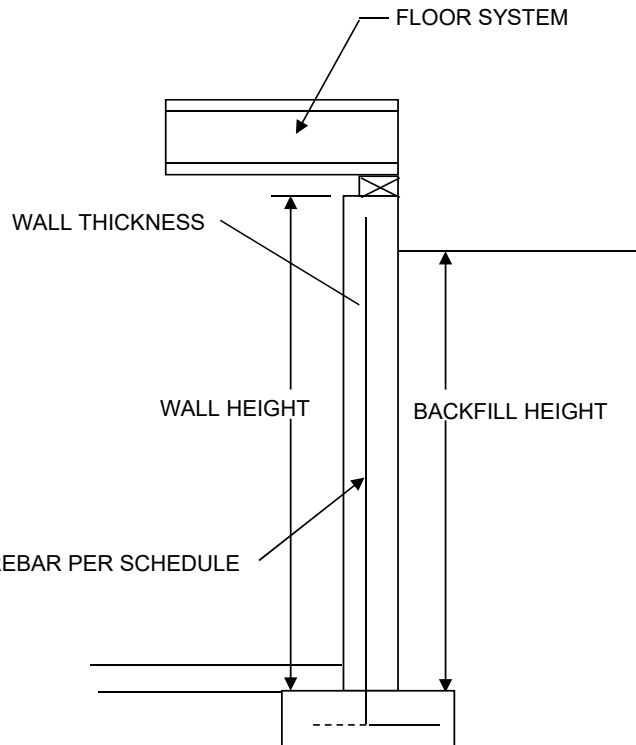
q = 1500 psf

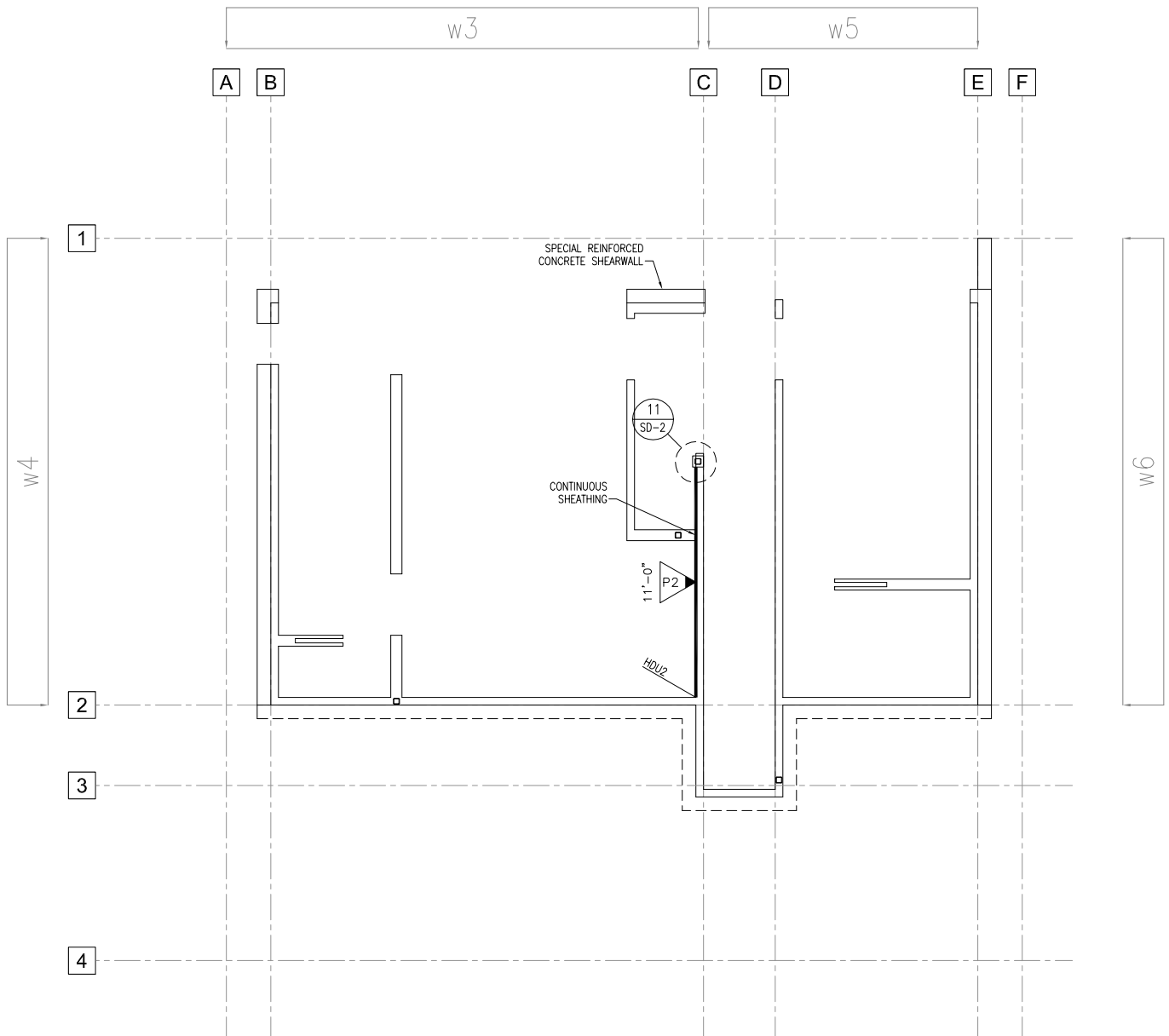
Continuous Footings:

| Title | Width (in) | Depth (in) | Loads (plf) | #4 Bars |
|-------|------------|------------|-------------|---------|
| CF1.5 | 18 | 10 | 2250 | 2 |
| CF1.8 | 20 | 10 | 2500 | 2 |
| CF2.0 | 24 | 12 | 3000 | 3 |
| CF2.5 | 30 | 12 | 3750 | 4 |
| CF3.0 | 36 | 12 | 4500 | 4 |
| CF3.5 | 42 | 12 | 5250 | 5 |
| CF4.0 | 48 | 12 | 6000 | 6 |
| CF4.5 | 54 | 12 | 6750 | 6 |
| CF5.0 | 60 | 12 | 7500 | 7 |

Spread Footings

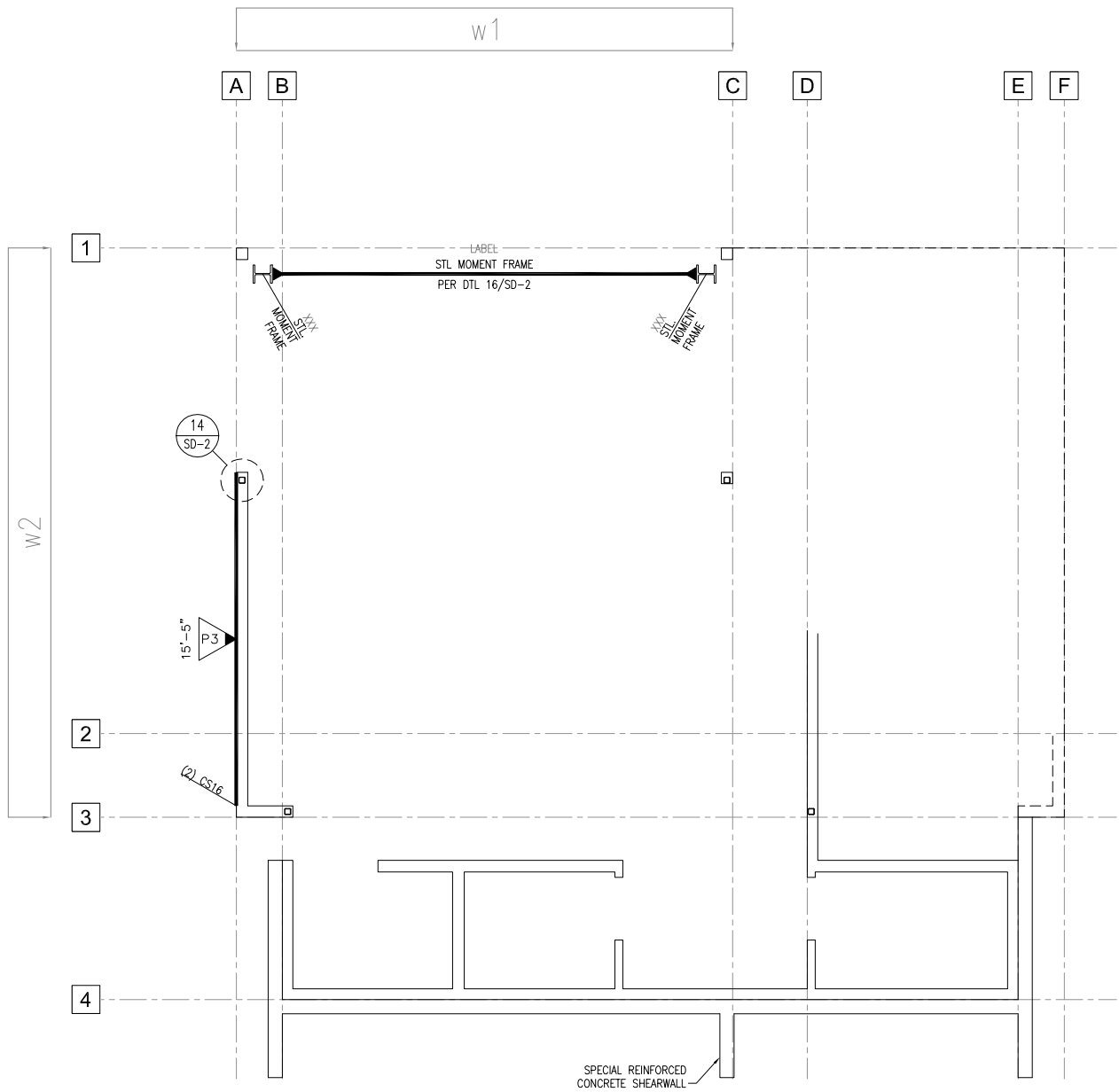
| Title | Width (in) | Depth (in) | Loads (lb) | #4 Bars |
|-------|------------|------------|------------|---------|
| F1.5 | 18 | 12 | 3375 | 2 |
| F2.0 | 24 | 12 | 6000 | 3 |
| F2.5 | 30 | 12 | 9375 | 4 |
| F3.0 | 36 | 12 | 13500 | 4 |
| F3.5 | 42 | 12 | 18375 | 5 |
| F4.0 | 48 | 12 | 24000 | 6 |
| F4.5 | 54 | 12 | 30375 | 6 |
| F5.0 | 60 | 12 | 37500 | 7 |
| F5.5 | 66 | 12 | 45375 | 8 |
| F6.0 | 72 | 12 | 54000 | 8 |
| F6.5 | 78 | 12 | 63375 | 9 |
| F7.0 | 84 | 12 | 73500 | 10 |





LOWER LEVEL SHEAR WALL PLAN

N.T.S.



UPPER LEVEL SHEAR WALL PLAN

N.T.S.



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PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: LATERAL LOADS

DESIGN OF ENCLOSED SIMPLE DIAPHRAGM LOW-RISE BUILDINGS FOR LATERAL LOADS

Seismic Parameters (ASCE 7-10 Chapters 11, 12, & 22)

| | | | | | |
|-------------------|-------|-----------|-----------------------|-------|-------------|
| Site Class: | D | S. 11.4.2 | N = | 2 | S. 12.8.2.1 |
| R = | 6.5 | T. 12.2-1 | C _t = | 0.02 | T. 12.8-2 |
| S _s = | 0.811 | F. 22-1 | h _n (ft) = | 25 | S. 12.8.2.1 |
| S ₁ = | 0.269 | F. 22-2 | x = | 0.75 | T. 12.8-2 |
| F _a = | 1.18 | T. 11.4-1 | T _a = | 0.22 | E. 12.8-7 |
| F _v = | 1.86 | T. 11.4-2 | T ₀ = | 0.11 | S. 11.4.5 |
| S _{MS} = | 0.95 | E. 11.4-1 | T _S = | 0.53 | S. 11.4.5 |
| S _{M1} = | 0.50 | E. 11.4-2 | C _U = | 1.40 | T. 12.8-1 |
| S _{DS} = | 0.636 | E. 11.4-3 | T _L = | 8 | F. 22-12 |
| S _{DI} = | 0.334 | E. 11.4-4 | S _a = | 0.636 | S. 11.4.5 |

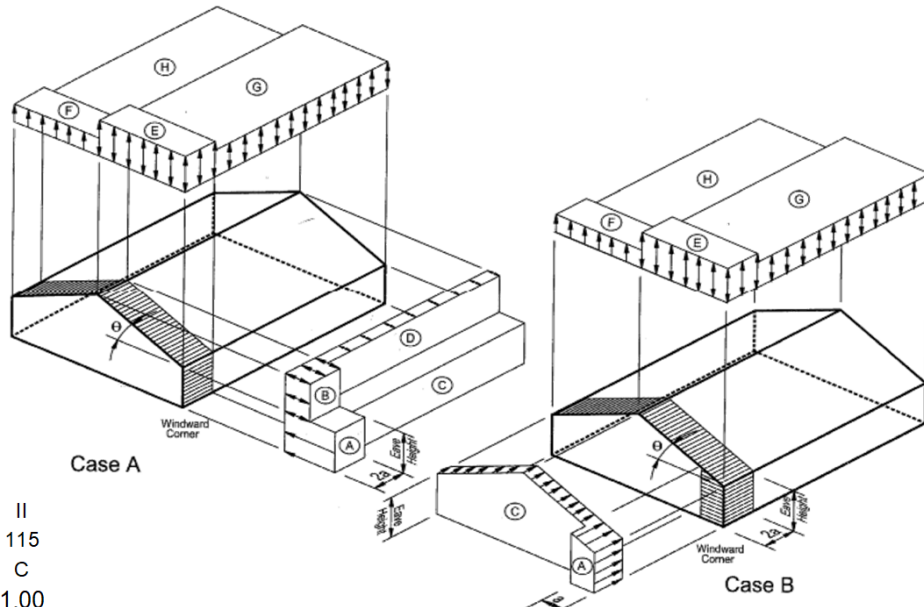
Determination of SDC:

| | |
|-----------------------------|-------------------|
| Per Table 11.6-1: | D |
| Per Table 11.6-2: | D |
| SDC: | D S. 11.6 |
| I _E = | 1.00 T. 1.5-2 |
| C _{SMAX} = | 0.230 E. 12.8-3,4 |
| C _S = | 0.098 E. 12.8-2 |
| C _{SMIN} = | 0.028 E. 12.8-5,6 |
| C _{SCONTROL} = | 0.098 S. 12.8.1.1 |
| C _{SCONTROL} *.7 = | 0.068 S. 2.4.1 |

Seismic Analysis Req'd? Yes IBC 1613.1
 Perform Seismic Analysis? Yes

Wind Parameters (ASCE 7-10 Chapter 28)

Wind areas labeled C and D are used for calculating line loads on the following sheet.



Risk Category: II
 Basic Wind Speed (mph): 115
 Exposure Category: C
 K_{zt}: 1.00

MAIN WIND FORCE RESISTING SYSTEM - METHOD 2 FIGURE 28.6-1
SIMPLIFIED DESIGN WIND PRESSURE, P_{s30} (psf) (Exposure B at h=30 feet)

| BASIC WIND SPEED (mph) | ROOF ANGLE (degrees) | LOAD CASE | Note: Wind load determined from pressures below will be multiplied by 0.6 (ASD load factor on wind loads) | | | | | | | | | |
|------------------------|----------------------|-----------|---|-------|------|------|--------------------|-------|-------|-------|-----------------|-----------------|
| | | | HORIZONTAL PRESSURES | | | | VERTICAL PRESSURES | | | | OVERHANGS | |
| | | | A | B | C | D | E | F | G | H | E _{OH} | G _{OH} |
| 115 | 0 to 5° | 1 | 21.0 | -10.9 | 13.9 | -6.4 | -25.2 | -14.3 | -17.5 | -11.0 | -35.3 | -27.7 |
| | 10° | 1 | 23.6 | -9.8 | 15.7 | -5.7 | -25.2 | -15.4 | -17.5 | -11.8 | -35.3 | -27.7 |
| | 15° | 1 | 26.3 | -8.7 | 17.5 | -5.0 | -25.2 | -16.5 | -17.5 | -12.6 | -35.3 | -27.7 |
| | 20° | 1 | 29.1 | -7.7 | 19.3 | -4.3 | -25.2 | -17.5 | -17.5 | -13.3 | -35.3 | -27.7 |
| | 25° | 1 | 26.3 | 4.3 | 19.0 | 4.4 | -11.7 | -16.0 | -8.4 | -12.8 | -21.8 | -18.6 |
| | | 2 | | | | | -4.5 | -8.6 | -1.2 | -5.6 | | |
| 30° to 45° | 1 | 23.6 | 16.2 | 18.8 | 12.9 | 1.9 | -14.3 | 0.7 | -12.4 | -8.3 | -9.5 | |
| | 2 | 23.6 | 16.2 | 18.8 | 12.9 | 9.1 | -7.1 | 7.9 | -5.0 | -8.3 | -9.5 | |



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PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: LINE LOADS

Level Descriptions

| Label | Height (ft) | W _{control} (lb) | V _{norm} (lb) | V _{redist} (lb) | Redist Fact |
|-------------|-------------|---------------------------|------------------------|--------------------------|-------------|
| Roof | 25 | 100414 | 9819 | 12843 | 1.31 |
| Upper Floor | 10 | 64842 | 6341 | 3317 | 0.52 |
| | | 0 | 0 | 0 | 1.00 |
| | | 0 | 0 | 0 | 1.00 |

k = 1
 $\sum w_i h_i^k = 3158773$

| | | |
|--------------|------|-----|
| Roof DL | 43 | psf |
| Seismic Snow | 54 | psf |
| Floor DL | 28 | psf |
| Wall DL | 10 | psf |
| Period, T | 0.22 | sec |

Total Weight (lb) 165256 Estimated Total Weight in Longitudinal Direction 165256
 Total Base Shear (lb) 16160 Estimated Total Weight in Transverse Direction 165256
 Percent difference in estimated weights 0.0%

Seismic Line Loads

| Label | Width | Level | Direction | Number of times to include | Roof Trib (ft) | Floor Trib (ft) | Wall Trib Height (ft) | Ext Wall Length (ft) | Other Weight (lb/ft) | Total Weight (lb/ft) | Total Force (lb/ft) | Redist Factor | Revised Force (lb/ft) | Force Redist to 1 |
|-------|-------|-------------|-----------|----------------------------|----------------|-----------------|-----------------------|----------------------|----------------------|----------------------|---------------------|---------------|-----------------------|-------------------|
| ω1 | 24.7 | Roof | LONG | 1 | 40 | | 4.5 | 105 | | 4072 | 398 | 1.31 | 521 | NO |
| ω2 | 40 | Roof | TRANS | 1 | 24.7 | | 4.5 | 105 | | 2510 | 245 | 1.31 | 321 | NO |
| ω3 | 23.3 | Upper Floor | LONG | 1 | | 23.5 | 11 | 93.6 | | 1100 | 108 | 0.52 | 56 | NO |
| ω4 | 23.5 | Upper Floor | TRANS | 1 | | 23.3 | 11 | 93.6 | | 1091 | 107 | 0.52 | 56 | NO |
| ω5 | 16 | Upper Floor | LONG | 1 | 23 | | 4.5 | 78 | | 2451 | 240 | 0.52 | 125 | NO |
| ω6 | 23 | Upper Floor | TRANS | 1 | 16 | | 4.5 | 78 | | 1705 | 167 | 0.52 | 87 | NO |
| ω7 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω8 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω9 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω10 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω11 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω12 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω13 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω14 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω15 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω16 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω17 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω18 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω19 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |
| ω20 | | | | 1 | | | | 0 | | 0 | 0 | 1.00 | 0 | NO |

Wind Line Loads

Surface type 'C' is flat wall and 'D' is sloped roof, 'CP1' and 'CP2' represent parapets on only one side and both sides of the structure, respectively

| Label | Roof Pitch /12 | Mean Roof Height (ft) | Surface Type 1 | Equiv Height Exposed (ft) | Surface Type 2 | Equiv Height Exposed (ft) | Roof Angle (°) | Applied Interior Press 1 (psf) | Applied Interior Press 2 (psf) | Applied End Zone Press 1 (psf) | Applied End Zone Press 2 (psf) | Height & Exp Coeff, λ | Total Int Unif Load (plf) | Total End Zone Unif Load (plf) |
|-------|----------------|-----------------------|----------------|---------------------------|----------------|---------------------------|----------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|-----------------------|---------------------------|--------------------------------|
| ω1 | 3 | 25 | C | 8.5 | | | 14.0 | 23.16 | 0.00 | 34.83 | 0.00 | 1.35 | 196.83 | 296.04 |
| ω2 | 3 | 25 | C | 5.3 | | | 14.0 | 23.16 | 0.00 | 34.83 | 0.00 | 1.35 | 121.57 | 182.85 |
| ω3 | 3 | 25 | C | 15 | | | 14.0 | 23.16 | 0.00 | 34.83 | 0.00 | 1.35 | 347.35 | 522.43 |
| ω4 | 3 | 25 | C | 10.5 | | | 14.0 | 23.16 | 0.00 | 34.83 | 0.00 | 1.35 | 242.41 | 364.59 |
| ω5 | 3 | 15 | C | 6.75 | D | 2.5 | 14.0 | 20.76 | 0.00 | 31.22 | 0.00 | 1.21 | 140.10 | 210.71 |
| ω6 | 3 | 15 | C | 10.5 | | | 14.0 | 20.76 | 0.00 | 31.22 | 0.00 | 1.21 | 217.93 | 327.77 |
| ω7 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω8 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω9 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω10 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω11 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω12 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω13 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω14 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω15 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω16 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω17 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω18 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω19 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |
| ω20 | | | | | | | 0.0 | 0.00 | 0.00 | 0.00 | 0.00 | | 0.00 | 0.00 |



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PROJECT: PROJECT NAME

JOB NO.: UZ7

SUBJECT: SHEAR WALL SHEET EXPLANATION

Global p value applied

Calculated p values and controlling locations

$P_{Applied} = 1$
 Min Diaphragm Width (ft) = 20
 Allowable Seismic Aspect Ratio = 3.5
 Allowable Wind Aspect Ratio = 3.5
 Comb. Overstrength Factors: $(0-0.5)/1.2 = 2.08$

| p | Loc |
|------|-------|
| 1.00 | A-1ST |
| 1.00 | A-2ND |

Roof DL (psf) = 44
 Floor DL (psf) = 12
 Section 12.3.4.1

(includes seismic snow where occurs)

PERF/ FTAO wall calcs where applicable

| LINE: A 2ND STORY | | | | | | | | | | | | | | | | |
|-------------------|-------------|------------|-----------|------------------|------|----------|------------|---|--------|-------|-----------|-----------------------|-------------|---------------------|------------------------|------------------|
| Line Loads (plf) | | | | Loads from above | | | | Actual Applied Loads (plf unless noted otherwise) | | | | Diaphragm Shear (plf) | | Perf/FTAO Wall Info | | |
| Load | Trib w (ft) | E.Z. Appl* | Span (ft) | Line | % | Location | Seis (lbs) | Wind (lbs) | p*Seis | Wind | E.Z. Wind | 2a (ft) | E.Z. P (lb) | Drag (ft) | Seis (Load vs. Allow.) | (Not Applicable) |
| ω | 10 | Major | 20 | | 1.00 | Offset | | | 91.6 | 113.0 | 145.5 | 6 | 166 | 8 | 114 | 166 |
| | | None | | | 1.00 | Offset | | | | | | | | | | |
| | | | | | 1.00 | Above | 916 | 1296 | | | | | | | 162 | 232 |
| Total | | | | | | | | | | 916 | 1296 | | | | | |

Plate h (ft) = 10
 Max opening height (ft) = 10
 Apply 2w/l reduction? Yes
 Opening elevation = 2

100% Perforated SW? No
 Force Transfer @ Openings? No

Shear Length (ft) = 8
 Wall DL (psf) = 10

Story V (K) = 1831
 Max allow. drift (in) = 3

Include Ω for irregularities (above):

Diaphragm shear calculations

Wind (Load vs. Allow.)
 162 232

Total seismic shear applied at level, for calculating p

| Shear-Wall Length (ft) | Roof _{DL} w' (ft) | Floor _{DL} w' (ft) | Other _{DL} w' w' (plf) | Tension From Above (lb) | Selection of wall type, 'No' for both means a segmented wall | Hold-down Strap | HD Capacity (Stem w'-edge dist) | OTM (wind, seismic) (ft-lb) | .6*RM (ft-lb) | Aspect Ratio | 2w/l Reduct. | Seis. Shear (plf) | Seis. Wall Cap. (plf) | Wind Shear (plf) | Wind Wall Cap. (plf) | Sill Plate Cap. (plf) | Tension (lb) | HD Capacity | Max Shear-Wall Δ (in) |
|------------------------|----------------------------|-----------------------------|---------------------------------|-------------------------|--|-----------------|---------------------------------|-----------------------------|---------------|--------------|--------------|-------------------|-----------------------|------------------|----------------------|-----------------------|--------------|-------------|-----------------------|
| 3 | 2 | | | | P1 | S1 | CS16 | 4859 | 351 | 3.33 | 0.60 | 114 | 156 | 162 | 365 | 372 | 1502 | 1705 | 0.19 |
| 5 | 2 | | | | P1 | S1 | CS16 | 8098 | 976 | 2.00 | 1.00 | 114 | 260 | 162 | 365 | 372 | 1424 | 1705 | 0.18 |

Type of wind zone reaction, see below

Information on individual wall piers

Applied unit shears and unit shear capacities (reduced where appropriate)

Add'l Comments: Max: 0.19

| LINE: A 1ST STORY | | | | | | | | | | | | | | | | |
|-------------------|-------------|------------|-----------|------------------|------|----------|------------|---|--------|-------|-----------|---------------------|------------------------|-------------|----------|--------------|
| Line Loads (plf) | | | | Loads from above | | | | Actual Applied Loads (plf unless noted otherwise) | | | | Perf/FTAO Wall Info | | Rdl (ft) | | |
| Load | Trib w (ft) | E.Z. Appl* | Span (ft) | Line | % | Location | Seis (lbs) | Wind (lbs) | p*Seis | Wind | E.Z. Wind | 2a (ft) | Seis (Load vs. Allow.) | Ltotal (ft) | DL (plf) | Opening (ft) |
| ω | 10 | Major | 20 | | 1.00 | Offset | | | 99.9 | 100.9 | 152.5 | 6 | 198 | 12 | 160 | 4 |
| | | None | | | 1.00 | Offset | | | | | | | | | | |
| | | | | | 1.00 | A-2ND | 916 | 1296 | | | | | | | | |
| Total | | | | | | | | | | 916 | 1296 | | | | | |

Plate h (ft) = 10
 Max opening height (ft) = 4
 Apply 2w/l reduction? Yes
 Opening elevation = 2

50% Perforated SW? No
 Force Transfer @ Openings? Yes

Shear Length (ft) = 8
 Wall DL (psf) = 10

Story V (K) = 383
 Max allow. drift (in) = 3

Include Ω for irregularities (above):

Perforated or FTAO calculations

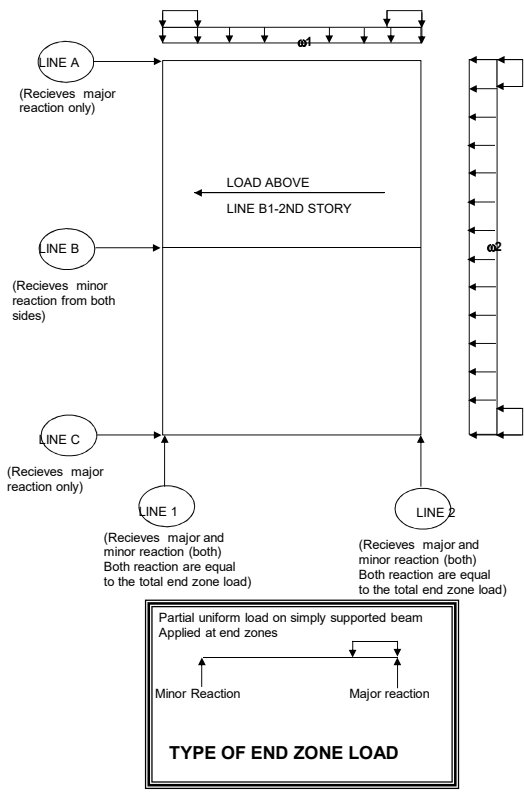
Co factor when applicable

Hold down information for global wall overturning

Seis (plf) 367
 Cap (plf) 380
 Wind (plf) 442
 Cap (plf) 520
 Strap (lb) 884

| Shear-Wall Length (ft) | Roof _{DL} w' (ft) | Floor _{DL} w' (ft) | Other _{DL} w' w' (plf) | Tension From Above (lb) | Required only for FTAO method | HD Capacity (Stem w'-edge dist) | OTM (wind, seismic) (ft-lb) | .6*RM (ft-lb) | Aspect Ratio | 2w/l Reduct. | Seis. Shear (plf) | Seis. Wall Cap. (plf) | Wind Shear (plf) | Wind Wall Cap. (plf) | Sill Plate Cap. (plf) | Tension (lb) | Maximum unit shear and strap forces calculated by Diekmann method for FTAO walls |
|------------------------|----------------------------|-----------------------------|---------------------------------|-------------------------|---|---------------------------------|-----------------------------|---------------|--------------|--------------|-------------------|-----------------------|------------------|----------------------|-----------------------|--------------|--|
| 3 | | | | | PERF/FTAO SHEAR-WALL CALCULATIONS APPLY - SEE ABOVE | | | | | | | | | | | | |
| 5 | | | | | PERF/FTAO SHEAR-WALL CALCULATIONS APPLY - SEE ABOVE | | | | | | | | | | | | |

Add'l Comments: Max: 0.00





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PROJECT: Ridge Nest 14

JOB NO.: U2784-001-181

SUBJECT: SHEAR WALLS

| $P_{Applied} = 1$ Min Diaphragm Width (ft) = 16 Allowable Seismic Aspect Ratio = 3.5 Allowable Wind Aspect Ratio = 3.5 Comb. Overstrength Factors: $(\Omega-0.5)/1.2 = 2.08$ | <table border="1"> <tr> <th>P_i</th> <th>Loc</th> </tr> <tr> <td>1.00</td> <td>1-2-1ST</td> </tr> <tr> <td>1.00</td> <td>1-2ND</td> </tr> </table> | P _i | Loc | 1.00 | 1-2-1ST | 1.00 | 1-2ND | Roof DL (psf) = 97 Floor DL (psf) = 28 (includes seismic snow where occurs) |
|--|--|----------------|-----|------|---------|------|-------|---|
| P _i | Loc | | | | | | | |
| 1.00 | 1-2-1ST | | | | | | | |
| 1.00 | 1-2ND | | | | | | | |
| p calculated in accordance with ASCE7-10 Section 12.3.4.1 No Exception in ASCE 7 12.3.4.2b met? | | | | | | | | |

| LINE: 1 2ND STORY | | | | | | | | | | | | | | | | | | |
|--|-------------|------------|-----------|---|------|----------|------------|---|--------|------|-----------|-----------------------|-------------|---------------------|------------------------|------------------|--|--|
| Line Loads (plf) | | | | Loads from above | | | | Actual Applied Loads (plf unless noted otherwise) | | | | Diaphragm Shear (plf) | | Perf/FTAO Wall Info | | | | |
| Load | Trib w (ft) | E.Z. Appl* | Span (ft) | Line | % | Location | Seis (lbs) | Wind (lbs) | p*Seis | Wind | E.Z. Wind | 2a (ft) | E.Z. P (lb) | Drag (ft) | Seis (Load vs. Allow.) | (Not Applicable) | | |
| ω2 | 21.5 | Major | 43 | | 1.00 | Offset | | | 321.1 | 72.9 | 109.7 | 8.6 | 285 | 23 | 300 | 294 | | |
| | | None | | | 1.00 | Offset | | | | | | | | | | | | |
| | | | | | 1.00 | Above | | | | | | | | | | | | |
| | | | | | | | Total | 5609 | 3088 | | | | | | | | | |
| Plate h (ft) = | | | | Include Ω for irregularities (above)? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| Max opening height (ft) = | | | | Wind (Load vs. Allow.) | | | | | | | | | | | | | | |
| Apply aspect ratio reduction? <input type="checkbox"/> | | | | 81 412 | | | | | | | | | | | | | | |
| Opening elevation = | | | | Story V (K) = 12843 | | | | | | | | | | | | | | |
| | | | | Max allow. drift (in) = | | | | | | | | | | | | | | |
| | | | | Shear Length (ft) = | | | | | | | | | | | | | | |
| | | | | Wall DL (psf) = 10 | | | | | | | | | | | | | | |
| | | | | Perforated SW? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| | | | | Force Transfer @ Openings? <input type="checkbox"/> No | | | | | | | | | | | | | | |

| Shear-Wall Length (ft) | Roof _{DL} 'w' (ft) | Floor _{DL} 'w' (ft) | Other _{DL} 'w' (plf) | Tension From Above (lb) | Wall Type | Sill Type | Holdown Strap | HD Capacity (Stem 'w'-edge dist) | OTM (wind, seismic) (ft-lb) | 6*RM (ft-lb) | Aspect Ratio | Aspect Ratio Reduc. | Seis. Shear (plf) | Seis. Wall Cap. (plf) | Wind Shear (plf) | Wind Wall Cap. (plf) | Sill Plate Cap. (plf) | Tension (lb) | HD Capacity | Max Shear-Wall δ (in) |
|--|-----------------------------|------------------------------|-------------------------------|-------------------------|-----------|-----------|---------------|----------------------------------|-----------------------------|--------------|--------------|---------------------|-------------------|-----------------------|------------------|----------------------|-----------------------|--------------|-------------|-----------------------|
| SPECIAL MOMENT FRAME PER ATTACHED CALCULATIONS | | | | | | | | | | | | | | | | | | | | |
| Add'l Comments: | | | | | | | | | | | | | | | | | | | | |

| LINE: A 2ND STORY | | | | | | | | | | | | | | | | | | |
|--|-------------|------------|-----------|---|------|----------|------------|---|--------|-------|-----------|-----------------------|-------------|---------------------|------------------------|------------------|--|--|
| Line Loads (plf) | | | | Loads from above | | | | Actual Applied Loads (plf unless noted otherwise) | | | | Diaphragm Shear (plf) | | Perf/FTAO Wall Info | | | | |
| Load | Trib w (ft) | E.Z. Appl* | Span (ft) | Line | % | Location | Seis (lbs) | Wind (lbs) | p*Seis | Wind | E.Z. Wind | 2a (ft) | E.Z. P (lb) | Drag (ft) | Seis (Load vs. Allow.) | (Not Applicable) | | |
| ω1 | 12.33 | Major | 24.66 | | 1.00 | Offset | | | 364.5 | 118.1 | 177.6 | 6 | 314 | 26 | 173 | 294 | | |
| | | None | | | 1.00 | Offset | | | | | | | | | | | | |
| | | | | | 1.00 | Above | | | | | | | | | | | | |
| | | | | | | | Total | 4495 | 1770 | | | | | | | | | |
| Plate h (ft) = 10 | | | | Include Ω for irregularities (above)? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| Max opening height (ft) = 10 | | | | Wind (Load vs. Allow.) | | | | | | | | | | | | | | |
| Apply aspect ratio reduction? <input type="checkbox"/> Yes | | | | 68 412 | | | | | | | | | | | | | | |
| Opening elevation = | | | | Story V (K) = 12843 | | | | | | | | | | | | | | |
| | | | | Max allow. drift (in) = 3 | | | | | | | | | | | | | | |
| | | | | Shear Length (ft) = 15.5 | | | | | | | | | | | | | | |
| | | | | Wall DL (psf) = 10 | | | | | | | | | | | | | | |
| | | | | Perforated SW? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| | | | | Force Transfer @ Openings? <input type="checkbox"/> No | | | | | | | | | | | | | | |

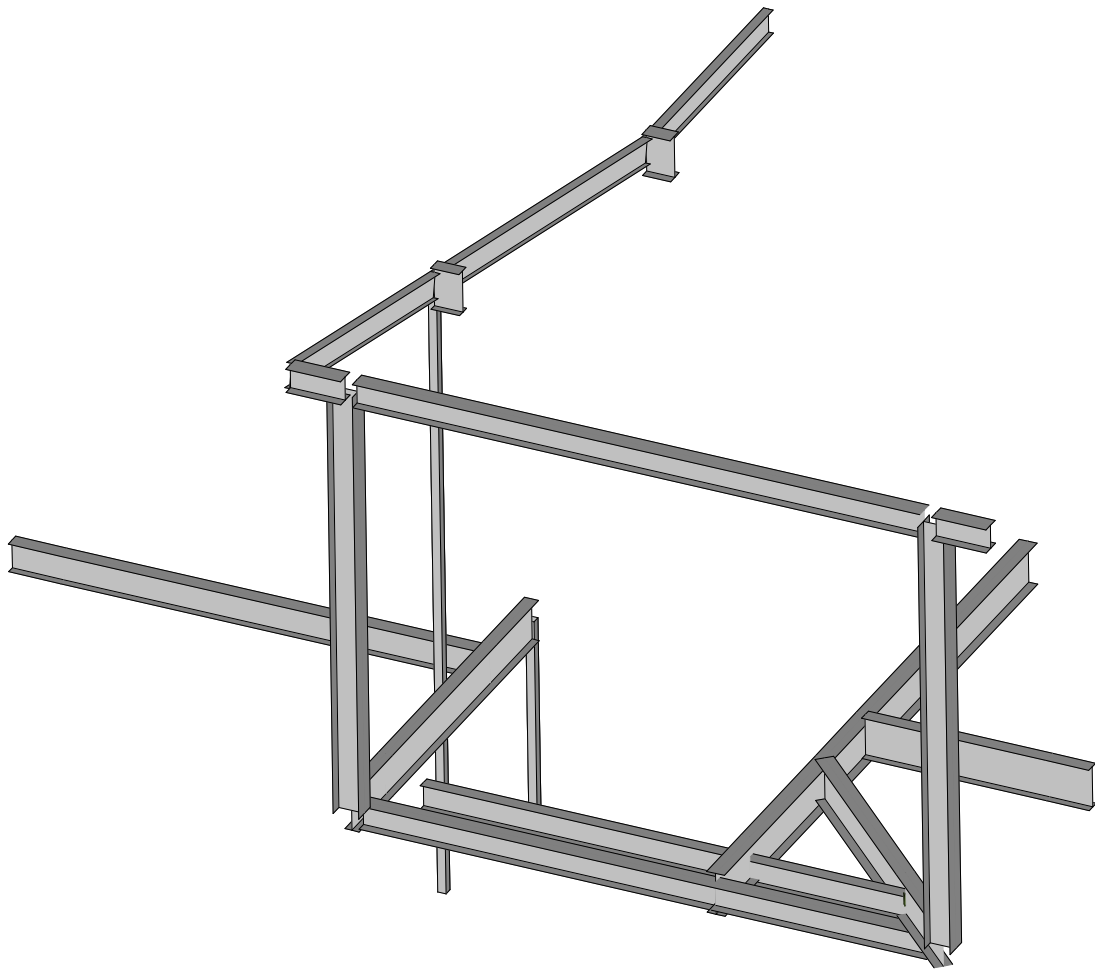
| Shear-Wall Length (ft) | Roof _{DL} 'w' (ft) | Floor _{DL} 'w' (ft) | Other _{DL} 'w' (plf) | Tension From Above (lb) | Wall Type | Sill Type | Holdown Strap | HD Capacity (Stem 'w'-edge dist) | OTM (wind, seismic) (ft-lb) | 6*RM (ft-lb) | Aspect Ratio | Aspect Ratio Reduc. | Seis. Shear (plf) | Seis. Wall Cap. (plf) | Wind Shear (plf) | Wind Wall Cap. (plf) | Sill Plate Cap. (plf) | Tension (lb) | HD Capacity | Max Shear-Wall δ (in) |
|------------------------|-----------------------------|------------------------------|-------------------------------|-------------------------|-----------|-----------|---------------|----------------------------------|-----------------------------|--------------|--------------|---------------------|-------------------|-----------------------|------------------|----------------------|-----------------------|--------------|-------------|-----------------------|
| 15.5 | 2 | | | | P2 | | (2) CS16 | | 44949 | 21193 | 0.65 | 1.00 | 290 | 380 | 114 | 520 | | 1533 | 3410 | 0.24 |
| Add'l Comments: | | | | | | | | | | | | | | | | | | | | |

| LINE: C 2ND STORY | | | | | | | | | | | | | | | | | | |
|--|-------------|------------|-----------|---|------|----------|------------|---|--------|-------|-----------|-----------------------|-------------|---------------------|------------------------|------------------|--|--|
| Line Loads (plf) | | | | Loads from above | | | | Actual Applied Loads (plf unless noted otherwise) | | | | Diaphragm Shear (plf) | | Perf/FTAO Wall Info | | | | |
| Load | Trib w (ft) | E.Z. Appl* | Span (ft) | Line | % | Location | Seis (lbs) | Wind (lbs) | p*Seis | Wind | E.Z. Wind | 2a (ft) | E.Z. P (lb) | Drag (ft) | Seis (Load vs. Allow.) | (Not Applicable) | | |
| ω1 | 12.33 | Minor | 24.66 | | 1.00 | Offset | | | 364.5 | 118.1 | 177.6 | 6 | 43 | 26 | 173 | 294 | | |
| | | None | | | 1.00 | Offset | | | | | | | | | | | | |
| | | | | | 1.00 | Above | | | | | | | | | | | | |
| | | | | | | | Total | 6421 | 1500 | | | | | | | | | |
| Plate h (ft) = 9.5 | | | | Include Ω for irregularities (above)? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| Max opening height (ft) = 9.5 | | | | Wind (Load vs. Allow.) | | | | | | | | | | | | | | |
| Apply aspect ratio reduction? <input type="checkbox"/> Yes | | | | 58 412 | | | | | | | | | | | | | | |
| Opening elevation = | | | | Story V (K) = 12843 | | | | | | | | | | | | | | |
| | | | | Max allow. drift (in) = 2.85 | | | | | | | | | | | | | | |
| | | | | Shear Length (ft) = | | | | | | | | | | | | | | |
| | | | | Wall DL (psf) = 10 | | | | | | | | | | | | | | |
| | | | | Perforated SW? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| | | | | Force Transfer @ Openings? <input type="checkbox"/> No | | | | | | | | | | | | | | |

| Shear-Wall Length (ft) | Roof _{DL} 'w' (ft) | Floor _{DL} 'w' (ft) | Other _{DL} 'w' (plf) | Tension From Above (lb) | Wall Type | Sill Type | Holdown Strap | HD Capacity (Stem 'w'-edge dist) | OTM (wind, seismic) (ft-lb) | 6*RM (ft-lb) | Aspect Ratio | Aspect Ratio Reduc. | Seis. Shear (plf) | Seis. Wall Cap. (plf) | Wind Shear (plf) | Wind Wall Cap. (plf) | Sill Plate Cap. (plf) | Tension (lb) | HD Capacity | Max Shear-Wall δ (in) |
|--|-----------------------------|------------------------------|-------------------------------|-------------------------|-----------|-----------|---------------|----------------------------------|-----------------------------|--------------|--------------|---------------------|-------------------|-----------------------|------------------|----------------------|-----------------------|--------------|-------------|-----------------------|
| Drag beams and Special RC Shearwall see attached calcs | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | #VALUE! | | | | | | |
| Add'l Comments: | | | | | | | | | | | | | | | | | | | | |

| LINE: 1.2 1ST STORY | | | | | | | | | | | | | | | | | | |
|--|-------------|------------|-----------|---|------|----------|------------|---|--------|-------|-----------|-----------------------|-------------|---------------------|------------------------|------------------|--|--|
| Line Loads (plf) | | | | Loads from above | | | | Actual Applied Loads (plf unless noted otherwise) | | | | Diaphragm Shear (plf) | | Perf/FTAO Wall Info | | | | |
| Load | Trib w (ft) | E.Z. Appl* | Span (ft) | Line | % | Location | Seis (lbs) | Wind (lbs) | p*Seis | Wind | E.Z. Wind | 2a (ft) | E.Z. P (lb) | Drag (ft) | Seis (Load vs. Allow.) | (Not Applicable) | | |
| ω4 | 2.5 | Major | 5 | 1-2ND | 1.00 | Offset | 6903 | 3088 | 55.8 | 145.4 | 218.8 | 6 | 176 | 36 | 244 | 294 | | |
| ω4 | 9.25 | None | 18.5 | | 1.00 | Offset | | | 55.8 | 145.4 | 218.8 | 6 | | 36 | 14 | 294 | | |
| | | | | | 1.00 | Above | | | | | | | | | | | | |
| | | | | | | | Total | 7558 | 4973 | | | | | | | | | |
| Plate h (ft) = 10 | | | | Include Ω for irregularities (above)? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| Max opening height (ft) = 10 | | | | Wind (Load vs. Allow.) | | | | | | | | | | | | | | |
| Apply aspect ratio reduction? <input type="checkbox"/> Yes | | | | 101 412 | | | | | | | | | | | | | | |
| Opening elevation = | | | | Story V (K) = 16160 | | | | | | | | | | | | | | |
| | | | | Max allow. drift (in) = 3 | | | | | | | | | | | | | | |
| | | | | Shear Length (ft) = | | | | | | | | | | | | | | |
| | | | | Wall DL (psf) = 10 | | | | | | | | | | | | | | |
| | | | | Perforated SW? <input type="checkbox"/> No | | | | | | | | | | | | | | |
| | | | | Force Transfer @ Openings? <input type="checkbox"/> No | | | | | | | | | | | | | | |

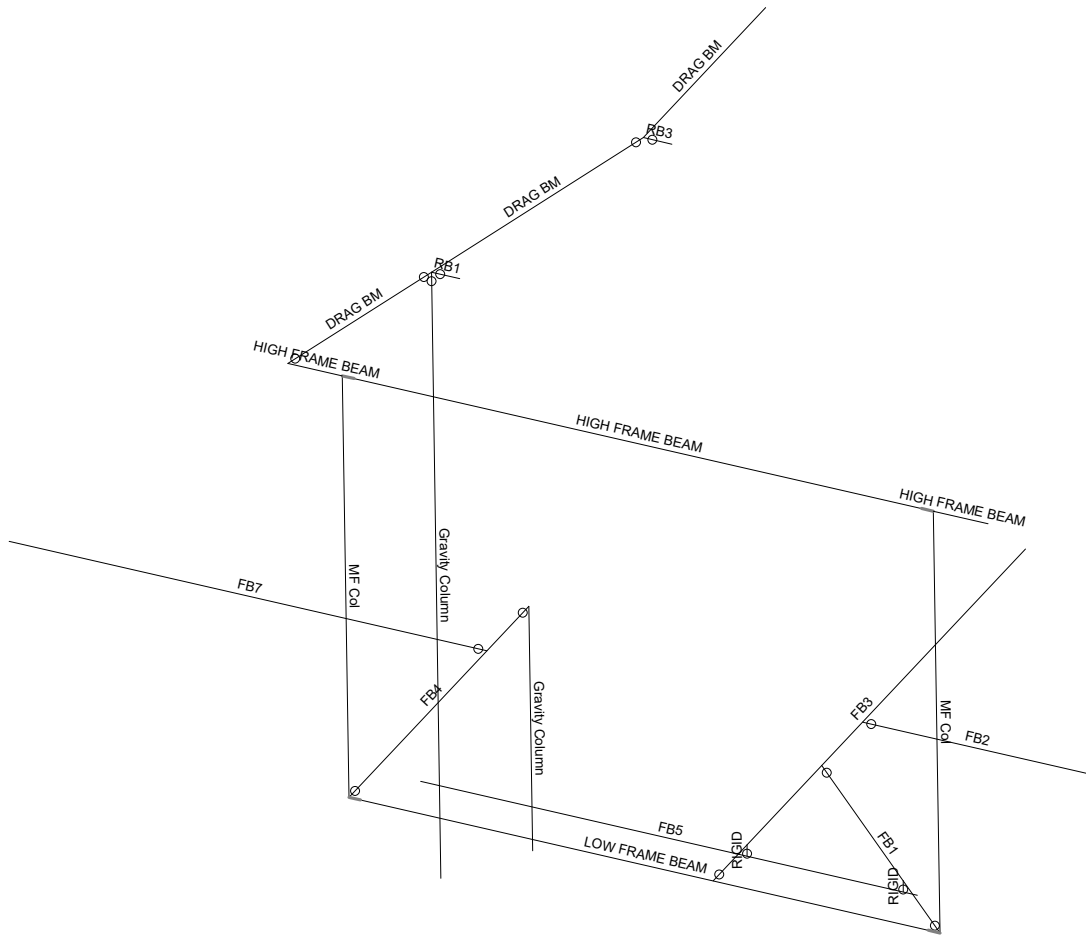
| Shear-Wall Length (ft) | Roof _{DL} 'w' (ft) | Floor _{DL} 'w' (ft) | Other _{DL} 'w' (plf) | Tension From Above (lb) | Wall Type | Sill Type | Holdown Strap | HD Capacity (Stem 'w'-edge dist) | OTM (wind, seismic) (ft-lb) | 6*RM (ft-lb) | Aspect Ratio | Aspect Ratio Reduc. | Seis. Shear (plf) | Seis. Wall Cap. (plf) | Wind Shear (plf) | Wind Wall Cap. (plf) | Sill Plate Cap. (plf) | Tension (lb) | HD Capacity | Max Shear-Wall δ (in) |
|--|-----------------------------|------------------------------|-------------------------------|-------------------------|-----------|-----------|---------------|----------------------------------|-----------------------------|--------------|--------------|---------------------|-------------------|-----------------------|------------------|----------------------|-----------------------|--------------|-------------|-----------------------|
| SPECIAL REINFORCED CONCRETE SHEARWALL, SEE CALCS | | | | | | | | | | | | | | | | | | | | |
| Add'l Comments: | | | | | | | | | | | | | | | | | | | | |



VSE
JBA
U2784-001-181

Summit Powder Mtn

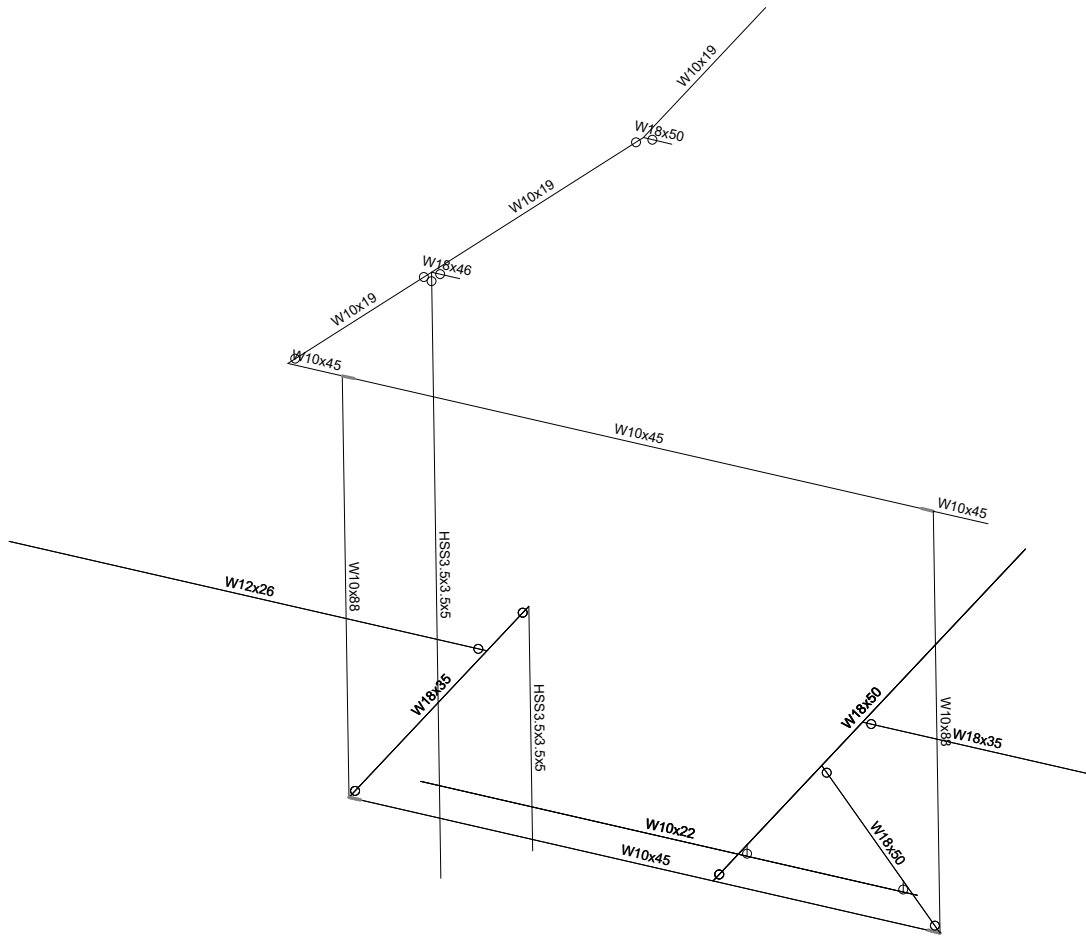
SK - 1
July 2, 2018 at 9:52 AM
Moment Frame Special -- Relocate...



VSE
JBA
U2784-001-181

Summit Powder Mtn

SK - 2
July 2, 2018 at 9:52 AM
Moment Frame Special -- Relocate...



VSE

JBA

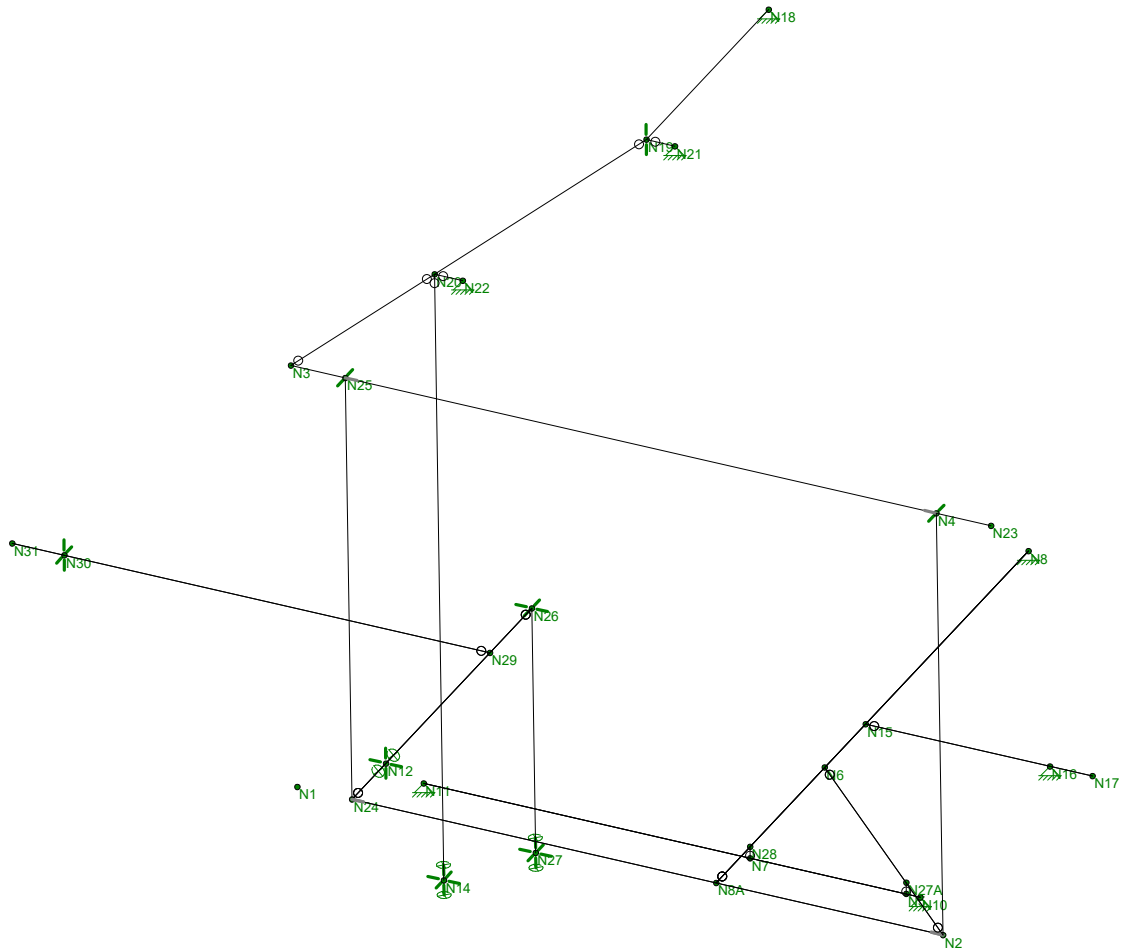
U2784-001-181

Summit Powder Mtn

SK - 3

July 2, 2018 at 9:53 AM

Moment Frame Special -- Relocate...



VSE

JBA

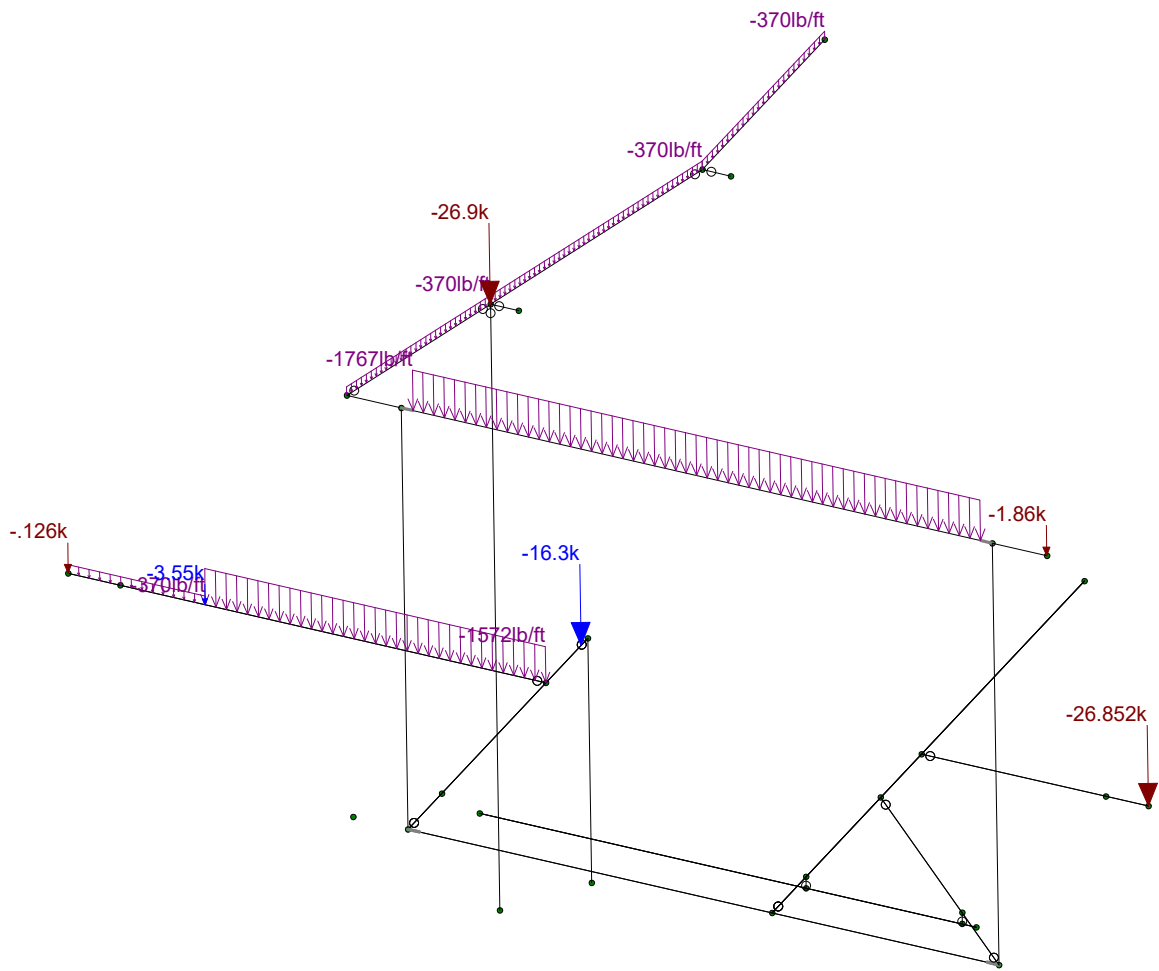
U2784-001-181

Summit Powder Mtn

SK - 4

July 2, 2018 at 9:53 AM

Moment Frame Special -- Relocate...



Loads: BLC 2, Snow

VSE

JBA

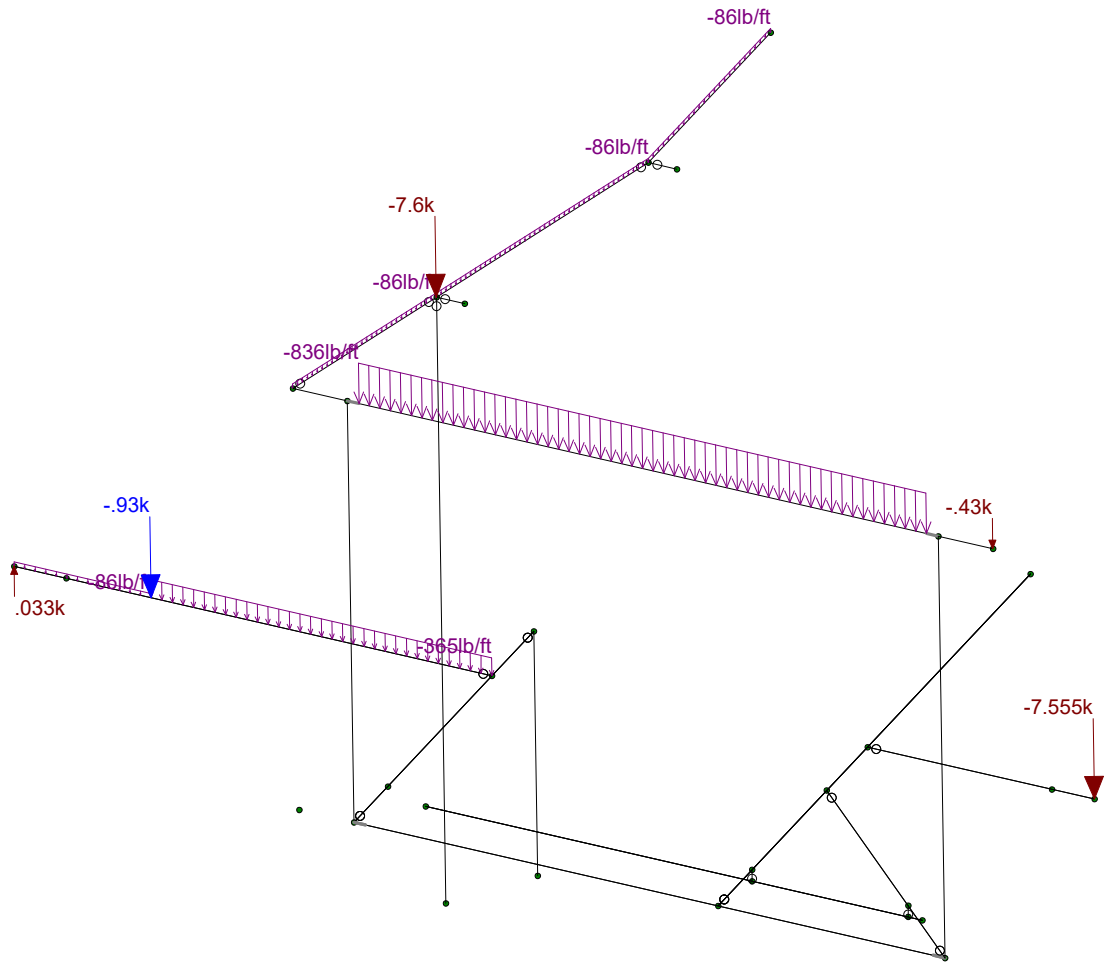
U2784-001-181

Summit Powder Mtn

SK - 5

July 2, 2018 at 9:54 AM

Moment Frame Special -- Relocate...



Loads: BLC 3, Roof Dead

VSE

JBA

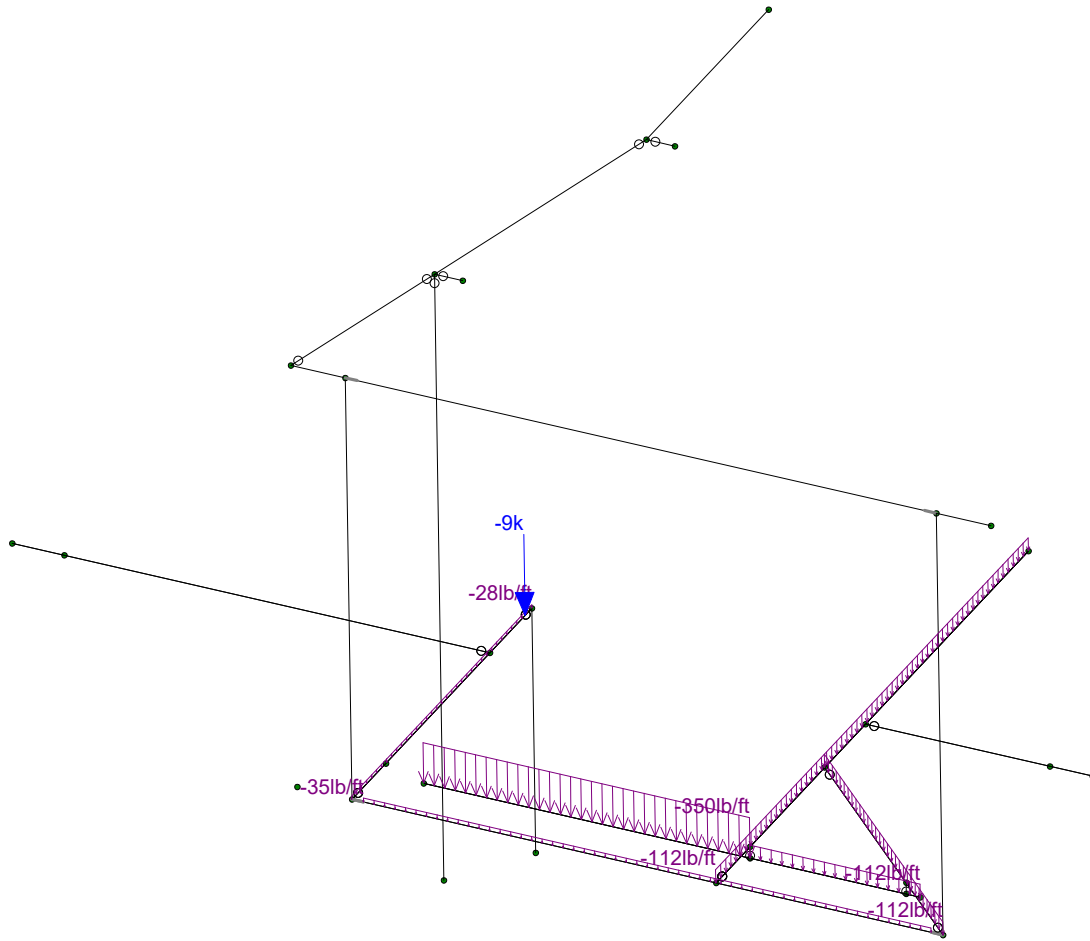
U2784-001-181

Summit Powder Mtn

SK - 6

July 2, 2018 at 9:54 AM

Moment Frame Special -- Relocate...



Loads: BLC 4, Floor Dead

VSE

JBA

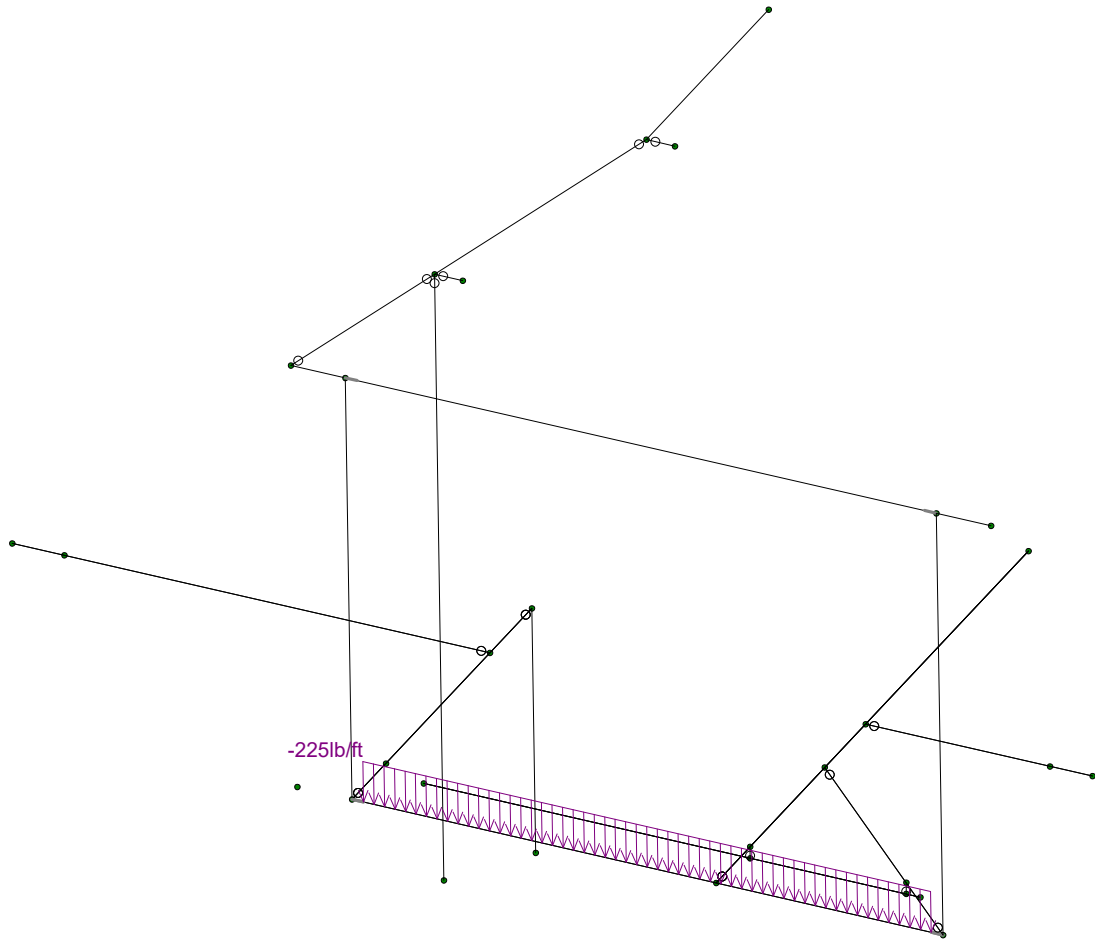
U2784-001-181

Summit Powder Mtn

SK - 7

July 2, 2018 at 9:54 AM

Moment Frame Special -- Relocate...



Loads: BLC 5, Wall Dead

VSE

JBA

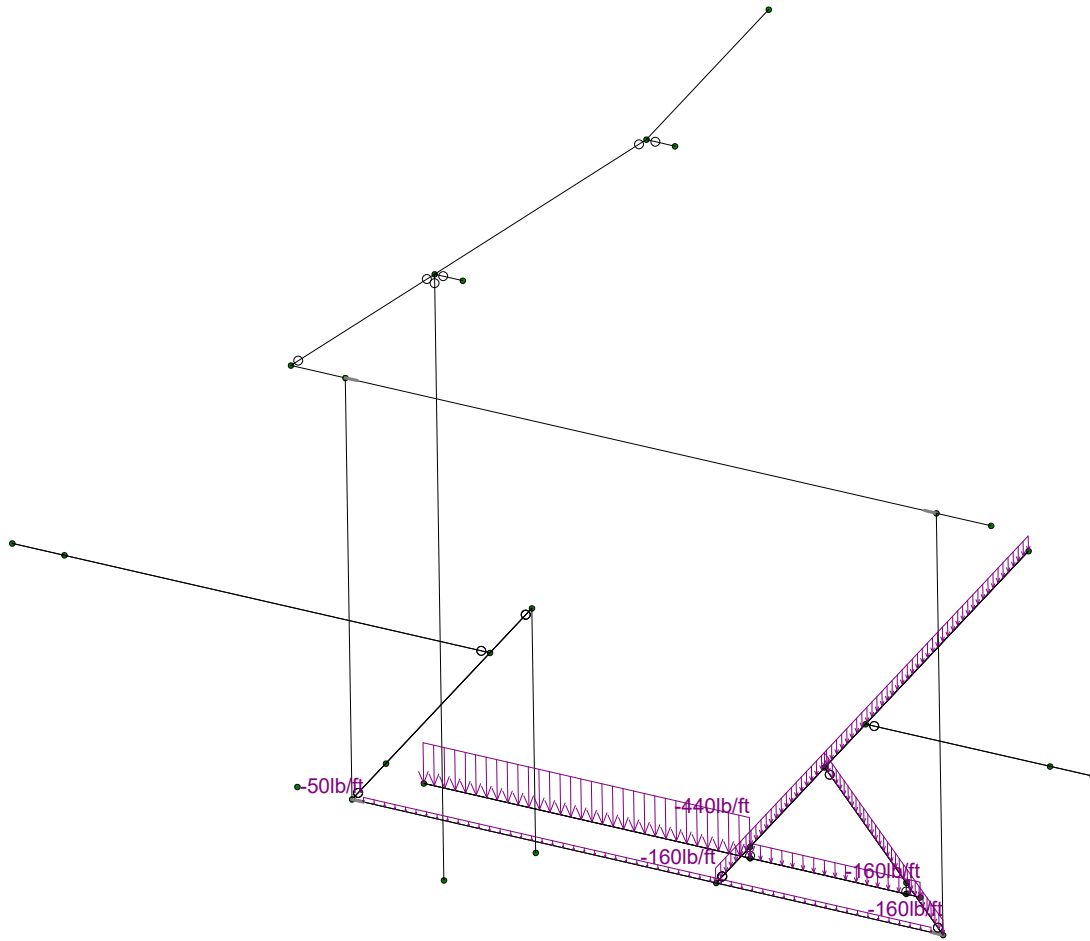
U2784-001-181

Summit Powder Mtn

SK - 8

July 2, 2018 at 9:54 AM

Moment Frame Special -- Relocate...

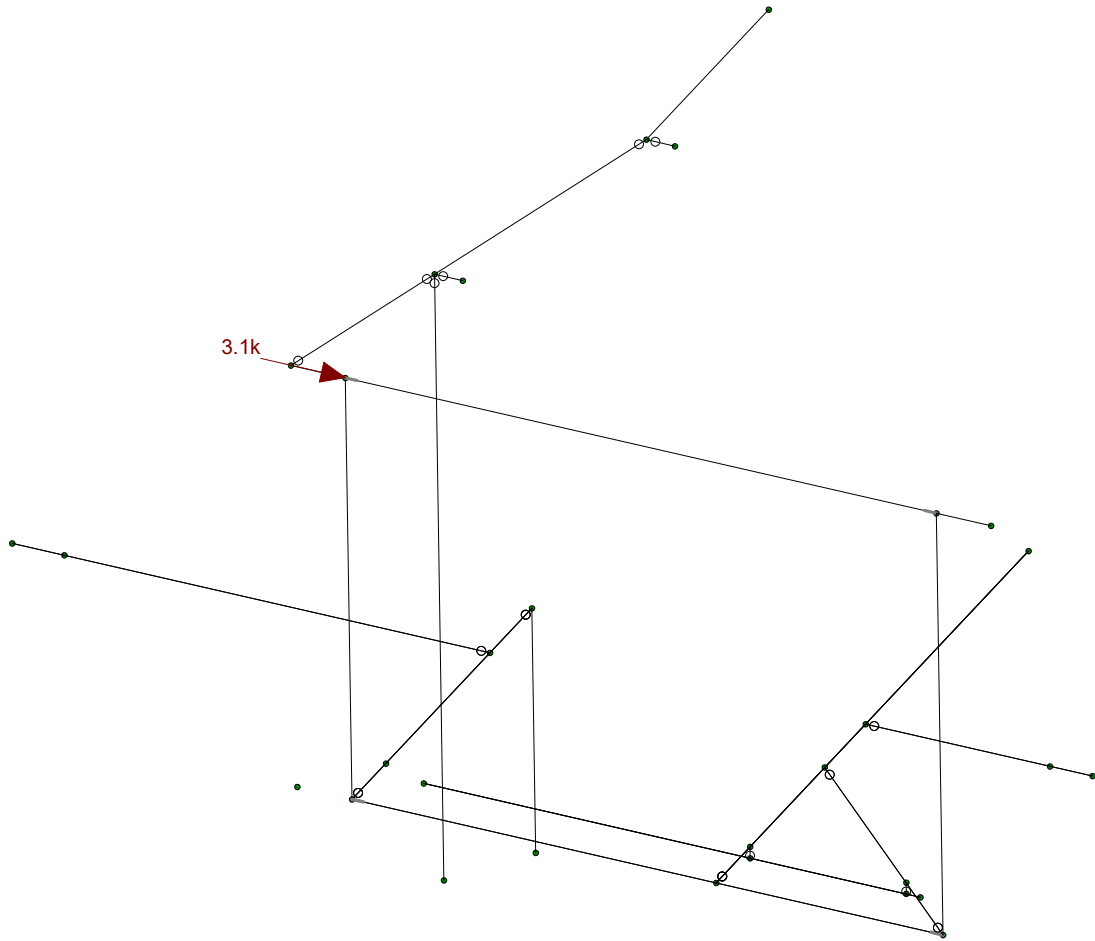


Loads: BLC 8, Live

| |
|---------------|
| VSE |
| JBA |
| U2784-001-181 |

Summit Powder Mtn

| |
|-------------------------------------|
| SK - 9 |
| July 2, 2018 at 9:55 AM |
| Moment Frame Special -- Relocate... |

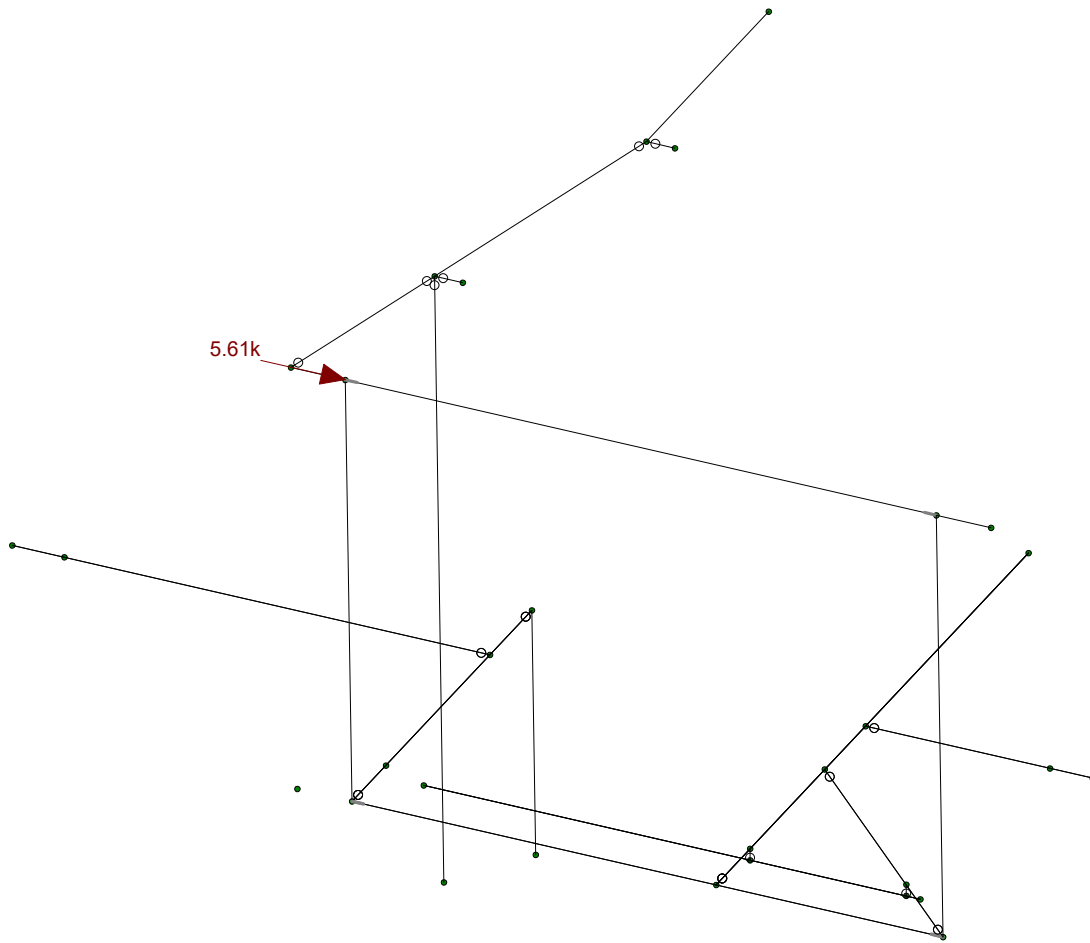


Loads: BLC 10, Wind X

| |
|---------------|
| VSE |
| JBA |
| U2784-001-181 |

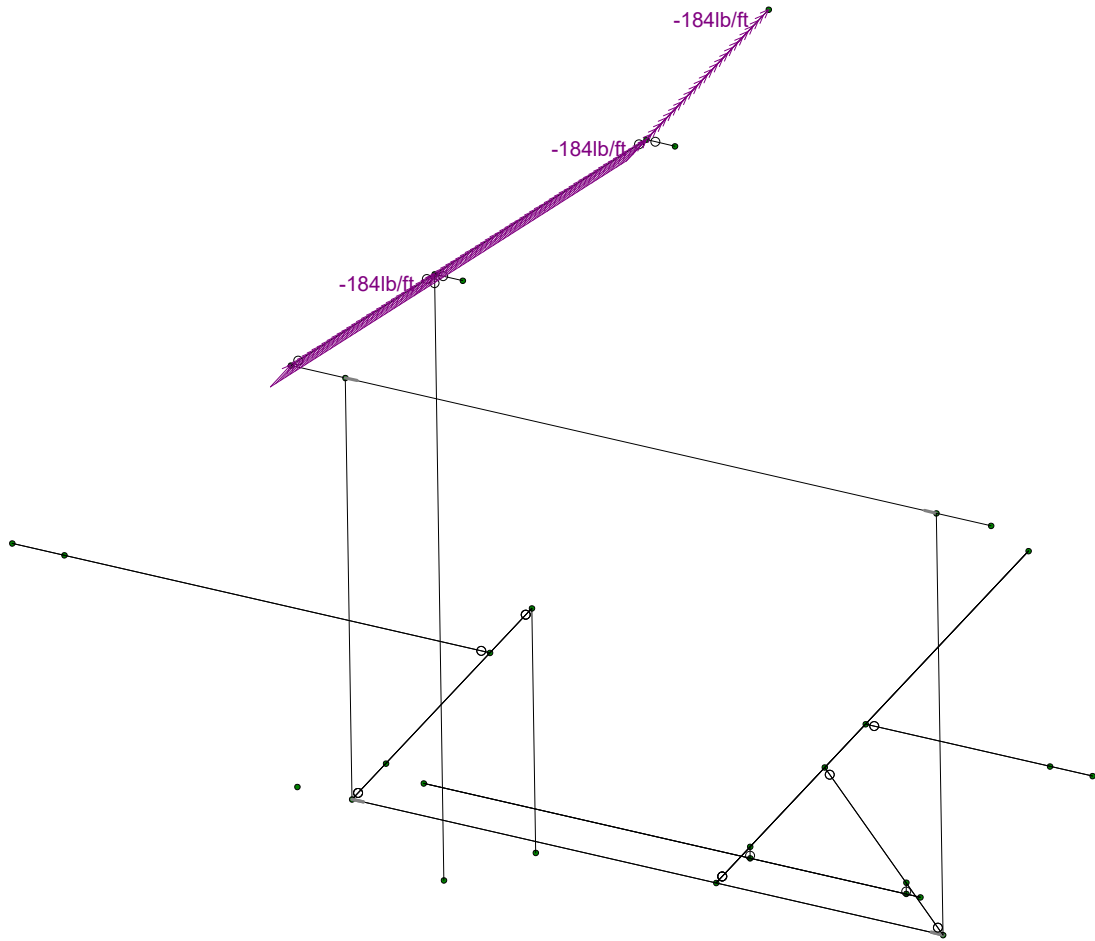
Summit Powder Mtn

| |
|-------------------------------------|
| SK - 10 |
| July 2, 2018 at 9:55 AM |
| Moment Frame Special -- Relocate... |



Loads: BLC 11, Seismic X

| | | |
|---------------|-------------------|-------------------------------------|
| VSE | Summit Powder Mtn | SK - 11 |
| JBA | | July 2, 2018 at 9:55 AM |
| U2784-001-181 | | Moment Frame Special -- Relocate... |



Loads: BLC 12, Seismic Z

VSE

JBA

U2784-001-181

Summit Powder Mtn

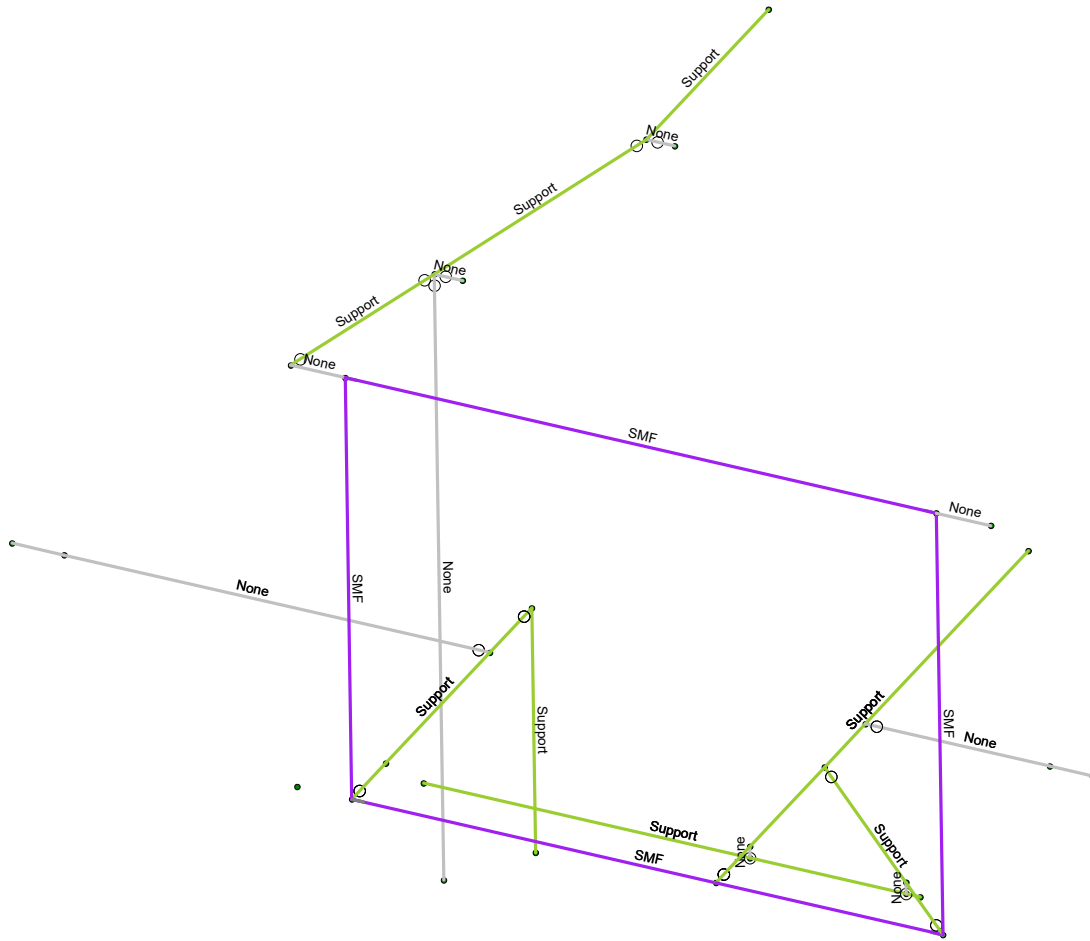
SK - 12

July 2, 2018 at 9:55 AM

Moment Frame Special -- Relocate...



- Seismic Rules
- None
 - OCBF
 - SCBF
 - OMF
 - IMF
 - SMF
 - SCCS
 - Support



Member Seismic Design Rule Displayed

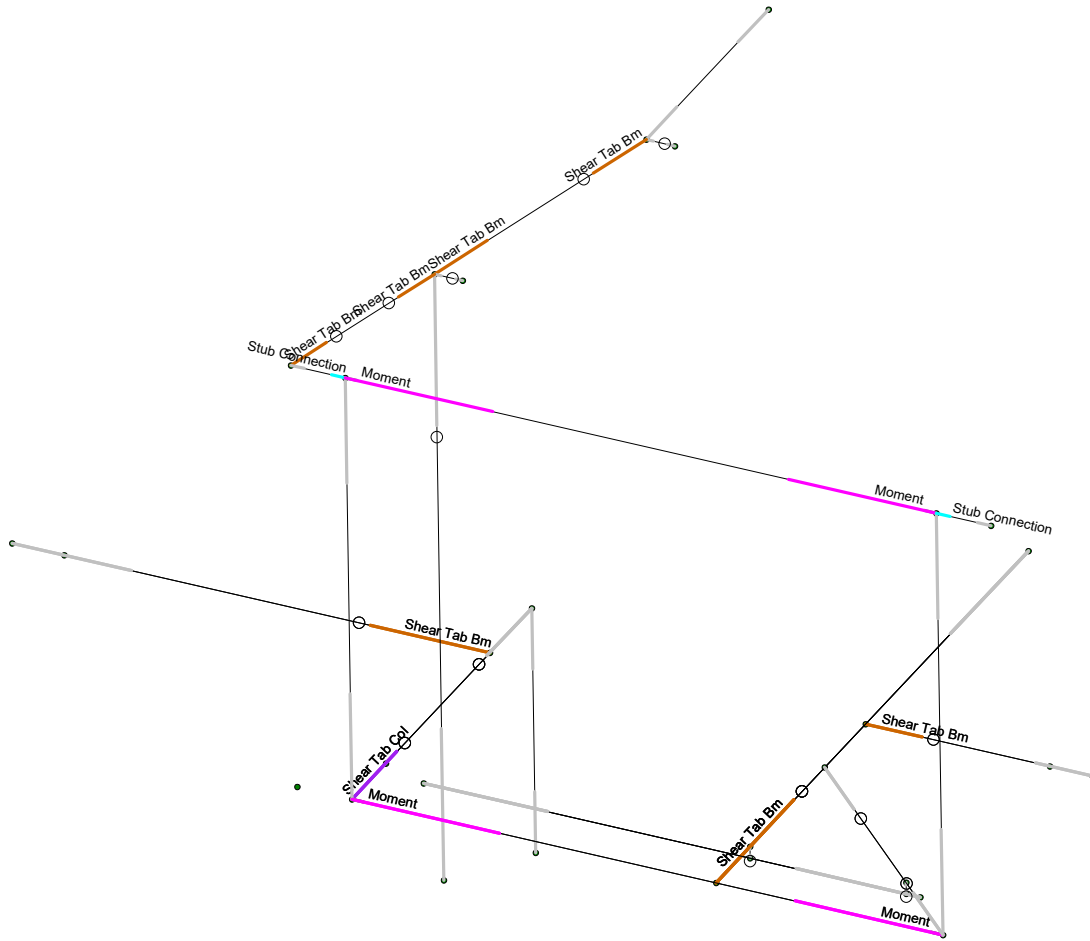
| |
|---------------|
| VSE |
| JBA |
| U2784-001-181 |

Summit Powder Mtn

| |
|-------------------------------------|
| SK - 13 |
| July 2, 2018 at 9:56 AM |
| Moment Frame Special -- Relocate... |



| Conn Rules | |
|-------------------|-------------------|
| None | None |
| Moment | Moment |
| Stub Connection | Stub Connection |
| Shear Tab Bm | Shear Tab Bm |
| Seismic Shear Tab | Seismic Shear Tab |
| Shear Tab Col | Shear Tab Col |
| Baseplate | Baseplate |

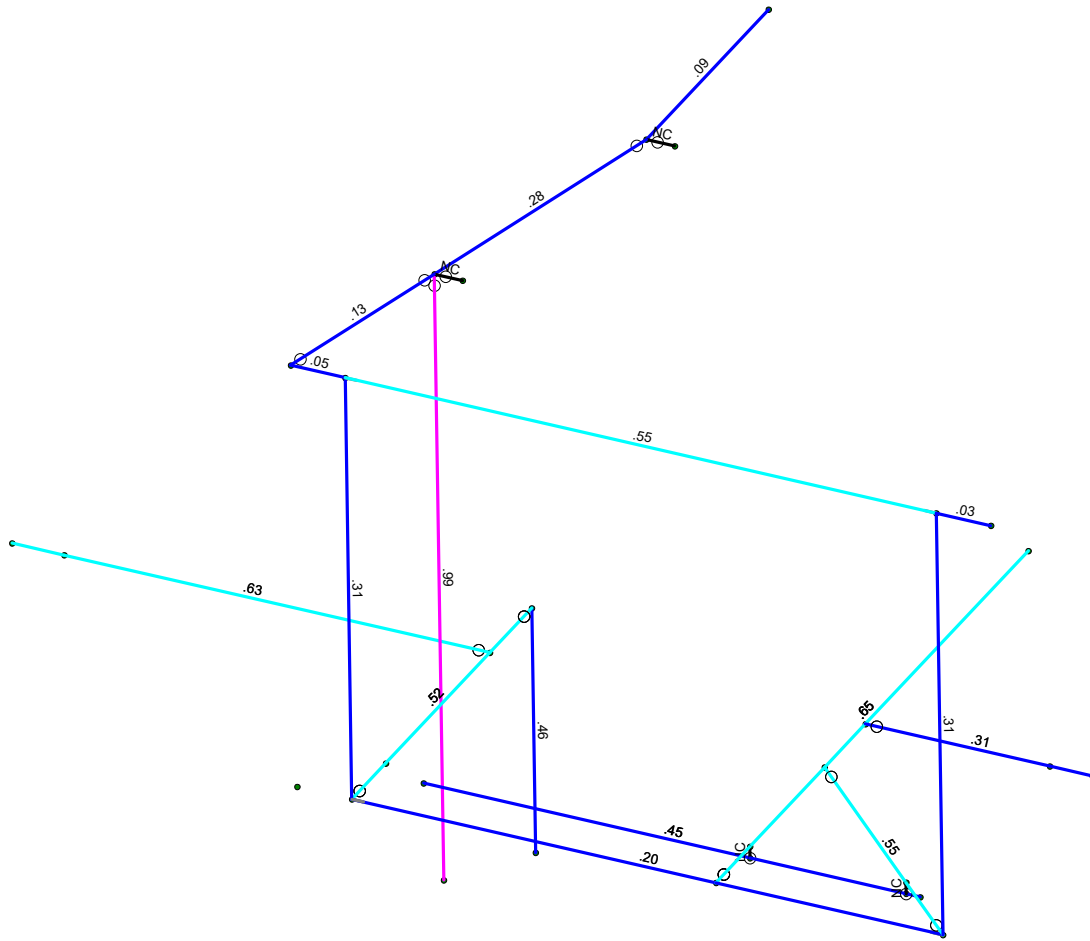


Member Connection Design Rule Displayed

| | | |
|---------------|-------------------|-------------------------------------|
| VSE | Summit Powder Mtn | SK - 14 |
| JBA | | July 2, 2018 at 9:56 AM |
| U2784-001-181 | | Moment Frame Special -- Relocate... |

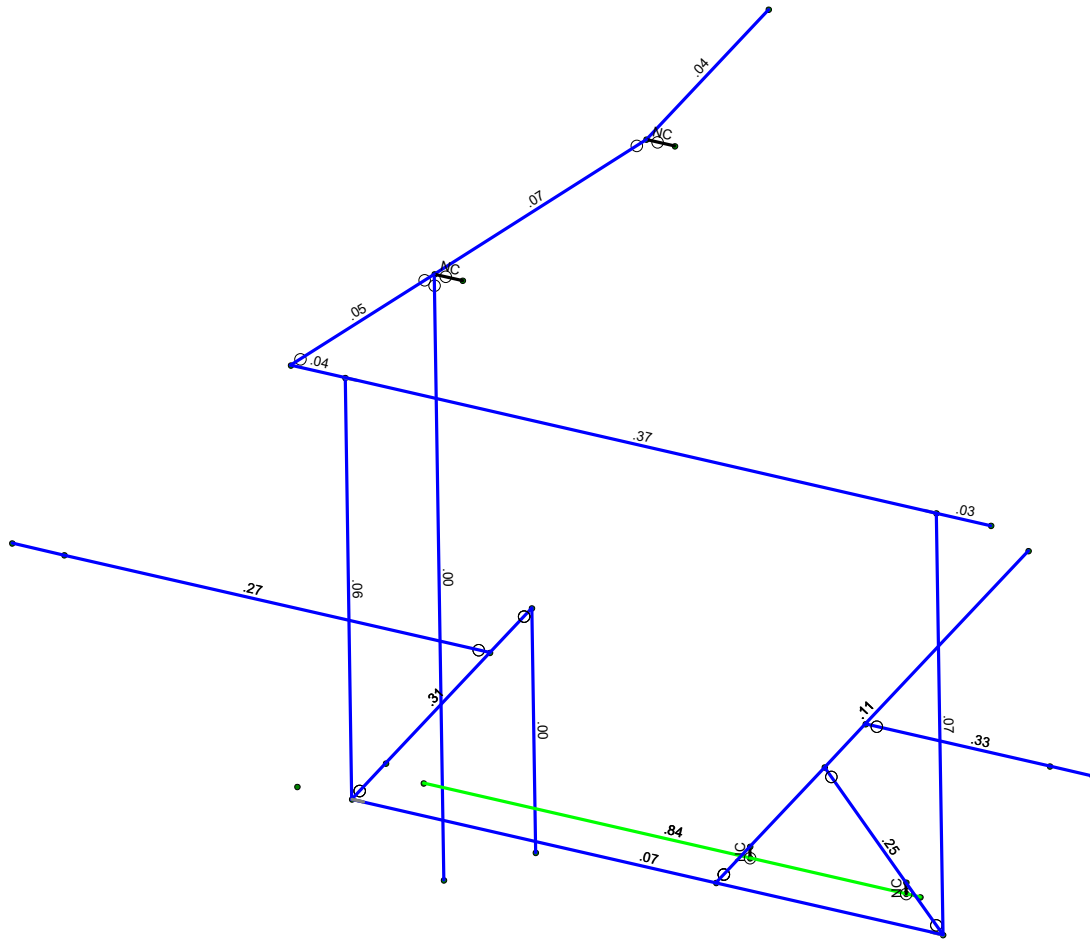
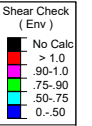


| Code Check (Env) | |
|------------------|---------|
| Black | No Calc |
| Red | > 1.0 |
| Magenta | .90-1.0 |
| Green | .75-.90 |
| Cyan | .50-.75 |
| Blue | 0-.50 |



Member Code Checks Displayed (Enveloped)
Results for LC 2, D

| | | |
|---------------|-------------------|-------------------------------------|
| VSE | Summit Powder Mtn | SK - 15 |
| JBA | | July 2, 2018 at 9:56 AM |
| U2784-001-181 | | Moment Frame Special -- Relocate... |



Member Shear Checks Displayed (Enveloped)
Results for LC 2, D

| | | |
|---------------|-------------------|-------------------------------------|
| VSE | Summit Powder Mtn | SK - 16 |
| JBA | | July 2, 2018 at 9:57 AM |
| U2784-001-181 | | Moment Frame Special -- Relocate... |

Hot Rolled Steel Properties

| | Label | E [ksi] | G [ksi] | Nu | Therm (1... | Density[k/ft^3] | Yield[ksi] | Ry | Fu[ksi] | Rt |
|---|----------------|---------|---------|----|-------------|-----------------|------------|-----|---------|-----|
| 1 | A36 Gr.36 | 29000 | 11154 | .3 | .65 | .49 | 36 | 1.5 | 58 | 1.2 |
| 2 | A572 Gr.50 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.1 | 65 | 1.1 |
| 3 | A992 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.1 | 65 | 1.1 |
| 4 | A500 Gr.B RND | 29000 | 11154 | .3 | .65 | .527 | 42 | 1.4 | 58 | 1.3 |
| 5 | A500 Gr.B Rect | 29000 | 11154 | .3 | .65 | .527 | 46 | 1.4 | 58 | 1.3 |
| 6 | A53 Gr.B | 29000 | 11154 | .3 | .65 | .49 | 35 | 1.6 | 60 | 1.2 |
| 7 | A1085 | 29000 | 11154 | .3 | .65 | .49 | 50 | 1.4 | 65 | 1.3 |

Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design ... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|----|-----------------|--------------|--------|-----------------|----------------|------------|---------|-----------|-----------|---------|
| 1 | Gravity Colu... | HSS3.5x3.5x5 | Column | RECT | A500 Gr.B Rect | Typical | 3.52 | 5.84 | 5.84 | 9.89 |
| 2 | HIGH FRAM... | W10x45 | Beam | SMF Wide Flange | A992 | Typical | 13.3 | 53.4 | 248 | 1.51 |
| 3 | LOW FRAM... | W10x45 | Beam | SMF Wide Flange | A992 | Typical | 13.3 | 53.4 | 248 | 1.51 |
| 4 | RB1 | W18x46 | Beam | Wide Flange | A992 | Typical | 13.5 | 22.5 | 712 | 1.22 |
| 5 | RB3 | W18x50 | Beam | Wide Flange | A992 | Typical | 14.7 | 40.1 | 800 | 1.24 |
| 6 | MF Col | W10x88 | Column | SMF Wide Flange | A992 | Typical | 26 | 179 | 534 | 7.53 |
| 7 | FB1 | W18x50 | Beam | Wide Flange | A992 | Typical | 14.7 | 40.1 | 800 | 1.24 |
| 8 | FB3 | W18x50 | Beam | Wide Flange | A992 | Typical | 14.7 | 40.1 | 800 | 1.24 |
| 9 | FB5 | W10x22 | Beam | Wide Flange | A992 | Typical | 6.49 | 11.4 | 118 | .239 |
| 10 | FB4 | W18x35 | Beam | Wide Flange | A992 | Typical | 10.3 | 15.3 | 510 | .506 |
| 11 | FB2 | W18x35 | Beam | Wide Flange | A992 | Typical | 10.3 | 15.3 | 510 | .506 |
| 12 | FB7 | W12x26 | Beam | Wide Flange | A992 | Typical | 7.65 | 17.3 | 204 | .3 |
| 13 | DRAG BM | W10x19 | Beam | Wide Flange | A992 | Typical | 5.62 | 4.29 | 96.3 | .233 |

Frame / HR Column Seismic Design Rule

| | Label | Frame Ductility | Overstrength Req'd |
|---|---------|-----------------|--------------------|
| 1 | OCBF | Minimal | Yes |
| 2 | SCBF | High | Yes |
| 3 | OMF | Minimal | Yes |
| 4 | IMF | Moderate | Yes |
| 5 | SMF | High | Yes |
| 6 | SCCS | High | Yes |
| 7 | Support | Minimal | Yes |

HR Beam Seismic Design Rule

| | Label | Moment Connection | Overstrength Req'd | Z Factor | Hinge Location[in] |
|---|---------|-------------------|--------------------|----------|--------------------|
| 1 | OCBF | Other/None | | | |
| 2 | SCBF | Other/None | | | |
| 3 | OMF | BFP | | | 12 |
| 4 | IMF | BFP | Yes | | 12 |
| 5 | SMF | BFP | | | 7.25 |
| 6 | SCCS | BFP | | | |
| 7 | Support | Other/None | Yes | | |

Connection Rules

| | Label | Conn Type | Type | Beam Conn | Col/Girder Conn |
|---|-------------------|-----------|--------------------------------|-----------|-----------------|
| 1 | Moment | Moment | Column/Beam Seismic Moment | N/A | N/A |
| 2 | Stub Connection | Moment | Column/Beam Direct Weld Moment | Bolted | N/A |
| 3 | Shear Tab Bm | Shear | Girder/Beam Shear Tab Shear | Bolted | N/A |
| 4 | Seismic Shear Tab | Shear | Beam Shear Tab Splice | N/A | N/A |



Company : VSE
 Designer : JBA
 Job Number : U2784-001-181
 Model Name : Summit Powder Mtn

July 2, 2018
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 Checked By: _____

Connection Rules (Continued)

| | Label | Conn Type | Type | Beam Conn | Col/Girder Conn |
|---|---------------|-----------|-----------------------------|-----------|-----------------|
| 5 | Shear Tab Col | Shear | Column/Beam Shear Tab Shear | Bolted | N/A |
| 6 | Baseplate | Baseplate | Single Column Baseplate | N/A | N/A |

Drift Definitions

| | Type | Floor/Diaphragm | Joint Label | Elevation[ft] |
|---|-------|-----------------|-------------|---------------|
| 1 | Joint | - | N25 | 15.5 |
| 2 | Joint | - | N24 | 0 |

Load Combinations

| | Description | Sol... | PDelta | SR... | BLCFa... | BLC Fa... | BLC Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... | B... Fa... |
|----|-----------------------|--------|--------|-------|----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 1 | Serviceability | | | | | | | | | | | | | | | | | | |
| 2 | D | Yes | Y | | DL 1 | | | | | | | | | | | | | | |
| 3 | L | Yes | Y | | LL 1 | RLL 1 | | | | | | | | | | | | | |
| 4 | D+L | Yes | Y | | DL 1 | LL 1 | RLL 1 | | | | | | | | | | | | |
| 5 | WLX | Yes | Y | | DL 1 | LL .5 | WLX .53 | | | | | | | | | | | | |
| 6 | S | Yes | Y | | SL 1 | | | | | | | | | | | | | | |
| 7 | | | Y | | DL 1 | LL .5 | WLX -.53 | | | | | | | | | | | | |
| 8 | ELX | Yes | Y | | DL 1.2 | ELX 1 | LL .5 | | | | | | | | | | | | |
| 9 | | | Y | | DL 1.2 | ELX -1 | LL .5 | | | | | | | | | | | | |
| 10 | | | Y | | DL .826 | ELX 1 | | | | | | | | | | | | | |
| 11 | | | Y | | DL .826 | ELX -1 | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | |
| 13 | ASCE 7-10 Strength | | | | | | | | | | | | | | | | | | |
| 14 | 1.4D | Yes | Y | | DL 1.4 | | | | | | | | | | | | | | |
| 15 | 1.2D+1.6SL+.5L | Yes | Y | | DL 1.2 | SL 1.6 | LL .5 | | | | | | | | | | | | |
| 16 | 1.2D+1.6SL+.5L+.5WLX | Yes | Y | | DL 1.2 | SL 1.6 | WLX .5 | | | | | | | | | | | | |
| 17 | 1.2D+1.6SL-.5WLX | Yes | Y | | DL 1.2 | SL 1.6 | WLX -.5 | | | | | | | | | | | | |
| 18 | 1.2D+WLX+.5SL | Yes | Y | | DL 1.2 | WLX 1 | SL .5 | | | | | | | | | | | | |
| 19 | 1.2D-WLX+.5SL | Yes | Y | | DL 1.2 | WLX -1 | SL .5 | | | | | | | | | | | | |
| 20 | 1.2D+WLX+L+.5S | Yes | Y | | DL 1.2 | WLX 1 | LL 1 | SL .5 | | | | | | | | | | | |
| 21 | 1.2D-WLX+L+.5S | Yes | Y | | DL 1.2 | WLX -1 | LL 1 | SL .5 | | | | | | | | | | | |
| 22 | 0.9D+WLX | Yes | Y | | DL .9 | WLX 1 | | | | | | | | | | | | | |
| 23 | 0.9D-WLX | Yes | Y | | DL .9 | WLX -1 | | | | | | | | | | | | | |
| 24 | 1.2D+ELX+.5L+.37WLX | Yes | Y | | DL 1.2 | ELX 1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 25 | 1.2D-ELX+.5L+.37WLX | Yes | Y | | DL 1.2 | ELX -1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 26 | 0.9D+ELX | Yes | Y | | DL .9 | ELX 1 | | | S... -.2 | | | | | | | | | | |
| 27 | 0.9D-ELX | Yes | Y | | DL .9 | ELX -1 | | | S... -.2 | | | | | | | | | | |
| 28 | 1.2D+OmELX+.5L+.37WLX | Yes | Y | | DL 1.2 | Om*... 1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 29 | 1.2D-OmELX+.5L+.37WLX | Yes | Y | | DL 1.2 | Om*... -1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 30 | 0.9D+OmELX | Yes | Y | | DL .9 | Om*... 1 | | | S... -.2 | | | | | | | | | | |
| 31 | 0.9D-OmELX | Yes | Y | | DL .9 | Om*... -1 | | | S... -.2 | | | | | | | | | | |
| 32 | 1.2D+ELZ+.5L+.37WLX | Yes | Y | | DL 1.2 | ELZ 1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 33 | 1.2D-ELZ+.5L+.37WLX | Yes | Y | | DL 1.2 | ELZ -1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 34 | 0.9D+ELZ | Yes | Y | | DL .9 | ELZ 1 | | | S... -.2 | | | | | | | | | | |
| 35 | 0.9D-ELZ | Yes | Y | | DL .9 | ELZ -1 | | | S... -.2 | | | | | | | | | | |
| 36 | 1.2D+.5L+OmELZ+.37WLX | Yes | Y | | DL 1.2 | Om*... 1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 37 | 1.2D+.5L-OmELZ+.37WLX | Yes | Y | | DL 1.2 | Om*... -1 | SL .37 | LL .5 | S... .2 | | | | | | | | | | |
| 38 | 0.9D+OmELZ | Yes | Y | | DL .9 | Om*... 1 | | | S... -.2 | | | | | | | | | | |
| 39 | 0.9D-OmELZ | Yes | Y | | DL .9 | Om*... -1 | | | S... -.2 | | | | | | | | | | |

Envelope Joint Reactions

| | Joint | | X [k] | LC | Y [k] | LC | Z [k] | LC | MX [k-ft] | LC | MY [k-ft] | LC | MZ [k-ft] | LC |
|----|---------|-----|-------|----|--------|----|-------|----|-----------|----|-----------|----|-----------|----|
| 1 | N4 | max | 0 | 2 | 0 | 2 | .08 | 17 | 0 | 2 | 0 | 2 | 0 | 2 |
| 2 | | min | 0 | 2 | 0 | 2 | 0 | 3 | 0 | 2 | 0 | 2 | 0 | 2 |
| 3 | N8 | max | .13 | 25 | 1.87 | 3 | .21 | 24 | 0 | 2 | 0 | 2 | 0 | 2 |
| 4 | | min | -.13 | 8 | -9.03 | 16 | -.39 | 25 | 0 | 2 | 0 | 2 | 0 | 2 |
| 5 | N11 | max | 1.27 | 25 | 5.18 | 21 | .14 | 25 | 0 | 2 | 0 | 2 | 0 | 2 |
| 6 | | min | -1.12 | 26 | -.88 | 6 | -.12 | 26 | 0 | 2 | 0 | 2 | 0 | 2 |
| 7 | N10 | max | 4.99 | 25 | 61.7 | 15 | .15 | 17 | 0 | 2 | 0 | 2 | 0 | 2 |
| 8 | | min | -5.46 | 24 | 5.92 | 3 | -.07 | 27 | 0 | 2 | 0 | 2 | 0 | 2 |
| 9 | N12 | max | .85 | 25 | 66.96 | 17 | 0 | 2 | 0 | 2 | 0 | 2 | .03 | 8 |
| 10 | | min | -.66 | 26 | 2.43 | 3 | 0 | 2 | 0 | 2 | 0 | 2 | -.03 | 25 |
| 11 | N14 | max | 0 | 17 | 62.11 | 16 | 0 | 16 | 0 | 2 | .03 | 16 | 0 | 2 |
| 12 | | min | 0 | 16 | 0 | 3 | 0 | 34 | 0 | 2 | 0 | 27 | 0 | 2 |
| 13 | N16 | max | 1.5 | 24 | 64.26 | 17 | 0 | 25 | 0 | 2 | 0 | 2 | 0 | 2 |
| 14 | | min | -1.47 | 25 | 0 | 3 | 0 | 4 | 0 | 2 | 0 | 2 | 0 | 2 |
| 15 | N18 | max | 0 | 33 | 3.24 | 15 | 6.8 | 32 | 0 | 2 | 0 | 2 | 0 | 2 |
| 16 | | min | 0 | 32 | 0 | 3 | -6.41 | 35 | 0 | 2 | 0 | 2 | 0 | 2 |
| 17 | N19 | max | 0 | 2 | 9.13 | 17 | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 2 |
| 18 | | min | 0 | 2 | 0 | 3 | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 2 |
| 19 | N21 | max | 0 | 16 | .04 | 14 | 0 | 32 | 0 | 2 | 0 | 2 | 0 | 2 |
| 20 | | min | 0 | 27 | 0 | 3 | 0 | 33 | 0 | 2 | 0 | 2 | 0 | 2 |
| 21 | N22 | max | 0 | 16 | .03 | 14 | 0 | 17 | 0 | 2 | 0 | 2 | 0 | 2 |
| 22 | | min | 0 | 25 | 0 | 6 | 0 | 16 | 0 | 2 | 0 | 2 | 0 | 2 |
| 23 | N25 | max | 0 | 2 | 0 | 2 | 0 | 3 | 0 | 2 | 0 | 2 | 0 | 2 |
| 24 | | min | 0 | 2 | 0 | 2 | -.85 | 16 | 0 | 2 | 0 | 2 | 0 | 2 |
| 25 | N26 | max | .12 | 26 | 0 | 2 | .12 | 25 | 0 | 2 | 0 | 2 | 0 | 2 |
| 26 | | min | -.16 | 25 | 0 | 2 | -.11 | 26 | 0 | 2 | 0 | 2 | 0 | 2 |
| 27 | N27 | max | 0 | 25 | 41.72 | 16 | 0 | 24 | 0 | 2 | 0 | 26 | 0 | 2 |
| 28 | | min | 0 | 16 | -.46 | 3 | 0 | 25 | 0 | 2 | 0 | 25 | 0 | 2 |
| 29 | N30 | max | 0 | 2 | 23.33 | 15 | 0 | 26 | 0 | 2 | 0 | 2 | 0 | 2 |
| 30 | | min | 0 | 2 | 0 | 3 | 0 | 23 | 0 | 2 | 0 | 2 | 0 | 2 |
| 31 | Totals: | max | 5.61 | 27 | 326.41 | 15 | 6.55 | 34 | | | | | | |
| 32 | | min | -5.61 | 8 | 12.51 | 3 | -6.55 | 33 | | | | | | |

Envelope Joint Reactions - Overstrength

| | Joint | | X [k] | LC | Y [k] | LC | Z [k] | LC | MX [k-ft] | LC | MY [k-ft] | LC | MZ [k-ft] | LC |
|----|-------|-----|--------|----|-------|----|--------|----|-----------|----|-----------|----|-----------|----|
| 1 | N4 | max | 0 | 28 | 0 | 28 | .04 | 29 | 0 | 28 | 0 | 28 | 0 | 28 |
| 2 | | min | 0 | 28 | 0 | 28 | 0 | 38 | 0 | 28 | 0 | 28 | 0 | 28 |
| 3 | N8 | max | .31 | 29 | .92 | 31 | .88 | 28 | 0 | 28 | 0 | 28 | 0 | 28 |
| 4 | | min | -.33 | 28 | -3.03 | 28 | -.63 | 29 | 0 | 28 | 0 | 28 | 0 | 28 |
| 5 | N11 | max | 3.05 | 31 | 4.74 | 29 | .32 | 31 | 0 | 28 | 0 | 28 | 0 | 28 |
| 6 | | min | -2.87 | 30 | 1.09 | 30 | -.32 | 30 | 0 | 28 | 0 | 28 | 0 | 28 |
| 7 | N10 | max | 12.64 | 29 | 51.64 | 28 | .11 | 37 | 0 | 28 | 0 | 28 | 0 | 28 |
| 8 | | min | -13.49 | 28 | 3.28 | 31 | -.31 | 31 | 0 | 28 | 0 | 28 | 0 | 28 |
| 9 | N12 | max | 1.92 | 29 | 50.37 | 29 | 0 | 28 | 0 | 28 | 0 | 28 | .08 | 30 |
| 10 | | min | -1.74 | 30 | 1.52 | 30 | 0 | 28 | 0 | 28 | 0 | 28 | -.08 | 29 |
| 11 | N14 | max | 0 | 29 | 25.71 | 37 | 0 | 37 | 0 | 28 | .03 | 28 | 0 | 28 |
| 12 | | min | 0 | 28 | 5.66 | 38 | 0 | 36 | 0 | 28 | -.01 | 31 | 0 | 28 |
| 13 | N16 | max | 3.9 | 28 | 24.81 | 37 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 |
| 14 | | min | -3.53 | 29 | 7.32 | 30 | 0 | 38 | 0 | 28 | 0 | 28 | 0 | 28 |
| 15 | N18 | max | 0 | 37 | 1.25 | 28 | 19.81 | 36 | 0 | 28 | 0 | 28 | 0 | 28 |
| 16 | | min | 0 | 36 | .37 | 30 | -19.42 | 39 | 0 | 28 | 0 | 28 | 0 | 28 |
| 17 | N19 | max | 0 | 28 | 5.7 | 36 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 |
| 18 | | min | 0 | 28 | -1.09 | 39 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 |
| 19 | N21 | max | 0 | 28 | .03 | 28 | 0 | 36 | 0 | 28 | 0 | 28 | 0 | 28 |

Envelope Joint Reactions - Overstrength (Continued)

| Joint | X [k] | LC | Y [k] | LC | Z [k] | LC | MX [k-ft] | LC | MY [k-ft] | LC | MZ [k-ft] | LC | | |
|-------|---------|--------|-------|-------|--------|--------|-----------|----|-----------|----|-----------|----|----|----|
| 20 | min | 0 | 31 | .02 | 30 | 0 | 37 | 0 | 28 | 0 | 28 | 0 | 28 | |
| 21 | N22 | max | 0 | 28 | .03 | 28 | 0 | 37 | 0 | 28 | 0 | 28 | 0 | 28 |
| 22 | min | 0 | 29 | .02 | 31 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 | |
| 23 | N25 | max | 0 | 28 | 0 | 28 | .04 | 38 | 0 | 28 | 0 | 28 | 0 | 28 |
| 24 | min | 0 | 28 | 0 | 28 | -.47 | 37 | 0 | 28 | 0 | 28 | 0 | 28 | |
| 25 | N26 | max | .33 | 30 | 0 | 28 | .28 | 29 | 0 | 28 | 0 | 28 | 0 | 28 |
| 26 | min | -.36 | 29 | 0 | 28 | -.27 | 30 | 0 | 28 | 0 | 28 | 0 | 28 | |
| 27 | N27 | max | 0 | 29 | 20.19 | 28 | 0 | 28 | 0 | 28 | 0 | 30 | 0 | 28 |
| 28 | min | 0 | 28 | 3.55 | 31 | 0 | 29 | 0 | 28 | 0 | 29 | 0 | 28 | |
| 29 | N30 | max | 0 | 28 | 8.67 | 28 | 0 | 28 | 0 | 28 | 0 | 28 | 0 | 28 |
| 30 | min | 0 | 28 | 2.41 | 31 | 0 | 29 | 0 | 28 | 0 | 28 | 0 | 28 | |
| 31 | Totals: | max | 14.02 | 31 | 157.78 | 28 | 19.64 | 38 | | | | | | |
| 32 | min | -14.03 | 28 | 57.04 | 31 | -19.64 | 37 | | | | | | | |

Envelope Story Drift - X-Direction, Strength

| Story (Elevation) | Story Drift[in] | Loc (Z,X) | LC | Drift Ratio (%) | Loc (Z,X) | LC | 2nd/1st Ratio | Loc (Z,X) | LC | |
|-------------------|-----------------|-----------|---------|-----------------|-----------|---------|---------------|-----------|---------|----|
| 1 N25 (15.5 ft) | max | 3.04 | 0, 1.92 | 24 | 1.63 | 0, 1.92 | 24 | 1.04 | 0, 1.92 | 16 |
| 2 | min | -2.67 | 0, 1.92 | 27 | .01 | 0, 1.92 | 14 | 1.01 | 0, 1.92 | 35 |
| 3 N24 (0 ft) | max | .4 | 0, 1.92 | 26 | NC | | | 1.12 | 0, 1.92 | 15 |
| 4 | min | -.51 | 0, 1.92 | 25 | NC | | | .96 | 0, 1.92 | 20 |

Envelope AISC 14th(360-10): LRFD Steel Code Checks

| Member | Shape | Code Check | Lo... | She... | Lo... | Dir | phi*Pnc [k] | phi*Pnt [k] | phi*Mn y-y | phi*Mn z-z [k.... | Eqn | | |
|--------|-------|------------|-------|---------|-------|--------|-------------|-------------|------------|-------------------|--------|----------|---------|
| 1 | M1 | W10x88 | .306 | 15.5... | .063 | 7.67 | y | 810.24 | 1170 | 199.13 | 423.75 | ...H1-1b | |
| 2 | M2 | W10x88 | .312 | 15.5... | .069 | 7.67 | y | 810.24 | 1170 | 199.13 | 423.75 | ...H1-1b | |
| 3 | M3 | W10x45 | .551 | 0 | .373 | 20 | y | 477.54 | 598.5 | 76.13 | 205.88 | ...H1-1b | |
| 4 | M4 | W18x50 | .554 | 3.43... | .248 | 3.43 | y | 401.21 | 661.5 | 62.25 | 378.75 | ...H1-1b | |
| 5 | M5 | W18x50 | .649 | 8.13... | .107 | 7.9 | y | 561.71 | 661.5 | 62.25 | 191.6 | ...H1-1b | |
| 6 | M6 | W10x22 | .452 | .53 | .840 | 0 | y | 243.84 | 292.05 | 22.88 | 97.5 | 1 H1-1b | |
| 7 | M7 | W18x35 | .524 | 10..... | .307 | 10.... | y | 136.72 | 463.5 | 30.23 | 237.53 | ...H1-1b | |
| 8 | M9 | W10x45 | .205 | 0 | .074 | 20 | y | 209.51 | 598.5 | 76.13 | 205.88 | ...H1-1b | |
| 9 | M10 | W18x35 | .312 | 6.46... | .327 | 6.55 | y | 281.53 | 463.5 | 30.23 | 249.38 | ...H1-1b | |
| 10 | M11 | W10x19 | .275 | 7.84... | .073 | 0 | y | 216.75 | 252.9 | 12.56 | 81 | 1 H1-1b | |
| 11 | M12 | W10x19 | .092 | 4.45... | .042 | 9 | y | 237.47 | 252.9 | 12.56 | 81 | 1 H1-1b | |
| 12 | M13 | HSS3.5... | .988 | 0 | .002 | 0 | y | 62.87 | 145.73 | 14.28 | 14.28 | 1 H1-1a | |
| 13 | M14 | W10x19 | .127 | 5.31... | .053 | 10.... | y | 234.32 | 252.9 | 12.56 | 81 | 1 H1-1b | |
| 14 | M17 | W10x45 | .033 | 0 | .034 | 0 | y | 592.74 | 598.5 | 76.13 | 205.88 | ...H1-1b | |
| 15 | M18 | HSS3.5... | .459 | 9 | .000 | 0 | y | 2 | 90.82 | 145.73 | 14.28 | 14.28 | 1 H1-1a |
| 16 | M18A | W10x45 | .055 | 0 | .036 | 0 | y | 592.74 | 598.5 | 76.13 | 205.88 | ...H1-1b | |
| 17 | M21 | W12x26 | .634 | 7.65... | .273 | 0 | y | 290.01 | 344.25 | 30.64 | 139.5 | 1 H1-1b | |

Seismic Detailing - Columns

| Label | Seismic | Ductilit... | UC M... | LC | Slenderness | Panel Zone | Panel Zone | Cont. Plate | Cont. Plate | SC/WB | SC/W... | Misc... | |
|-------|---------|-------------|---------|-----|-------------|------------|------------|-------------|-------------|---------------|-------------|---------|------|
| 1 | M1 | SMF | High | .31 | 17 | Warning | Fail (M3) | 360-10: Eqn | Yes (M3) | 360-10: Eq... | 1.27 (pa... | M3 | Pass |
| 2 | M2 | SMF | High | .31 | 16 | Warning | Fail (M3) | 360-10: Eqn | Yes (M3) | 360-10: Eq... | 1.27 (pa... | M3 | Pass |
| 3 | M18 | Support | Minimal | .46 | 16 | Pass | N/A | | No | N/A | N/A | N/A | Fail |



Company : VSE
 Designer : JBA
 Job Number : U2784-001-181
 Model Name : Summit Powder Mtn

July 2, 2018
 10:00 AM
 Checked By: _____

Seismic Detailing - Beams

| Label | Seis... | Ductilit... | UC ... | LC | Slenderness C... | Type | Req'd Sh... | Req'd Mome... | SC/WB R... | SC/WB Col | Span/D... | Misc. Che... |
|-------|---------|-------------|---------|-----|------------------|------|-------------|---------------|------------|-----------|-----------|-----------------|
| 1 | M3 | SMF | High | .55 | 17 | Pass | BFP | 65.93 | 329.2 | 1.27 | M2 | 23.7 (p... Pass |
| 2 | M7 | Supp... | Minimal | .52 | 29 | Pass | Other... | N/A | N/A | N/A | N/A | N/A Fail |
| 3 | M9 | SMF | High | .2 | 25 | Pass | BFP | 36.99 | 311.72 | 1.38 | M2 | 23.7 (p... Pass |
| 4 | M11 | Supp... | Minimal | .28 | 16 | Pass | Other... | N/A | N/A | N/A | N/A | N/A Fail |
| 5 | M12 | Supp... | Minimal | .09 | 15 | Pass | Other... | 27.44 | 108.9 | N/A | N/A | N/A Fail |
| 6 | M14 | Supp... | Minimal | .13 | 15 | Pass | Other... | N/A | N/A | N/A | N/A | N/A Pass |

Global Parameters - Description:

| | |
|---------------|-------------------|
| Project Title | Summit Powder Mtn |
| Company | VSE |
| Designer | JBA |
| Job Number | U2784-001-181 |
| Notes | |

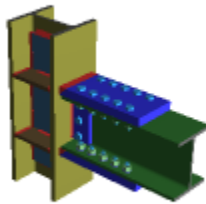
Global Parameters - Solution:

| | |
|--|--------------------------|
| Design Method | AISC 14th (360-10): LRFD |
| Bolt Group Analysis Method | Center of Rotation |
| Weld Analysis Method | Center of Rotation |
| Consider Bolt Hole Deformation? | Yes |
| Check Weld Filler Material Matching? | Yes |
| Check Rotational Ductility? | Yes |
| Full Shear Eccentricity Considered? | No |
| Plastic Panel-Zone Shear Deformation Considered? | No |

M3 I - M1: LRFD Results Report

LRFD

Column/Beam Flange Plate Moment Connection



Material Properties:

| | | | | |
|-----------------------------|------------------|---------------|----------------------------|----------------------------|
| Column | W10x88 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.75x4.00x8.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Moment Plate | P1.50x8.00x16.50 | A572 Gr.50 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Doubler | P0.75x7.42x25.10 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Transverse Stiffener | P0.75x4.10x8.82 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|------------------------|-----------------|--------------------------------------|
| Shear Load | 23.62 kips | User Input Shear Load |
| Moment | -103.66 kips-ft | User Input Moment |
| Axial Load | 25.17 kips | User Input Axial Force (compression) |
| Puf_c | 119.81 kips | Required Flange Force (compression) |
| Puf_t | 94.65 kips | Required Flange Force (tension) |
| Top Column Dist | 0.00 in | User Input Top Column Dist |
| Column Force | 0.00 kips | User Input Column Force |
| Story Shear | 0.00 kips | User Input Story Shear |

Seismic Detailing Input Data:

| | | |
|--------------------------|-----------|---------------------------------|
| Seismic System | SMF (BFP) | User Input Seismic System |
| Gravity Shear, Vg | 0.00 kips | User Input Shear due to Gravity |
| Clear Span, L | 19.93 ft | User Input Clear Span of Beam |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 29 - 1.2D-0mELX
+.5L+.37S**

| Limit State | Required | Available | Unity Check | Result |
|--|------------|-------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Geometry Restrictions at Flange Beam | | | | PASS |
| Shear Plate Weld at Column Limitations | | | | PASS |
| Shear Plate Weld Strength at Column | 23.62 kips | 89.09 kips | 0.27 | PASS |
| Beam Web Shear Yield | 23.62 kips | 106.05 kips | 0.22 | PASS |
| Vert. Plate Shear Yield | 23.62 kips | 129.60 kips | 0.18 | PASS |

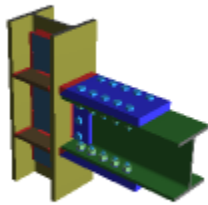
| | | | | |
|---|-------------|----------------|------|------|
| Beam Web Shear Rupture | 23.62 kips | 76.53 kips | 0.31 | PASS |
| Vert. Plate Shear Rupture | 23.62 kips | 105.22 kips | 0.22 | PASS |
| Beam Web Block Shear | 23.62 kips | 114.18 kips | 0.21 | PASS |
| Vert. Plate Block Shear | 23.62 kips | 144.18 kips | 0.16 | PASS |
| Bolt Shear at Beam Web | 23.62 kips | 83.50 kips | 0.28 | PASS |
| Bolt Bearing at Beam Web | 23.62 kips | 83.50 kips | 0.28 | PASS |
| Bolt Bearing at Vert. Plate | 23.62 kips | 78.91 kips | 0.30 | PASS |
| Bolt Shear at Flange Plate | 135.74 kips | 278.33 kips | 0.49 | PASS |
| Bolt Bearing at Beam Flange | 143.79 kips | 278.33 kips | 0.52 | PASS |
| Bolt Bearing at Flange Plate | 119.81 kips | 278.33 kips | 0.43 | PASS |
| Beam Flange Block Shear | 118.63 kips | 393.53 kips | 0.30 | PASS |
| Flange Plate Block Shear | 94.65 kips | 950.62 kips | 0.10 | PASS |
| Flange Plate Tearout | 94.65 kips | 946.05 kips | 0.10 | PASS |
| Flange Plate Weld Strength at Column | | | | PASS |
| Flange Plate Tensile Yield | 94.65 kips | 540.00 kips | 0.18 | PASS |
| Flange Plate Tensile Rupture | 94.65 kips | 457.03 kips | 0.21 | PASS |
| Flange Plate Compression | 119.81 kips | 540.00 kips | 0.22 | PASS |
| Column Flange Bending | 94.65 kips | 137.83 kips | 0.69 | PASS |
| Column Web Yielding | 119.81 kips | 299.13 kips | 0.40 | PASS |
| Column Web Buckling | 119.81 kips | 963.59 kips | 0.12 | PASS |
| Column Web Crippling | 119.81 kips | 455.34 kips | 0.26 | PASS |
| Column Panel Zone Shear | 107.23 kips | 176.42 kips | 0.61 | PASS |
| Doubler Shear Buckling | | | | PASS |
| Doubler Plate Shear Yield | 0.00 kips | 174.96 kips | 0.00 | PASS |
| Doubler Weld at Column Web Limitations | | | | PASS |
| Doubler Weld Strength at Column Flange | | | | PASS |
| Doubler Weld Strength at Column Web | 0.00 kips | 123.94 kips | 0.00 | n/a |
| Seismic Material and Geometry Limitations | | | | PASS |
| Seismic Width to Thickness Ratios | | | | PASS |
| Seismic Moment at Face of Column | | 326.19 kips-ft | | |
| Seismic Weld Limitations | | | | PASS |
| Seismic Flange Bolt Limitations | | | | PASS |
| Seismic Flange Plate Limitations | | | | PASS |
| Seismic Column-Beam Moment Ratio | | | | PASS |
| Seismic Flange Strength | | | | PASS |
| Seismic Beam Web Checks | | | 0.43 | PASS |
| Seismic Flange Bolt Shear Strength | 337.44 kips | 333.99 kips | 1.01 | FAIL |
| Seismic Beam Web Bolt Checks | | | | PASS |
| Seismic Vert. Plate Checks | | | | PASS |
| Seismic Stiffener Plate Limitations | | | | PASS |

Given that this check is comparing reduced bolt strength against the strain-hardened maximum probable moment the beam can produce, we find within 1% acceptable

| | | | |
|---------------------------------|-------------|-------------|-------------|
| Seismic Panel Zone Limitations | | | PASS |
| Seismic Column Panel Zone Shear | 305.24 kips | 196.02 kips | N/A |
| Seismic Doubler Plate Strength | | | PASS |

M3 J - M2: LRFD Results Report

LRFD
Column/Beam Flange Plate Moment Connection



Material Properties:

| | | | | |
|-----------------------------|------------------|---------------|----------------------------|----------------------------|
| Column | W10x88 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.75x4.00x8.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Moment Plate | P1.50x8.00x16.50 | A572 Gr.50 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Doubler | P0.75x7.42x25.10 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Transverse Stiffener | P0.75x4.10x8.82 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|------------------------|-----------------|---|
| Shear Load | -23.57 kips | <i>User Input Shear Load</i> |
| Moment | -102.64 kips-ft | <i>User Input Moment</i> |
| Axial Load | 24.96 kips | <i>User Input Axial Force (compression)</i> |
| Puf_c | 118.66 kips | <i>Required Flange Force (compression)</i> |
| Puf_t | 93.70 kips | <i>Required Flange Force (tension)</i> |
| Top Column Dist | 0.00 in | <i>User Input Top Column Dist</i> |
| Column Force | 0.00 kips | <i>User Input Column Force</i> |
| Story Shear | 0.00 kips | <i>User Input Story Shear</i> |

Seismic Detailing Input Data:

| | | |
|-------------------------------------|-----------|--|
| Seismic System | SMF (BFP) | <i>User Input Seismic System</i> |
| Gravity Shear, V_g | 0.00 kips | <i>User Input Shear due to Gravity</i> |
| Clear Span, L | 19.93 ft | <i>User Input Clear Span of Beam</i> |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 28 - 1.2D+OmELX
+.5L+.37S**

| Limit State | Required | Available | Unity Check | Result |
|---|-------------|-------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Geometry Restrictions at Flange Beam | | | | PASS |
| Shear Plate Weld at Column Limitations | | | | PASS |
| Shear Plate Weld Strength at Column | 23.57 kips | 89.09 kips | 0.26 | PASS |
| Beam Web Shear Yield | 23.57 kips | 106.05 kips | 0.22 | PASS |
| Vert. Plate Shear Yield | 23.57 kips | 129.60 kips | 0.18 | PASS |
| Beam Web Shear Rupture | 23.57 kips | 76.53 kips | 0.31 | PASS |
| Vert. Plate Shear Rupture | 23.57 kips | 105.22 kips | 0.22 | PASS |
| Beam Web Block Shear | 23.57 kips | 110.08 kips | 0.21 | PASS |
| Vert. Plate Block Shear | 23.57 kips | 144.18 kips | 0.16 | PASS |
| Bolt Shear at Beam Web | 23.57 kips | 83.50 kips | 0.28 | PASS |
| Bolt Bearing at Beam Web | 23.57 kips | 83.50 kips | 0.28 | PASS |
| Bolt Bearing at Vert. Plate | 23.57 kips | 78.91 kips | 0.30 | PASS |
| Bolt Shear at Flange Plate | 134.43 kips | 278.33 kips | 0.48 | PASS |
| Bolt Bearing at Beam Flange | 142.40 kips | 278.33 kips | 0.51 | PASS |
| Bolt Bearing at Flange Plate | 118.66 kips | 278.33 kips | 0.43 | PASS |

| | | | | |
|---|-------------|-----------------------|------|------|
| Beam Flange Block Shear | 117.44 kips | 393.53 kips | 0.30 | PASS |
| Flange Plate Block Shear | 93.70 kips | 950.62 kips | 0.10 | PASS |
| Flange Plate Tearout | 93.70 kips | 946.05 kips | 0.10 | PASS |
| Flange Plate Weld Strength at Column | | | | PASS |
| Flange Plate Tensile Yield | 93.70 kips | 540.00 kips | 0.17 | PASS |
| Flange Plate Tensile Rupture | 93.70 kips | 457.03 kips | 0.21 | PASS |
| Flange Plate Compression | 118.66 kips | 540.00 kips | 0.22 | PASS |
| Column Flange Bending | 93.70 kips | 137.83 kips | 0.68 | PASS |
| Column Web Yielding | 118.66 kips | 299.13 kips | 0.40 | PASS |
| Column Web Buckling | 118.66 kips | 963.59 kips | 0.12 | PASS |
| Column Web Crippling | 118.66 kips | 455.34 kips | 0.26 | PASS |
| Column Panel Zone Shear | 106.18 kips | 176.42 kips | 0.60 | PASS |
| Doubler Shear Buckling | | | | PASS |
| Doubler Plate Shear Yield | 0.00 kips | 174.96 kips | 0.00 | PASS |
| Doubler Weld at Column Web Limitations | | | | PASS |
| Doubler Weld Strength at Column Flange | | | | PASS |
| Doubler Weld Strength at Column Web | 0.00 kips | 123.94 kips | 0.00 | n/a |
| Seismic Material and Geometry Limitations | | | | PASS |
| Seismic Width to Thickness Ratios | | | | PASS |
| Seismic Moment at Face of Column | | 326.19 kips-ft | | |
| Seismic Weld Limitations | | | | PASS |
| Seismic Flange Bolt Limitations | | | | PASS |
| Seismic Flange Plate Limitations | | | | PASS |
| Seismic Column-Beam Moment Ratio | | | | PASS |
| Seismic Flange Strength | | | | PASS |
| Seismic Beam Web Checks | | | 0.43 | PASS |
| Seismic Flange Bolt Shear Strength | 337.44 kips | 333.99 kips | 1.01 | FAIL |
| Seismic Beam Web Bolt Checks | | | | PASS |
| Seismic Vert. Plate Checks | | | | PASS |
| Seismic Stiffener Plate Limitations | | | | PASS |
| Seismic Panel Zone Limitations | | | | PASS |
| Seismic Column Panel Zone Shear | 305.24 kips | 196.02 kips | | N/A |
| Seismic Doubler Plate Strength | | | | PASS |

Given that this check is comparing reduced bolt strength against the strain-hardened maximum probable moment the beam can produce, we find within 1% acceptable

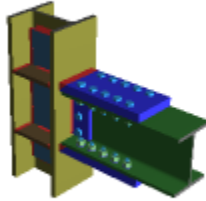
M9 I - M1: LRFD Results Report

LRFD

Column/Beam Flange Plate Moment Connection

Material Properties:

| | | | | |
|---------------------|------------------|------|----------------------------|----------------------------|
| Column | W10x88 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.75x4.00x8.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Moment Plate | P1.50x8.00x16.50 | A572 | F _y = 50.00 ksi | F _u = 65.00 ksi |



| | | | | |
|--------------------------------------|------------------|---|----------------------------|----------------------------|
| Doubler | P0.75x7.42x25.10 | Gr.50 A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Transverse Stiffener | P0.75x4.10x8.82 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Input Data: | | | | |
| Shear Load | 10.55 kips | <i>User Input Shear Load</i> | | |
| Moment | -73.79 kips-ft | <i>User Input Moment</i> | | |
| Axial Load | 27.08 kips | <i>User Input Axial Force (compression)</i> | | |
| Puf_c | 89.88 kips | <i>Required Flange Force (compression)</i> | | |
| Puf_t | 62.80 kips | <i>Required Flange Force (tension)</i> | | |
| Top Column Dist | 0.00 in | <i>User Input Top Column Dist</i> | | |
| Column Force | 27.06 kips | <i>User Input Column Force</i> | | |
| Story Shear | 12.19 kips | <i>User Input Story Shear</i> | | |
| Seismic Detailing Input Data: | | | | |
| Seismic System | SMF (BFP) | <i>User Input Seismic System</i> | | |
| Gravity Shear, Vg | 0.00 kips | <i>User Input Shear due to Gravity</i> | | |
| Clear Span, L | 19.93 ft | <i>User Input Clear Span of Beam</i> | | |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 29 - 1.2D-0mELX
+.5L+.37S**

| Limit State | Required | Available | Unity Check | Result |
|---|-------------|-------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Geometry Restrictions at Flange Beam | | | | PASS |
| Shear Plate Weld at Column Limitations | | | | PASS |
| Shear Plate Weld Strength at Column | 10.55 kips | 89.09 kips | 0.12 | PASS |
| Beam Web Shear Yield | 10.55 kips | 106.05 kips | 0.10 | PASS |
| Vert. Plate Shear Yield | 10.55 kips | 129.60 kips | 0.08 | PASS |
| Beam Web Shear Rupture | 10.55 kips | 76.53 kips | 0.14 | PASS |
| Vert. Plate Shear Rupture | 10.55 kips | 105.22 kips | 0.10 | PASS |
| Beam Web Block Shear | 10.55 kips | 114.18 kips | 0.09 | PASS |
| Vert. Plate Block Shear | 10.55 kips | 144.18 kips | 0.07 | PASS |
| Bolt Shear at Beam Web | 10.55 kips | 83.50 kips | 0.13 | PASS |
| Bolt Bearing at Beam Web | 10.55 kips | 83.50 kips | 0.13 | PASS |
| Bolt Bearing at Vert. Plate | 10.55 kips | 78.91 kips | 0.13 | PASS |
| Bolt Shear at Flange Plate | 101.21 kips | 278.33 kips | 0.36 | PASS |
| Bolt Bearing at Beam Flange | 106.95 kips | 278.33 kips | 0.38 | PASS |
| Bolt Bearing at Flange Plate | 89.88 kips | 278.33 kips | 0.32 | PASS |
| Beam Flange Block Shear | 79.87 kips | 393.53 kips | 0.20 | PASS |
| Flange Plate Block Shear | 62.80 kips | 950.62 kips | 0.07 | PASS |
| Flange Plate Tearout | 62.80 kips | 946.05 kips | 0.07 | PASS |
| Flange Plate Weld Strength at Column | | | | PASS |
| Flange Plate Tensile Yield | 62.80 kips | 540.00 kips | 0.12 | PASS |
| Flange Plate Tensile Rupture | 62.80 kips | 457.03 kips | 0.14 | PASS |
| Flange Plate Compression | 89.88 kips | 540.00 kips | 0.17 | PASS |
| Column Flange Bending | 62.80 kips | 137.83 kips | 0.46 | PASS |
| Column Web Yielding | 89.88 kips | 299.13 kips | 0.30 | PASS |
| Column Web Buckling | 89.88 kips | 963.59 kips | 0.09 | PASS |

| | | | | |
|---|-------------|-----------------------|-------------|-------------|
| Column Web Crippling | 89.88 kips | 455.34 kips | 0.20 | PASS |
| Column Panel Zone Shear | 64.15 kips | 176.42 kips | 0.36 | PASS |
| Doubler Shear Buckling | | | | PASS |
| Doubler Plate Shear Yield | 0.00 kips | 174.96 kips | 0.00 | PASS |
| Doubler Weld at Column Web Limitations | | | | PASS |
| Doubler Weld Strength at Column Flange | | | | PASS |
| Doubler Weld Strength at Column Web | 0.00 kips | 123.94 kips | 0.00 | n/a |
| Seismic Material and Geometry Limitations | | | | PASS |
| Seismic Width to Thickness Ratios | | | | PASS |
| Seismic Moment at Face of Column | | 326.19 kips-ft | | |
| Seismic Weld Limitations | | | | PASS |
| Seismic Flange Bolt Limitations | | | | PASS |
| Seismic Flange Plate Limitations | | | | PASS |
| Seismic Column-Beam Moment Ratio | | | | PASS |
| Seismic Flange Strength | | | | PASS |
| Seismic Beam Web Checks | | | 0.43 | PASS |
| Seismic Flange Bolt Shear Strength | 337.44 kips | 333.99 kips | 1.01 | FAIL |
| Seismic Beam Web Bolt Checks | | | | PASS |
| Seismic Vert. Plate Checks | | | | PASS |
| Seismic Stiffener Plate Limitations | | | | PASS |
| Seismic Panel Zone Limitations | | | | PASS |
| Seismic Column Panel Zone Shear | 305.24 kips | 196.02 kips | | N/A |
| Seismic Doubler Plate Strength | | | | PASS |

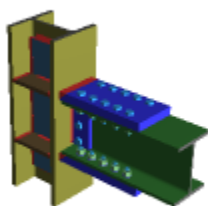
Given that this check is comparing reduced bolt strength against the strain-hardened maximum probable moment the beam can produce, we find within 1% acceptable



M9 J - M2: LRFD Results Report

LRFD

Column/Beam Flange Plate Moment Connection



Material Properties:

| | | | | |
|-----------------------------|------------------|---------------|----------------------------|----------------------------|
| Column | W10x88 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.75x4.00x8.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Moment Plate | P1.50x8.00x16.50 | A572 Gr.50 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Doubler | P0.75x7.42x25.10 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |
| Transverse Stiffener | P0.75x4.10x8.82 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|------------------------|----------------|--------------------------------------|
| Shear Load | -9.80 kips | User Input Shear Load |
| Moment | -69.90 kips-ft | User Input Moment |
| Axial Load | 26.87 kips | User Input Axial Force (compression) |
| Puf_c | 85.75 kips | Required Flange Force (compression) |
| Puf_t | 58.88 kips | Required Flange Force (tension) |
| Top Column Dist | 0.00 in | User Input Top Column Dist |
| Column Force | 26.85 kips | User Input Column Force |
| Story Shear | 11.87 kips | User Input Story Shear |

Seismic Detailing Input Data:

| | | |
|-------------------------------------|-----------|---------------------------------|
| Seismic System | SMF (BFP) | User Input Seismic System |
| Gravity Shear, V_g | 0.00 kips | User Input Shear due to Gravity |

Clear Span, L 19.93 ft

User Input Clear Span of Beam

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 28 - 1.2D+OmELX
+.5L+.37S**

| Limit State | Required | Available | Unity Check | Result |
|--|-------------|-----------------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Geometry Restrictions at Flange Beam | | | | PASS |
| Shear Plate Weld at Column Limitations | | | | PASS |
| Shear Plate Weld Strength at Column | 9.80 kips | 89.09 kips | 0.11 | PASS |
| Beam Web Shear Yield | 9.80 kips | 106.05 kips | 0.09 | PASS |
| Vert. Plate Shear Yield | 9.80 kips | 129.60 kips | 0.08 | PASS |
| Beam Web Shear Rupture | 9.80 kips | 76.53 kips | 0.13 | PASS |
| Vert. Plate Shear Rupture | 9.80 kips | 105.22 kips | 0.09 | PASS |
| Beam Web Block Shear | 9.80 kips | 110.08 kips | 0.09 | PASS |
| Vert. Plate Block Shear | 9.80 kips | 144.18 kips | 0.07 | PASS |
| Bolt Shear at Beam Web | 9.80 kips | 83.50 kips | 0.12 | PASS |
| Bolt Bearing at Beam Web | 9.80 kips | 83.50 kips | 0.12 | PASS |
| Bolt Bearing at Vert. Plate | 9.80 kips | 78.91 kips | 0.12 | PASS |
| Bolt Shear at Flange Plate | 96.49 kips | 278.33 kips | 0.35 | PASS |
| Bolt Bearing at Beam Flange | 101.92 kips | 278.33 kips | 0.37 | PASS |
| Bolt Bearing at Flange Plate | 85.75 kips | 278.33 kips | 0.31 | PASS |
| Beam Flange Block Shear | 75.05 kips | 393.53 kips | 0.19 | PASS |
| Flange Plate Block Shear | 58.88 kips | 950.62 kips | 0.06 | PASS |
| Flange Plate Tearout | 58.88 kips | 946.05 kips | 0.06 | PASS |
| Flange Plate Weld Strength at Column | | | | PASS |
| Flange Plate Tensile Yield | 58.88 kips | 540.00 kips | 0.11 | PASS |
| Flange Plate Tensile Rupture | 58.88 kips | 457.03 kips | 0.13 | PASS |
| Flange Plate Compression | 85.75 kips | 540.00 kips | 0.16 | PASS |
| Column Flange Bending | 58.88 kips | 137.83 kips | 0.43 | PASS |
| Column Web Yielding | 85.75 kips | 299.13 kips | 0.29 | PASS |
| Column Web Buckling | 85.75 kips | 963.59 kips | 0.09 | PASS |
| Column Web Crippling | 85.75 kips | 455.34 kips | 0.19 | PASS |
| Column Panel Zone Shear | 60.45 kips | 176.42 kips | 0.34 | PASS |
| Doubler Shear Buckling | | | | PASS |
| Doubler Plate Shear Yield | 0.00 kips | 174.96 kips | 0.00 | PASS |
| Doubler Weld at Column Web Limitations | | | | PASS |
| Doubler Weld Strength at Column Flange | | | | PASS |
| Doubler Weld Strength at Column Web | 0.00 kips | 123.94 kips | 0.00 | n/a |
| Seismic Material and Geometry Limitations | | | | PASS |
| Seismic Width to Thickness Ratios | | | | PASS |
| Seismic Moment at Face of Column | | 326.19 kips-ft | | |

| | | | | |
|-------------------------------------|-------------|-------------|------|------|
| Seismic Weld Limitations | | | | PASS |
| Seismic Flange Bolt Limitations | | | | PASS |
| Seismic Flange Plate Limitations | | | | PASS |
| Seismic Column-Beam Moment Ratio | | | | PASS |
| Seismic Flange Strength | | | | PASS |
| Seismic Beam Web Checks | | | 0.43 | PASS |
| Seismic Flange Bolt Shear Strength | 337.44 kips | 333.99 kips | 1.01 | FAIL |
| Seismic Beam Web Bolt Checks | | | | PASS |
| Seismic Vert. Plate Checks | | | | PASS |
| Seismic Stiffener Plate Limitations | | | | PASS |
| Seismic Panel Zone Limitations | | | | PASS |
| Seismic Column Panel Zone Shear | 305.24 kips | 196.02 kips | | N/A |
| Seismic Doubler Plate Strength | | | | PASS |

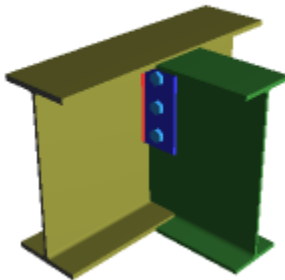
Given that this check is comparing reduced bolt strength against the strain-hardened maximum probable moment the beam can produce, we find within 1% acceptable



M10 I - M5: LRFD Results Report

LRFD

Girder/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|--------|-----------------|------|----------------------------|----------------------------|
| Girder | W18x50 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W18x35 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.31x4.00x9.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|------------|------------|----------------------------------|
| Shear Load | -4.46 kips | User Input Shear Load |
| Axial Load | -3.90 kips | User Input Axial Force (tension) |

Note: Unless specified, all code references are from AISC 360-10

Governing LC: 3D - 28 - 1.2D+0mELX +.5L+.37S

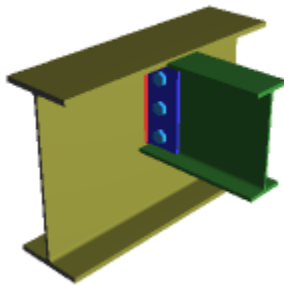
| Limit State | Required | Available | Unity Check | Result |
|--|-----------|-------------|-------------|--------|
| Geometry Restrictions at Beam | | | | PASS |
| Girder Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 4.46 kips | 142.77 kips | 0.03 | PASS |
| Plate Shear Yield | 4.46 kips | 60.75 kips | 0.07 | PASS |
| Beam Shear Rupture | 4.46 kips | 116.16 kips | 0.04 | PASS |
| Plate Shear Rupture at Beam | 4.46 kips | 52.00 kips | 0.09 | PASS |
| Beam Axial Yield | 3.90 kips | 214.15 kips | 0.02 | PASS |
| Plate Axial Yield | 3.90 kips | 91.13 kips | 0.04 | PASS |
| Beam Tension Rupture | 3.90 kips | 193.61 kips | 0.02 | PASS |
| Plate Tension Rupture at Beam | 3.90 kips | 86.66 kips | 0.04 | PASS |

| | | | | |
|---------------------------------------|-----------------|-----------------|------|------|
| Beam Block Shear | 4.46 kips | 111.68 kips | 0.04 | PASS |
| Plate Block Shear | 4.46 kips | 59.21 kips | 0.08 | PASS |
| Beam Tearout | 3.90 kips | 80.80 kips | 0.05 | PASS |
| Plate Tearout on Plate at Beam | 3.90 kips | 78.02 kips | 0.05 | PASS |
| Lateral Stability / Stabilizer Plates | 5.92 kips | 291.22 kips | 0.02 | PASS |
| Plate Flexural Yield | | | 0.03 | PASS |
| Plate Flexural Rupture | | | 0.03 | PASS |
| Plate Flexural Buckling | 4.46 kips | 50.44 kips | 0.09 | PASS |
| Coped Beam Flexural Rupture | 4.46 kips | 150.61 kips | 0.03 | PASS |
| Coped Beam Lateral Torsional Buckling | 4.46 kips | 139.02 kips | 0.03 | PASS |
| Bolt Bearing on Beam | 5.92 kips | 53.68 kips | 0.11 | PASS |
| Bolt Bearing on Plate at Beam | 5.92 kips | 53.68 kips | 0.11 | PASS |
| Bolt Shear at Beam | 5.92 kips | 48.71 kips | 0.12 | PASS |
| Bolt Group Eccentricity | | 0.91 | | |
| Girder Weld Strength | 24999.08 lbs/ft | 97980.58 lbs/ft | 0.26 | PASS |

M11 I - M16: LRFD Results Report

LRFD

Girder/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Girder | W18x50 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x19 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x4.00x9.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|-------------------|------------|--------------------------------------|
| Shear Load | -0.27 kips | User Input Shear Load |
| Axial Load | 14.90 kips | User Input Axial Force (compression) |

Note: Unless specified, all code references are from AISC 360-10

Governing LC: 3D - 38 - 0.9D+OmELZ

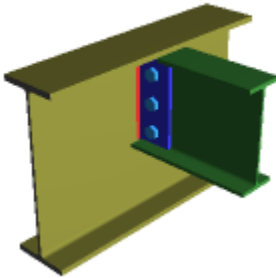
| Limit State | Required | Available | Unity Check | Result |
|---|------------|-------------|-------------|--------|
| Geometry Restrictions at Beam | | | | PASS |
| Girder Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 0.27 kips | 68.92 kips | 0.00 | PASS |
| Plate Shear Yield | 0.27 kips | 72.90 kips | 0.00 | PASS |
| Beam Shear Rupture | 0.27 kips | 48.01 kips | 0.01 | PASS |
| Plate Shear Rupture at Beam | 0.27 kips | 62.40 kips | 0.00 | PASS |
| Beam Axial Yield | 14.90 kips | 172.46 kips | 0.09 | PASS |
| Plate Axial Yield | 14.90 kips | 109.35 kips | 0.14 | PASS |
| Beam Block Shear | 0.27 kips | 82.87 kips | 0.00 | PASS |

| | | | | |
|---------------------------------------|------------|-------------|------|------|
| Plate Block Shear | 0.27 kips | 71.05 kips | 0.00 | PASS |
| Compression Buckling of the Plate | 14.90 kips | 109.35 kips | 0.14 | PASS |
| Lateral Stability / Stabilizer Plates | 14.90 kips | 503.22 kips | 0.03 | PASS |
| Plate Flexural Yield | | | 0.12 | PASS |
| Plate Flexural Rupture | | | 0.05 | PASS |
| Plate Flexural Buckling | | | 0.14 | PASS |
| Coped Beam Flexural Rupture | 0.27 kips | 63.71 kips | 0.00 | PASS |
| Coped Beam Local Web Buckling | 0.27 kips | 58.81 kips | 0.00 | PASS |
| Bolt Bearing on Beam | 14.90 kips | 53.68 kips | 0.28 | PASS |
| Bolt Bearing on Plate at Beam | 14.90 kips | 53.68 kips | 0.28 | PASS |
| Bolt Shear at Beam | 14.90 kips | 46.31 kips | 0.32 | PASS |
| Bolt Group Eccentricity | | 0.86 | | |
| Girder Weld Strength | 14.90 kips | 88.18 kips | 0.17 | PASS |

M11 J - M15: LRFD Results Report

LRFD

Girder/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Girder | W18x46 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x19 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x4.00x9.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|-------------------|------------|----------------------------------|
| Shear Load | -3.06 kips | User Input Shear Load |
| Axial Load | -6.27 kips | User Input Axial Force (tension) |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 37 - 1.2D+.5L-
OmELZ+.37S**

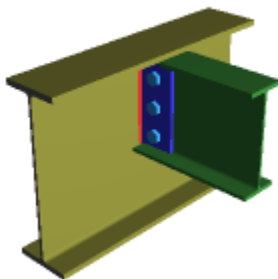
| Limit State | Required | Available | Unity Check | Result |
|--|-----------|-------------|-------------|--------|
| Geometry Restrictions at Beam | | | | PASS |
| Girder Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 3.06 kips | 68.92 kips | 0.04 | PASS |
| Plate Shear Yield | 3.06 kips | 72.90 kips | 0.04 | PASS |
| Beam Shear Rupture | 3.06 kips | 48.01 kips | 0.06 | PASS |
| Plate Shear Rupture at Beam | 3.06 kips | 62.40 kips | 0.05 | PASS |
| Beam Axial Yield | 6.27 kips | 172.46 kips | 0.04 | PASS |
| Plate Axial Yield | 6.27 kips | 109.35 kips | 0.06 | PASS |
| Beam Tension Rupture | 6.27 kips | 154.84 kips | 0.04 | PASS |
| Plate Tension Rupture at Beam | 6.27 kips | 103.99 kips | 0.06 | PASS |

| | | | | |
|---------------------------------------|-----------------|------------------|------|------|
| Beam Block Shear | 3.06 kips | 82.87 kips | 0.04 | PASS |
| Plate Block Shear | 3.06 kips | 71.05 kips | 0.04 | PASS |
| Beam Tearout | 6.27 kips | 67.34 kips | 0.09 | PASS |
| Plate Tearout on Plate at Beam | 6.27 kips | 93.63 kips | 0.07 | PASS |
| Lateral Stability / Stabilizer Plates | 6.97 kips | 503.22 kips | 0.01 | PASS |
| Plate Flexural Yield | | | 0.03 | PASS |
| Plate Flexural Rupture | | | 0.03 | PASS |
| Plate Flexural Buckling | 3.06 kips | 60.52 kips | 0.05 | PASS |
| Coped Beam Flexural Rupture | 3.06 kips | 68.15 kips | 0.04 | PASS |
| Coped Beam Local Web Buckling | 3.06 kips | 62.91 kips | 0.05 | PASS |
| Bolt Bearing on Beam | 6.97 kips | 53.68 kips | 0.13 | PASS |
| Bolt Bearing on Plate at Beam | 6.97 kips | 53.68 kips | 0.13 | PASS |
| Bolt Shear at Beam | 6.97 kips | 46.62 kips | 0.15 | PASS |
| Bolt Group Eccentricity | | 0.87 | | |
| Girder Weld Strength | 16583.99 lbs/ft | 117576.70 lbs/ft | 0.14 | PASS |

M14 I - M15: LRFD Results Report

LRFD

Girder/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Girder | W18x46 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x19 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x4.00x9.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|-------------------|-----------|--------------------------------------|
| Shear Load | 0.84 kips | User Input Shear Load |
| Axial Load | 6.41 kips | User Input Axial Force (compression) |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 36 - 1.2D+.5L
+OmELZ+.37S**

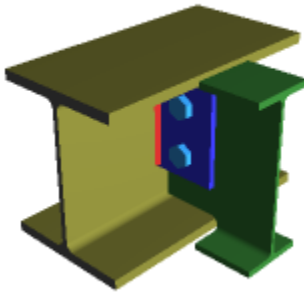
| Limit State | Required | Available | Unity Check | Result |
|--|-----------|-------------|-------------|--------|
| Geometry Restrictions at Beam | | | | PASS |
| Girder Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 0.84 kips | 68.92 kips | 0.01 | PASS |
| Plate Shear Yield | 0.84 kips | 72.90 kips | 0.01 | PASS |
| Beam Shear Rupture | 0.84 kips | 48.01 kips | 0.02 | PASS |
| Plate Shear Rupture at Beam | 0.84 kips | 62.40 kips | 0.01 | PASS |
| Beam Axial Yield | 6.41 kips | 172.46 kips | 0.04 | PASS |
| Plate Axial Yield | 6.41 kips | 109.35 kips | 0.06 | PASS |

| | | | | |
|---------------------------------------|-----------|-------------|------|------|
| Beam Block Shear | 0.84 kips | 51.80 kips | 0.02 | PASS |
| Plate Block Shear | 0.84 kips | 71.05 kips | 0.01 | PASS |
| Compression Buckling of the Plate | 6.41 kips | 109.35 kips | 0.06 | PASS |
| Lateral Stability / Stabilizer Plates | 6.47 kips | 503.22 kips | 0.01 | PASS |
| Plate Flexural Yield | | | 0.03 | PASS |
| Plate Flexural Rupture | | | 0.01 | PASS |
| Plate Flexural Buckling | | | 0.07 | PASS |
| Coped Beam Flexural Rupture | 0.84 kips | 68.15 kips | 0.01 | PASS |
| Coped Beam Local Web Buckling | 0.84 kips | 62.91 kips | 0.01 | PASS |
| Bolt Bearing on Beam | 6.47 kips | 53.68 kips | 0.12 | PASS |
| Bolt Bearing on Plate at Beam | 6.47 kips | 53.68 kips | 0.12 | PASS |
| Bolt Shear at Beam | 6.47 kips | 50.28 kips | 0.13 | PASS |
| Bolt Group Eccentricity | | 0.94 | | |
| Girder Weld Strength | 6.47 kips | 88.18 kips | 0.07 | PASS |

M14 J - M18A: LRFD Results Report

LRFD

Girder/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Girder | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x19 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x4.00x6.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|-------------------|------------|------------------------|
| Shear Load | -3.78 kips | User Input Shear Load |
| Axial Load | 0.00 kips | User Input Axial Force |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 15 - 1.2D+1.6SL
+.5L**

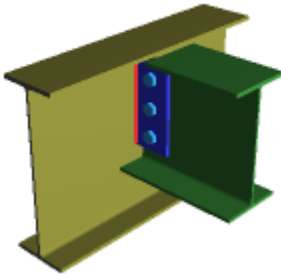
| Limit State | Required | Available | Unity Check | Result |
|---|-----------|-------------|-------------|--------|
| Geometry Restrictions at Beam | | | | PASS |
| Girder Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 3.78 kips | 58.95 kips | 0.06 | PASS |
| Plate Shear Yield | 3.78 kips | 48.60 kips | 0.08 | PASS |
| Beam Shear Rupture | 3.78 kips | 44.68 kips | 0.08 | PASS |
| Plate Shear Rupture at Beam | 3.78 kips | 41.60 kips | 0.09 | PASS |
| Beam Block Shear | 3.78 kips | 48.72 kips | 0.08 | PASS |
| Plate Block Shear | 3.78 kips | 52.83 kips | 0.07 | PASS |
| Lateral Stability / Stabilizer Plates | 3.78 kips | 335.48 kips | 0.01 | PASS |

| | | | | |
|---------------------------------------|-----------|------------|------|------|
| Plate Flexural Yield | | | 0.01 | PASS |
| Plate Flexural Rupture | | | 0.01 | PASS |
| Plate Flexural Buckling | 3.78 kips | 56.50 kips | 0.07 | PASS |
| Coped Beam Flexural Rupture | 3.78 kips | 28.80 kips | 0.13 | PASS |
| Coped Beam Lateral Torsional Buckling | 3.78 kips | 26.58 kips | 0.14 | PASS |
| Bolt Bearing on Beam | 3.78 kips | 35.78 kips | 0.11 | PASS |
| Bolt Bearing on Plate at Beam | 3.78 kips | 35.78 kips | 0.11 | PASS |
| Bolt Shear at Beam | 3.78 kips | 29.23 kips | 0.13 | PASS |
| Bolt Group Eccentricity | | 0.82 | | |
| Girder Weld Strength | 3.78 kips | 46.58 kips | 0.08 | PASS |

M21 I - M7: LRFD Results Report

LRFD

Girder/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Girder | W18x35 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W12x26 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x4.00x9.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|-------------------|------------|------------------------|
| Shear Load | 22.98 kips | User Input Shear Load |
| Axial Load | 0.00 kips | User Input Axial Force |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 15 - 1.2D+1.6SL
+.5L**

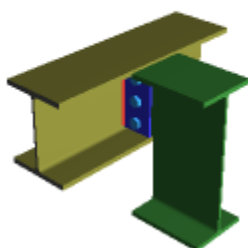
| Limit State | Required | Available | Unity Check | Result |
|---|------------|-------------|-------------|--------|
| Geometry Restrictions at Beam | | | | PASS |
| Girder Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 22.98 kips | 77.21 kips | 0.30 | PASS |
| Plate Shear Yield | 22.98 kips | 72.90 kips | 0.32 | PASS |
| Beam Shear Rupture | 22.98 kips | 57.62 kips | 0.40 | PASS |
| Plate Shear Rupture at Beam | 22.98 kips | 62.40 kips | 0.37 | PASS |
| Beam Block Shear | 22.98 kips | 50.95 kips | 0.45 | PASS |
| Plate Block Shear | 22.98 kips | 71.05 kips | 0.32 | PASS |
| Lateral Stability / Stabilizer Plates | 22.98 kips | 503.22 kips | 0.05 | PASS |
| Plate Flexural Yield | | | 0.11 | PASS |
| Plate Flexural Rupture | | | 0.14 | PASS |
| Plate Flexural Buckling | 22.98 kips | 121.05 kips | 0.19 | PASS |
| Coped Beam Flexural Rupture | 22.98 kips | 98.47 kips | 0.23 | PASS |

| | | | | |
|-------------------------------|------------|------------|------|------|
| Coped Beam Local Web Buckling | 22.98 kips | 90.90 kips | 0.25 | PASS |
| Bolt Bearing on Beam | 22.98 kips | 53.68 kips | 0.43 | PASS |
| Bolt Bearing on Plate at Beam | 22.98 kips | 53.68 kips | 0.43 | PASS |
| Bolt Shear at Beam | 22.98 kips | 48.57 kips | 0.47 | PASS |
| Bolt Group Eccentricity | 0.90 | | | |
| Girder Weld Strength | 22.98 kips | 81.47 kips | 0.28 | PASS |

M5 I - M9: LRFD Results Report

LRFD

Girder/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Girder | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W18x50 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.31x4.00x8.03 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|-------------------|------------|--------------------------------------|
| Shear Load | -5.91 kips | User Input Shear Load |
| Axial Load | 0.09 kips | User Input Axial Force (compression) |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 16 - 1.2D+1.6SL
+ .5L+.5WLX**

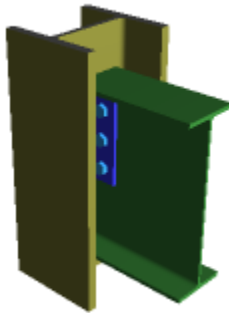
| Limit State | Required | Available | Unity Check | Result |
|---|-----------|-------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Girder Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 5.91 kips | 83.92 kips | 0.07 | PASS |
| Plate Shear Yield | 5.91 kips | 54.20 kips | 0.11 | PASS |
| Beam Shear Rupture | 5.91 kips | 54.57 kips | 0.11 | PASS |
| Plate Shear Rupture at Beam | 5.91 kips | 44.08 kips | 0.13 | PASS |
| Beam Block Shear | 5.91 kips | 63.17 kips | 0.09 | PASS |
| Plate Block Shear | 5.91 kips | 55.56 kips | 0.11 | PASS |
| Lateral Stability / Stabilizer Plates | 5.91 kips | 259.83 kips | 0.02 | PASS |
| Plate Flexural Yield | | | 0.02 | PASS |
| Plate Flexural Rupture | | | 0.02 | PASS |
| Plate Flexural Buckling | 5.91 kips | 37.32 kips | 0.16 | PASS |
| Coped Beam Flexural Rupture | 5.91 kips | 41.10 kips | 0.14 | PASS |
| Coped Beam Lateral Torsional Buckling | 5.91 kips | 37.94 kips | 0.16 | PASS |
| Bolt Bearing on Beam | 5.91 kips | 47.49 kips | 0.12 | PASS |
| Bolt Bearing on Plate at Beam | 5.91 kips | 49.55 kips | 0.12 | PASS |
| Bolt Shear at Beam | 5.91 kips | 38.26 kips | 0.15 | PASS |

| | | | | |
|--------------------------------|-----------|------------|-------------|-------------|
| Bolt Group Eccentricity | | | 0.71 | |
| Girder Weld Strength | 5.91 kips | 58.72 kips | 0.10 | PASS |

M7 J - M1: LRFD Results Report

LRFD

Column/Beam Shear Tab Shear Connection



Material Properties:

| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Column | W10x88 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W18x35 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x3.50x9.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

Input Data:

| | | |
|-------------------|------------|--------------------------------------|
| Shear Load | 47.06 kips | User Input Shear Load |
| Axial Load | 0.03 kips | User Input Axial Force (compression) |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 17 - 1.2D
+1.6SL-.5WLX**

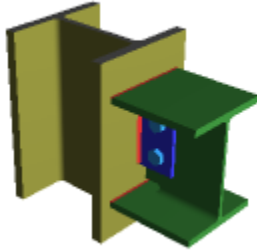
| Limit State | Required | Available | Unity Check | Result |
|---|------------|-------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Column Weld Limitations | | | | PASS |
| Rotational Ductility, Erection Stability | | | | PASS |
| Beam Shear Yield | 47.06 kips | 159.30 kips | 0.30 | PASS |
| Plate Shear Yield | 47.06 kips | 72.90 kips | 0.65 | PASS |
| Beam Shear Rupture | 47.06 kips | 132.28 kips | 0.36 | PASS |
| Plate Shear Rupture at Beam | 47.06 kips | 62.40 kips | 0.75 | PASS |
| Beam Block Shear | 47.06 kips | 104.98 kips | 0.45 | PASS |
| Plate Block Shear | 47.06 kips | 62.89 kips | 0.75 | PASS |
| Lateral Stability / Stabilizer Plates | 47.06 kips | 503.22 kips | 0.09 | PASS |
| Plate Flexural Yield | | | 0.45 | PASS |
| Plate Flexural Rupture | | | 0.61 | PASS |
| Plate Flexural Buckling | 47.06 kips | 121.05 kips | 0.39 | PASS |
| Bolt Bearing on Beam | 47.06 kips | 67.59 kips | 0.70 | PASS |
| Bolt Bearing on Plate at Beam | 47.06 kips | 66.47 kips | 0.71 | PASS |
| Bolt Shear at Beam | 47.06 kips | 61.16 kips | 0.77 | PASS |
| Bolt Group Eccentricity | | 0.90 | | |
| Weld at Column | 47.06 kips | 81.47 kips | 0.58 | PASS |

M17 I - M2: LRFD Results Report

LRFD

Column/Beam Direct Weld Moment Connection

Material Properties:



| | | | | |
|---------------|-----------------|------|----------------------------|----------------------------|
| Column | W10x88 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x3.50x6.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |

| | | | | |
|------------------------|---------------|--|--|--|
| Input Data: | | | | |
| Shear Load | 3.60 kips | <i>User Input Shear Load</i> | | |
| Moment | -6.81 kips-ft | <i>User Input Moment</i> | | |
| Axial Load | 0.00 kips | <i>User Input Axial Force</i> | | |
| Puf_c | 8.62 kips | <i>Required Flange Force (compression)</i> | | |
| Puf_t | 8.62 kips | <i>Required Flange Force (tension)</i> | | |
| Top Column Dist | 0.00 in | <i>User Input Top Column Dist</i> | | |
| Column Force | 0.00 kips | <i>User Input Column Force</i> | | |
| Story Shear | 0.00 kips | <i>User Input Story Shear</i> | | |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 15 - 1.2D+1.6SL
+.5L**

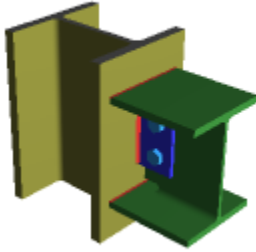
| Limit State | Required | Available | Unity Check | Result |
|--------------------------------------|-----------|-------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Column Weld Limitations | | | | PASS |
| Flange Weld Limitations | | | | PASS |
| Beam Web Shear Yield | 3.60 kips | 77.28 kips | 0.05 | PASS |
| Plate Shear Yield | 3.60 kips | 48.60 kips | 0.07 | PASS |
| Beam Web Shear Rupture | 3.60 kips | 57.43 kips | 0.06 | PASS |
| Plate Shear Rupture | 3.60 kips | 41.60 kips | 0.09 | PASS |
| Beam Block Shear | 3.60 kips | 50.76 kips | 0.07 | PASS |
| Plate Block Shear at Beam | 3.60 kips | 44.67 kips | 0.08 | PASS |
| Bolt Bearing at Beam Web | 3.60 kips | 35.78 kips | 0.10 | PASS |
| Bolt Bearing at Shear Plate | 3.60 kips | 35.78 kips | 0.10 | PASS |
| Bolt Shear at Beam Web | 3.60 kips | 35.78 kips | 0.10 | PASS |
| Column Weld Strength | 3.60 kips | 58.79 kips | 0.06 | PASS |
| Flange Weld Strength | 8.62 kips | 67.37 kips | 0.13 | PASS |
| Beam Flange Tensile Yield | 8.62 kips | 223.76 kips | 0.04 | PASS |
| Beam Flange Tensile Rupture | 8.62 kips | 242.40 kips | 0.04 | PASS |
| Beam Flange Compression | 8.62 kips | 223.76 kips | 0.04 | PASS |
| Column Flange Bending | 8.62 kips | 137.83 kips | 0.06 | PASS |
| Column Web Yielding | 8.62 kips | 123.37 kips | 0.07 | PASS |
| Column Web Buckling | 8.62 kips | 368.27 kips | 0.02 | PASS |
| Column Web Crippling | 8.62 kips | 177.08 kips | 0.05 | PASS |
| Column Panel Zone Shear | 8.62 kips | 176.42 kips | 0.05 | PASS |

M18A I - M1: LRFD Results Report

LRFD

Column/Beam Direct Weld Moment Connection

| | | | | |
|----------------------|-----------------|------|----------------------------|----------------------------|
| Material Properties: | | | | |
| Column | W10x88 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Beam | W10x45 | A992 | F _y = 50.00 ksi | F _u = 65.00 ksi |
| Plate | P0.38x3.50x6.00 | A36 | F _y = 36.00 ksi | F _u = 58.00 ksi |



Input Data:

| | | |
|------------------------|---------------|---|
| Shear Load | 3.80 kips | <i>User Input Shear Load</i> |
| Moment | -7.20 kips-ft | <i>User Input Moment</i> |
| Axial Load | 0.00 kips | <i>User Input Axial Force (compression)</i> |
| Puf_c | 9.12 kips | <i>Required Flange Force (compression)</i> |
| Puf_t | 9.12 kips | <i>Required Flange Force (tension)</i> |
| Top Column Dist | 0.00 in | <i>User Input Top Column Dist</i> |
| Column Force | 0.00 kips | <i>User Input Column Force</i> |
| Story Shear | 0.00 kips | <i>User Input Story Shear</i> |

Note: Unless specified, all code references are from AISC 360-10

**Governing LC: 3D - 16 - 1.2D+1.6SL
+ .5L+.5WLX**

| Limit State | Required | Available | Unity Check | Result |
|--------------------------------------|-----------|-------------|-------------|-------------|
| Geometry Restrictions at Beam | | | | PASS |
| Column Weld Limitations | | | | PASS |
| Flange Weld Limitations | | | | PASS |
| Beam Web Shear Yield | 3.80 kips | 77.28 kips | 0.05 | PASS |
| Plate Shear Yield | 3.80 kips | 48.60 kips | 0.08 | PASS |
| Beam Web Shear Rupture | 3.80 kips | 57.43 kips | 0.07 | PASS |
| Plate Shear Rupture | 3.80 kips | 41.60 kips | 0.09 | PASS |
| Beam Block Shear | 3.80 kips | 50.76 kips | 0.07 | PASS |
| Plate Block Shear at Beam | 3.80 kips | 44.67 kips | 0.09 | PASS |
| Bolt Bearing at Beam Web | 3.80 kips | 35.78 kips | 0.11 | PASS |
| Bolt Bearing at Shear Plate | 3.80 kips | 35.78 kips | 0.11 | PASS |
| Bolt Shear at Beam Web | 3.80 kips | 35.78 kips | 0.11 | PASS |
| Column Weld Strength | 3.80 kips | 58.79 kips | 0.06 | PASS |
| Flange Weld Strength | 9.12 kips | 67.37 kips | 0.14 | PASS |
| Beam Flange Tensile Yield | 9.12 kips | 223.76 kips | 0.04 | PASS |
| Beam Flange Tensile Rupture | 9.12 kips | 242.40 kips | 0.04 | PASS |
| Beam Flange Compression | 9.12 kips | 223.76 kips | 0.04 | PASS |
| Column Flange Bending | 9.12 kips | 137.83 kips | 0.07 | PASS |
| Column Web Yielding | 9.12 kips | 123.37 kips | 0.07 | PASS |
| Column Web Buckling | 9.12 kips | 368.27 kips | 0.02 | PASS |
| Column Web Crippling | 9.12 kips | 177.08 kips | 0.05 | PASS |
| Column Panel Zone Shear | 9.12 kips | 176.42 kips | 0.05 | PASS |

WELDED CONNECTION WITH FILLET WELDS TREATED AS LINES

Description: Cap Plate Weld

Geometry

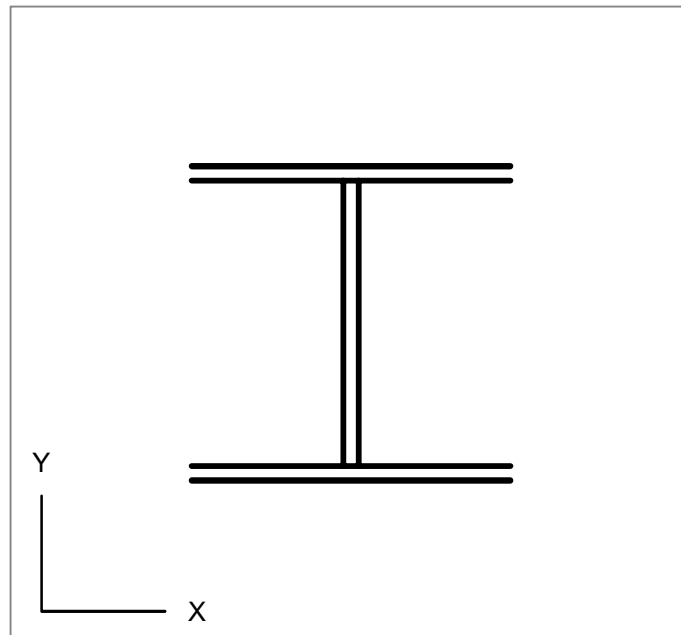
Weld Pattern: Pattern around wideflange shape, strong axis
 b (in) = 10.25 (parallel to x-axis)
 d (in) = 10.875

S_{XWELD} (in²) = 262.36
 S_{YWELD} (in²) = 70.04
 I_{pWELD} (in³) = 1,785.54
 Lweld (in) = 62.75
 Torque arm (in) = 7.47

Graphic Scale: 100%

Results

Electrode Class Number (ksi): 70
 Required leg size (in) = 0.241
 Actual leg size (in) = 1/4
 Stress ratio: 96.4%



Loads on Weld Group

Load Type: LRFD
 Axial_(z) (lb) =
 Shear_x (lb) = 337000
 Shear_y (lb) =
 Moment_{xx} (ft-lb) =
 Moment_{yy} (ft-lb) =
 Torque_(zz) (ft-lb) =

v_{axial} (lb/in) = 0
 v_{shearx} (lb/in) = 5371
 v_{sheary} (lb/in) = 0
 $v_{momentxx}$ (lb/in) = 0
 $v_{momentyy}$ (lb/in) = 0
 v_{torque} (lb/in) = 0

 v_{max} (lb/in) = 5371

Special RC Shear Wall Checks per 18.10 (C-2ND)

$$f'_c := 4500$$

$$f_y := 60 \cdot \text{ksi}$$

$$\lambda := 1$$

$$d_b := .5 \text{ in}$$

$$t_w := 8 \text{ in}$$

$$l_w := 8 \text{ ft}$$

$$h_w := 8 \text{ ft}$$

$$\frac{h_w}{l_w} = 1$$

$$\alpha_c := 3$$

$$A_{cv} := l_w \cdot h_w = 64 \text{ ft}^2$$

$$\rho_{wmin} := .0025$$

$$A_{req} := \frac{t_w \cdot 12 \text{ in} \cdot \rho_{wmin}}{\left(\frac{\pi \cdot d_b^2}{4} \right)} = 1.222 \text{ bars/ft}$$

$$s := 9 \text{ in}$$

$$\rho_w := \frac{\frac{12 \text{ in} \cdot \pi \cdot d_b^2}{4}}{t_w \cdot 12 \text{ in}} = 0.0027$$

$$V_u := 8350 \text{ lbf} = 8.35 \text{ kip}$$

$$V_n := A_{cv} \cdot (\alpha_c \cdot \lambda \cdot \sqrt{f'_c} \cdot \text{psi} + \rho_w \cdot f_y) = 3363 \text{ kip}$$

$$2 \cdot A_{cv} \cdot \lambda \cdot \sqrt{f'_c} \cdot \text{psi} = 1236 \text{ kip} \quad \text{Greater than } V_u, \text{ two curtains of reinf. not req. per 18.10.2.2}$$

$$S_{xw} := \frac{t_w \cdot l_w^2}{6} = 7.111 \text{ ft}^3$$

$$\sigma := \frac{V_u \cdot h_w}{S_{xw}} = 65.234 \text{ psi}$$

$$0.2 \cdot f'_c \cdot \text{psi} = 900 \text{ psi} \quad \text{sigma} < 0.2f'_c, \text{ no special boundary elements required}$$

$$T_w := \frac{V_u \cdot h_w}{l_w} = 8.35 \text{ kip}$$

$$A_{boundary} := \frac{T_w}{f_y \cdot .9} = 0.155 \text{ in}^2$$

Special RC Shear Wall Checks per 18.10 (1.2-1ST)

$$t_w := 8 \text{ in} \quad l_w := 3 \text{ ft} + 10 \text{ in} \quad h_w := 8 \text{ ft} \quad \frac{h_w}{l_w} = 2.087 \quad \alpha_c := 3$$

$$A_{cv} := l_w \cdot h_w = 30.667 \text{ ft}^2$$

$$\rho_{wmin} := .0025$$

$$A_{req} := \frac{t_w \cdot 12 \text{ in} \cdot \rho_{wmin}}{\left(\frac{\pi \cdot d_b^2}{4} \right)} = 1.222 \text{ bars/ft}$$

$$s := 9 \text{ in}$$

$$\rho_w := \frac{\frac{12 \text{ in} \cdot \pi \cdot d_b^2}{4}}{t_w \cdot 12 \text{ in}} = 0.0027$$

$$V_u := 9826 \text{ lbf} = 9.826 \text{ kip}$$

$$V_n := A_{cv} \cdot \left(\alpha_c \cdot \lambda \cdot \sqrt{f'_c} \cdot \text{psi} + \rho_w \cdot f_y \right) = 1611 \text{ kip}$$

$$2 \cdot A_{cv} \cdot \lambda \cdot \sqrt{f'_c} \cdot \text{psi} = 592 \text{ kip} \quad \text{Greater than } V_u, \text{ two curtains of reinf. not req. per 18.10.2.2}$$

$$S_{xw} := \frac{t_w \cdot l_w^2}{6} = 1.633 \text{ ft}^3$$

$$\sigma := \frac{V_u \cdot h_w}{S_{xw}} = 334.344 \text{ psi}$$

$$0.2 \cdot f'_c \cdot \text{psi} = 900 \text{ psi} \quad \text{sigma} < 0.2f'_c, \text{ no special boundary elements required}$$

$$T_w := \frac{V_u \cdot h_w}{l_w} = 20.506 \text{ kip}$$

$$A_{boundary} := \frac{T_w}{f_y \cdot .9} = 0.38 \text{ in}^2$$