CT ENGINEERING
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#23027
Structural Calculations For:

# Selby Primary Suite & Garage Addition

## 4731 90th Ave SE
## Mercer Island, WA 98040

Designer: FFWD LLC ( Egbert Bom )

Design Criteria: IBC 2018 as adopted by Mercer Island
Wind: Wind Speed = 110 mph, Exposure 'C', Kzt = 1.00
Seismic: Site Class D [Default], SDC = D, R = 6.5, I=1.0
Roof Rain-on-Snow Load = 25 psf
Roof Future PV Load = 5psf
Deck Live Load = 60psf
Residential Floor Live Load = 40psf

Summary:
Two wings are being added onto a Rambler Remodel. Conventional wood framing and shallow concrete foundation has been engineered wood-framed sheathed walls for the lateral force resisting system.

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# CALCULATION SECTION 1.0: LOADING

SHEET TITLE: **DEAD LOAD SUMMARY**

## 1.1) ESTIMATED DEADLOADS

| FRAMED ROOF | | |
|---|---|---|
| Roofing - | 3.5 | psf |
| 5/8" plywood (O.S.B.) | 2.2 | psf |
| Rafters or Trusses at 24" o.c. | 4.0 | psf |
| Insulation | 1.0 | psf |
| (1) 5/8" gypsum ceiling | 2.8 | psf |
| Misc./Mech. | 1.5 | psf |
| **ROOF DEAD LOAD** | **15.0** | **PSF** |
| **FUTURE P.V. AUX. LOAD** | **5.0** | **PSF** |

| RESIDENTIAL FLOOR (NO GYPCRETE) | | |
|---|---|---|
| floor finish | 4.0 | psf |
| 3/4" plywood (O.S.B.) | 2.7 | psf |
| Joists @ 16" o.c. | 2.5 | psf |
| Insulation | 1.0 | psf |
| (1) 5/8" gypsum ceiling | 2.8 | psf |
| Misc. | 2.0 | psf |
| **FLOOR DEAD LOAD** | **15.0** | **PSF** |

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# CALCULATION SECTION 2.0: ROOF FRAMING

## Framing Notes

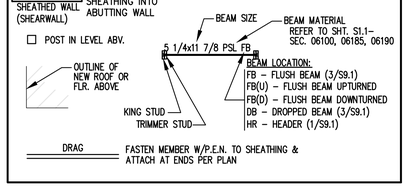
1. REFER TO S9.1 FOR TYPICAL FRAMING DETAILS
2. ROOF FRAMING – RAFTERS PER PLAN.
3. FLOOR FRAMING – 2x JOISTS PER PLAN. BLOCKING AT BEARING AND SHEARWALLS SHALL BE PER BEARING AND SHEARWALL SCHEDULE (VERIFY EXIST. BRG. LOC.). FLOOR SHEATHING SHALL BE GLUED AND NAILED.
4. WALLS INDICATED ARE BELOW THE FRAMING LEVEL (REFER TO SYMBOL KEY FOR TYPE). SEE BEARING WALL SCHEDULE THIS SHEET
5. PLUMBING, MECHANICAL, AND ELECTRICAL SYSTEMS SHALL BE DESIGNED AND BUILT TO ACCOMMODATE 3/8" PER FLOOR WOOD SHRINKAGE.
6. SEE DETAIL 1/S9.1 FOR TYPICAL HEADER/BUNDLED STUD CONSTRUCTION.
7. SEE ARCHITECTURAL FOR DRAFTSTOP AND VENTING LOCATIONS.
8. FRAMING MEMBERS AND SHEATHING SHALL BE PER STRUCTURAL NOTES AS NOTED ON SHEET S1.1
9. ALL UNLABELED EXTERIOR WALLS ARE TO BE TYPE 'P6'; SEE SHEARWALL SCHEDULE ON SHEET S1.2
10. HANGERS INDICATED ARE AS MANUFACTURED BY SIMPSON STRONG-TIE. SEE SEC. 06103/S1.1 FOR TYPICAL HANGERS, U.N.O..
11. PROVIDE JOIST OR BLOCKING ATOP SHEARWALLS.
12. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS AND TOP PLATE ELEVATIONS.
13. BUNDLED STUDS FROM THIS LEVEL SHALL BE CONTINUED DOWN TO FOUNDATION OR SUPPORTING BEAM. (RE: 4/S9.1)
14. ALL BEAMS AND HEADERS SHALL HAVE A MINIMUM OF (1) FULL HEIGHT STUD AT EACH END FOR BRACING TYPICAL UNLESS NOTED OTHERWISE.
15. PROVIDE MINIMUM (2) 2X BUNDLED STUDS UNDER EACH BEAM END, TYPICAL UNLESS NOTED OTHERWISE. (AT HEADERS: TRIMMER+KING=2 BUNDLED STUDS)
15. SEE DETAILS 19 & 20 ON SHEET S1.3 FOR TYPICAL CORNER FRAMING DETAILS AT HOLD DOWNS & SHEARWALLS.
16. HANGER OCCURS WHERE FLUSH BEAM HANGS TO SUPPORT BEAMS, TYP. U.N.O.

## Bearing Wall Stud Schedule

| BEARING WALL TYPE | STUD SIZE AND SPACING, U.N.O. |
|---|---|
| EXTERIOR | 2 X 6 AT 16" O.C., U.N.O. |
| INTERIOR NON-BEARING | 2 X 4 AT 16 O.C. |

BEARING WALL NOTES
1. SEE SHEARWALL SCHEDULE SHEET S1.2 FOR WALL SHEATHING, ADDITIONAL PLATE AND STUD REQUIREMENTS, BLOCKING AND PLATE NAILING. SEE SAWN LUMBER STRUCTURAL NOTES SHEET S1.1 FOR SPECIES AND GRADE OF WALL PLATES AND STUDS.
2. SECURE SILL PLATES TO CONCRETE WITH ⅝" DIA. ANCHOR BOLTS AT 48" ON CENTER TYPICAL UNLESS NOTED OTHERWISE. RE:S1.2. REFER TO SHEARWALL AND HOLDOWN SCHEDULE FOR ADDITIONAL ANCHOR BOLT REQUIREMENTS. WHERE PRESERVATIVE TREATED WOOD IS USED, REFER TO THAT NOTE SECTION FOR CORROSION PROTECTION REQUIREMENTS FOR CONNECTORS.
3. SEE 2/S9.1 FOR TOP PLATE SPLICE. PROVIDE ADDITIONAL CONNECTORS AT SHEARWALLS AS INDICATED ON THE PLANS.
4. ALIGN STUDS UNDER JOISTS

## Framing Legend



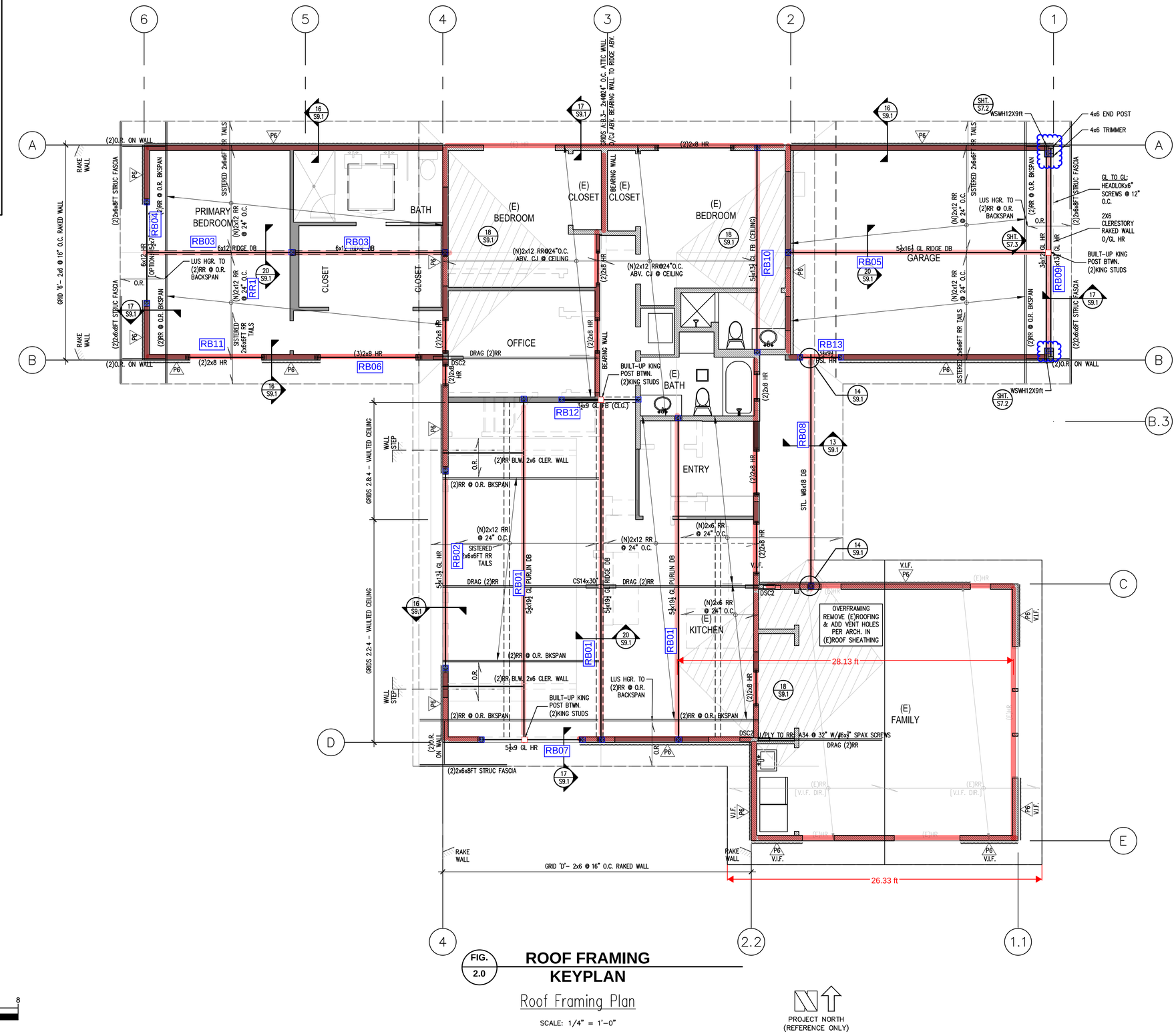




**FIG. 2.0** **ROOF FRAMING KEYPLAN**

Roof Framing Plan

SCALE: 1/4" = 1'-0"

PROJECT NORTH (REFERENCE ONLY)

Note:
PLANS PREPARED USING ARCHITECTURAL BACKGROUNDS RECEIVED 12/15/2023

GRAPHIC SCALE
−4 0 2 4 8
( IN FEET )
1 inch = 4 ft.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Selby Primary Suite & Garage Addition

4731 90th Ave SE
Mercer Island, WA 98040

Permit Set

| Date: | Description: |
|---|---|
| 12/21/23 | Permit Submit |
| | |
| | |
| | |
| | |

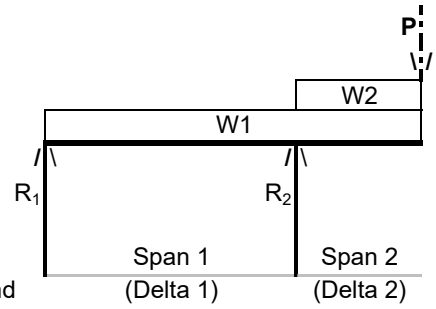
Project No.: CTE#23027
Drawn:

ROOF FRAMING PLAN

Sheet No:
S2.2

## RR01) ROOF RAFTERS

OVERHANGING CANTILEVER




| | | |
|---|---|---|
| Span 1 = | 9 | ft |
| Span 2 = | 2 | ft |
| Spacing = | 24 | in o.c. |
| Uniform Load W1 = | 90 | lb/ft |
| Add'l. Uniform Load W2 = | 0 | lb/ft |
| Concentrated Load = | 0 | lb @ Cantilever End |

$V_{max}$ = 425 lb
$M_{max}$ = 911 lb-ft

$R_{1Max}$ = 405 lb
$R_{2Max}$ = 605 lb

Nominal Beam Size: b = 2 in. d= 10 in. Number of Sections = 1
$b_{act}$ = 1.50 in. $d_{act}$ = 9.25 in.

Lumber Species/Type:---------- HF2 REPETITIVE MEMBER?---------- Y
POST?: NO
Design Stresses and Factors:

| | | | | | |
|---|---|---|---|---|---|
| | | $C_L$= | 0.58 | ›isture > 19%? | NO |
| Fv = | 145 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 850 psi | Cr = | 1.15 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,300 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 405 psi | $CF_{(B)}$ = | 1.10 | $C_{M(c\perp)}$ = | 1.00 |
| E = | 1.3E+06 psi | Delta1=L/ | 360 | $C_{M(E)}$ = | 1.00 |
| Emin = | .47E+06 psi | Delta2=L/ | 360 | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 38.4 | **145** |
| Fb (psi) | 511 | **629** |
| Delta1(in) | 0.10 | **0.30** |
| Delta2(in) | 0.02 | **0.13** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | 3.7 | 13.9 |
| Sx (in3) | 17.4 | 21.4 |
| I (1) (in4) | 34.1 | 98.9 |
| I (2) (in4) | 12.6 | 98.9 |

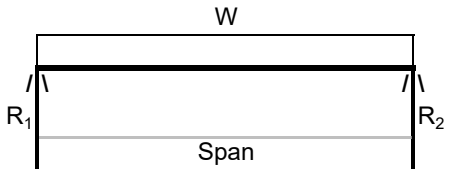
| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 1.00 inches
UNBAL. UPLIFT AT R1 = -20 LBS
NOTCH DEPTH = 0 inches
$f_{V,NOTCH}$ (Tension Face) = N/A < Fv' = 145 psi

**USE: 2 x 10 HF2 @ 24 IN. O.C.**

## RB01) RIDGE & PURLINS BEAMS BETWEEN B.3:C

**SIMPLE SPAN - UNIFORM LOAD**




Span = 28.25 ft

Uniform Load (full span), W = 292.5 lb/ft

Reactions

$V_{max}$ = 4132 lb — $R_1$ = 4132 lb

$M_{max}$ = 29179 lb-ft — $R_2$ = 4132 lb

Nominal Beam Size: b = 5.5 in. d= 19.5 in. Number of Sections = 1

$b_{act}$ = 5.50 in. $d_{act}$ = 19.50 in.

Lumber Species/Type:---------- GLB REPETITIVE MEMBER?---------- N

Post?: NO

Design Stresses and Factors:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | $C_L$= | 0.90 | Moisture > 19%? | N | | |
| Fv = | 240 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 | | |
| Fb = | 2,400 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 | | |
| Fc\|\| = | 1,650 psi | Cv = | 0.92 | $C_{M(c\|\|)}$ = | 1.00 | | |
| Fc⊥ = | 650 psi | $CF_{(B)}$ = | 1.00 | $C_{M(c\|)}$ = | 1.00 | | |
| E = | 1.8E+06 psi | $\delta_{TOTAL}$=L/ | 360 | $C_{M(E)}$ = | 1.00 | | |
| Emin = | .93E+06 psi | | | Incise Ci= | 1.00 | | |

| Stresses and Deflections | | | Section Properties | | | 0 INCH ϕ HOLE SEC. REDUC. |
|---|---|---|---|---|---|---|
| | Actual | Allowable | | Required | Provided | |
| Fv (psi) | 51.1 | **240** | A (in2) | **22.85** | 107.3 | |
| Fb (psi) | 1005 | **1976** | Sx (in3) | **177.20** | 348.56 | 0.0 in3 |
| Delta (in.) | 0.69 | **0.94** | I (in4) | **2472.93** | 3398.5 | 0.0 in4 |

REQ'D END BEARING = 1.16 inches

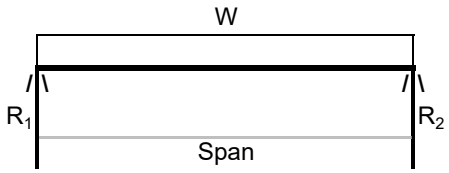
NOTCH DEPTH = 0 inches

$f_{V,NOTCH}$ (Tension Face) = < Fv' = 240 psi

**USE: 5.5 x 19-1/2 IN. 24F-V4 GLB**

## RB02) GRID 4 HEADER ON DINING

**SIMPLE SPAN - UNIFORM LOAD**




Span = 16.5 ft

Uniform Load (full span), W = 308 lb/ft

Reactions

$V_{max}$ = 2541 lb — $R_1$ = 2541 lb

$M_{max}$ = 10482 lb-ft — $R_2$ = 2541 lb

Nominal Beam Size: b = 5.5 in. d= 13.5 in. Number of Sections = 1

$b_{act}$ = 5.50 in. $d_{act}$ = 13.50 in.

Lumber Species/Type:---------- GLB REPETITIVE MEMBER?---------- N

Post?: NO

Design Stresses and Factors:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | $C_L$= | 0.97 | Moisture > 19%? | N | | |
| Fv = | 240 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 | | |
| Fb = | 2,400 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 | | |
| Fc\|\| = | 1,650 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 | | |
| Fc⊥ = | 650 psi | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 | | |
| E = | 1.8E+06 psi | $\delta_{TOTAL}$=L/ | 700 | $C_{M(E)}$ = | 1.00 | | |
| Emin = | .93E+06 psi | | | Incise Ci= | 1.00 | | |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 44.3 | **240** |
| Fb (psi) | 753 | **2340** |
| Delta (in.) | 0.25 | **0.28** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **13.72** | 74.3 |
| Sx (in3) | **53.76** | 167.06 |
| I (in4) | **1008.86** | 1127.7 |

| **0 INCH ϕ HOLE SEC. REDUC.** |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 0.71 inches

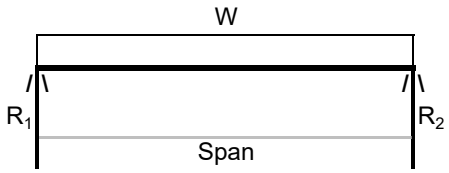
NOTCH DEPTH = 0 inches

$f_{V,NOTCH}$ (Tension Face) = < Fv' = 240 psi

**USE: 5.5 x 13-1/2 IN. 24F-V4 GLB**

**RB03) GRID A.5 BTWN. 5:6 & 4:5**

**SIMPLE SPAN - UNIFORM LOAD**




Span = 12.75 ft

Uniform Load (full span), W = 405 lb/ft

$V_{max}$ = 2582 lb
$M_{max}$ = 8230 lb-ft

Reactions
$R_1$ = 2582 lb
$R_2$ = 2582 lb

Nominal Beam Size: b = 6 in. d= 12 in. Number of Sections = 1
$b_{act}$ = 5.50 in. $d_{act}$ = 11.50 in.

Lumber Species/Type:---------- HF1 REPETITIVE MEMBER?---------- N
Post?: NO
Design Stresses and Factors:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | $C_L$= | 0.99 | Moisture > 19%? | N | |
| Fv = | 140 | psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 | |
| Fb = | 1,050 | psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 | |
| Fc\|\| = | 750 | psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 | |
| Fc⊥ = | 405 | psi | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 | |
| E = | 1.3E+06 | psi | $\delta_{TOTAL}$=L/ | 360 | $C_{M(E)}$ = | 1.00 | |
| Emin = | .47E+06 | psi | | | Incise Ci= | 1.00 | |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 52.0 | **140** |
| Fb (psi) | 815 | **1037** |
| Delta (in.) | 0.27 | **0.43** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **23.50** | 63.3 |
| Sx (in3) | **95.22** | 121.23 |
| I (in4) | **435.86** | 697.1 |

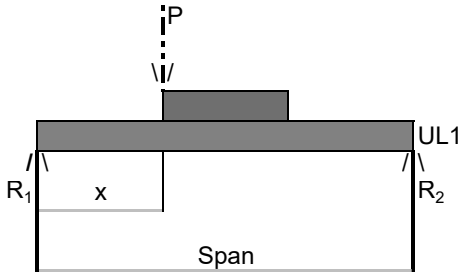
| **0 INCH ϕ HOLE SEC. REDUC.** |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 1.16 inches
NOTCH DEPTH = 0 inches
$f_{V,NOTCH}$ (Tension Face) = < Fv' = 140 psi

**USE: (1) 6 x 12 HF1**

**RB04) GRID 6 HEADER**

SIMPLE SPAN - UNIFORM LOAD/PARTIAL LOAD/CONC. LD.




Span = 8.25 ft

| | Load | | |
|---|---|---|---|
| Uniform Load 1 ( full span) = | 225 lb/ft | | |
| Uniform Load 2 (lbs/ft) = | 0 | from x = 0 | 4.125 feet |
| Sum UL1 + UL2 = 225 | | | |
| Concentrated Load (lbs) = | 2600 | @ x = 4.125 | feet |

| | | Reactions | |
|---|---|---|---|
| $V_{max}$ = | 2228 lb | $R_1$ = | 2228 lb |
| $M_{max}$ = | 7277 lb-ft | $R_2$ = | 2228 lb |

Nominal Beam Size: b = 6 in. d= 12 in. Number of Sections = 1
$b_{act}$ = 5.50 in. $d_{act}$ = 11.50 in.

Lumber Species/Type:---------- HF1 REPETITIVE MEMBER?---------- N
POST?: NO
Design Stresses and Factors:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | $C_L$= | 0.99 | Moisture > 19%? | N |
| Fv = | 140 | psi | | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 1,050 | psi | | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 750 | psi | | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 405 | psi | | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 |
| E = | 1.3E+06 | psi | | Delta = L/ | 360 | $C_{M(E)}$ = | 1.00 |
| Emin = | .47E+06 | psi | | | | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 47.73 | **140** |
| Fb (psi) | 720 | **1042** |
| Delta (in.) | 0.08 | **0.28** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **21.6** | 63.3 |
| Sx (in3) | **83.8** | 121.2 |
| I (in4) | **212.6** | 697.1 |

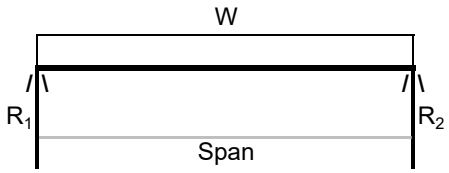
| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 1.00 inches
NOTCH DEPTH = 0 inches
$f_{V,NOTCH}$ (Tension Face) = N/A < Fv' = 140 psi

**USE: (1) 6 x 12 HF1**

## RB05) GRID A.5 RIDGE BEAM BTWN.

**SIMPLE SPAN - UNIFORM LOAD**




Span = 21.75 ft

Uniform Load (full span), W = 405 lb/ft

Reactions

$V_{max}$ = 4404 lb — $R_1$ = 4404 lb

$M_{max}$ = 23949 lb-ft — $R_2$ = 4404 lb

Nominal Beam Size: b = 5.5 in. d= 16.5 in. Number of Sections = 1

$b_{act}$ = 5.50 in. $d_{act}$ = 16.50 in.

Lumber Species/Type:---------- GLB REPETITIVE MEMBER?---------- N

Post?: NO

Design Stresses and Factors:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | $C_L$= | 0.95 | Moisture > 19%? | N | | |
| Fv = | 240 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 | | |
| Fb = | 2,400 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 | | |
| Fc\|\| = | 1,650 psi | Cv = | 0.96 | $C_{M(c\|\|)}$ = | 1.00 | | |
| Fc⊥ = | 650 psi | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 | | |
| E = | 1.8E+06 psi | $\delta_{TOTAL}$=L/ | 360 | $C_{M(E)}$ = | 1.00 | | |
| Emin = | .93E+06 psi | | | Incise Ci= | 1.00 | | |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 63.6 | **240** |
| Fb (psi) | 1152 | **2187** |
| Delta (in.) | 0.55 | **0.73** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **24.05** | 90.8 |
| Sx (in3) | **131.38** | 249.56 |
| I (in4) | **1562.66** | 2058.9 |

| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 1.23 inches

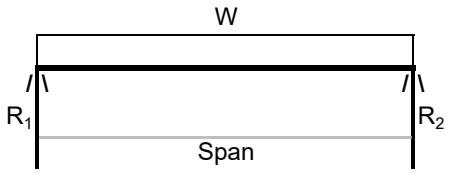
NOTCH DEPTH = 0 inches

$f_{V,NOTCH}$ (Tension Face) = < Fv' = 240 psi

**USE: 5.5 x 16-1/2 IN. 24F-V4 GLB**

## RB06) GRID B HEADER @ PRIMARY BEDROOM

**SIMPLE SPAN - UNIFORM LOAD**




Span = 8.25 ft

Uniform Load (full span), W = 303 lb/ft

Reactions

$V_{max}$ = 1250 lb — $R_1$ = 1250 lb

$M_{max}$ = 2578 lb-ft — $R_2$ = 1250 lb

Nominal Beam Size: b = 2 in. d= 8 in. Number of Sections = 3

$b_{act}$ = 1.50 in. $d_{act}$ = 7.25 in.

Lumber Species/Type:---------- HF2 REPETITIVE MEMBER?---------- N

Post?: NO

Design Stresses and Factors:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | $C_L$= | 0.99 | Moisture > 19%? | N | | |
| Fv = | 145 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 | | |
| Fb = | 850 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 | | |
| Fc\|\| = | 1,300 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 | | |
| Fc⊥ = | 405 psi | $CF_{(B)}$ = | 1.20 | $C_{M(c\perp)}$ = | 1.00 | | |
| E = | 1.3E+06 psi | $\delta_{TOTAL}$=L/ | 360 | $C_{M(E)}$ = | 1.00 | | |
| Emin = | .47E+06 psi | | | Incise Ci= | 1.00 | | |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 49.0 | **145** |
| Fb (psi) | 785 | **1013** |
| Delta (in.) | 0.17 | **0.28** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **11.04** | 32.6 |
| Sx (in3) | **30.53** | 39.42 |
| I (in4) | **88.34** | 142.9 |

| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 0.69 inches

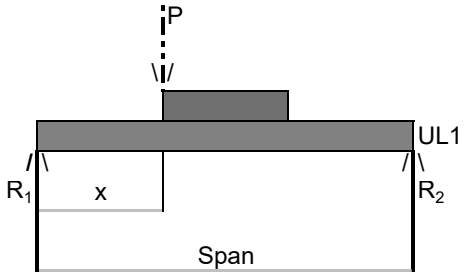
NOTCH DEPTH = 0 inches

$f_{V,NOTCH}$ (Tension Face) = < Fv' = 145 psi

**USE: (3) 2 x 8 HF2**

## RB07) GRID D HEADER CARRYING RB01 PURLIN

SIMPLE SPAN - UNIFORM LOAD/PARTIAL LOAD/CONC. LD.




Span = 8.25 ft

| | Load | | | |
|---|---|---|---|---|
| Uniform Load 1 ( full span) = | 225 | lb/ft | | |
| Uniform Load 2 (lbs/ft) = | 0 | from x = | 0 | 3.5 feet |
| Sum UL1 + UL2 = | 225 | | | |
| Concentrated Load (lbs) = | 4200 | @ x = | 3.5 | feet |

| | | Reactions | |
|---|---|---|---|
| $V_{max}$ = | 3346 lb | $R_1$ = | 3346 lb |
| $M_{max}$ = | 10210 lb-ft | $R_2$ = | 2710 lb |

Nominal Beam Size: b = 5.5 in. d= 9 in. Number of Sections = 1
$b_{act}$ = 5.50 in. $d_{act}$ = 9.00 in.

Lumber Species/Type:---------- GLB REPETITIVE MEMBER?---------- N
POST?: NO
Design Stresses and Factors:

| | | | | | |
|---|---|---|---|---|---|
| | | $C_L$= | 0.99 | Moisture > 19%? | N |
| Fv = | 240 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 2,400 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,650 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 650 psi | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 |
| E = | 1.8E+06 psi | Delta = L/ | 360 | $C_{M(E)}$ = | 1.00 |
| Emin = | .93E+06 psi | | | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 96.29 | **240** |
| Fb (psi) | 1650 | **2384** |
| Delta (in.) | 0.17 | **0.28** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **19.9** | 49.5 |
| Sx (in3) | **51.4** | 74.3 |
| I (in4) | **210.9** | 334.1 |

| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 0.94 inches
NOTCH DEPTH = 0 inches
$f_{V,NOTCH}$ (Tension Face) = N/A < Fv' = 240 psi

**USE: 5.5 x 9 IN. 24F-V4 GLB**

Project Title:
Engineer:
Project ID:
Project Descr:

# Steel Beam



Lic. # : KW-06015571 C.T. ENGINEERING

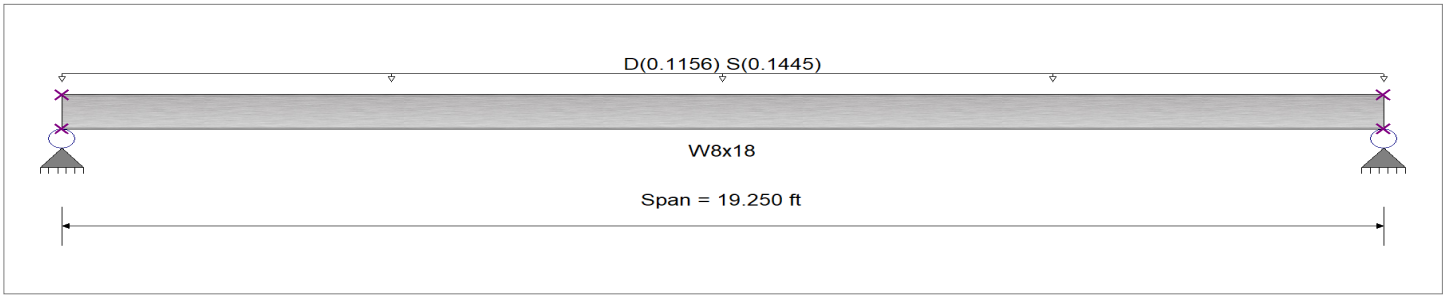
DESCRIPTION: RB08) GRID 1.9 BEAM @ FRONT AWNING

## CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

### Material Properties

| | | | |
|---|---|---|---|
| Analysis Method : | Allowable Strength Design | Fy : Steel Yield : | 50.0 ksi |
| Beam Bracing : | Completely Unbraced | E: Modulus : | 29,000.0 ksi |
| Bending Axis : | Major Axis Bending | | |




### Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight NOT internally calculated and added
Uniform Load : D = 0.020, S = 0.0250 ksf, Tributary Width = 5.780 ft

## DESIGN SUMMARY

**Design OK**

| | | | |
|---|---|---|---|
| Maximum Bending Stress Ratio = | 0.640 : 1 | Maximum Shear Stress Ratio = | 0.067 : 1 |
| Section used for this span | W8x18 | Section used for this span | W8x18 |
| Ma : Applied | 12.048 k-ft | Va : Applied | 2.503 k |
| Mn / Omega : Allowable | 18.819 k-ft | Vn/Omega : Allowable | 37.444 k |
| Load Combination | +D+S | Load Combination | +D+S |
| Location of maximum on span | 9.625 ft | Location of maximum on span | 0.000 ft |
| Span # where maximum occurs | Span # 1 | Span # where maximum occurs | Span # 1 |

Maximum Deflection

| | | | |
|---|---|---|---|
| Max Downward Transient Deflection | 0.250 in | Ratio = | 924 >=360 |
| Max Upward Transient Deflection | 0.000 in | Ratio = | 0 <360 |
| Max Downward Total Deflection | 0.450 in | Ratio = | 514 >=240. |
| Max Upward Total Deflection | 0.000 in | Ratio = | 0 <240.0 |

### Maximum Forces & Stresses for Load Combinations

| Load Combination / Segment Length | Span # | Max Stress Ratios M | Max Stress Ratios V | Summary of Moment Values Mmax + | Mmax - | Ma Max | Mnx | Mnx/Omega | Cb | Rm | Summary of Shear Values Va Max | Vnx | Vnx/Omega |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| D Only | | | | | | | | | | | | | |
| Dsgn. L = 19.25 ft | 1 | 0.285 | 0.030 | 5.35 | | 5.35 | 31.43 | 18.82 | 1.14 | 1.00 | 1.11 | 56.17 | 37.44 |
| +D+S | | | | | | | | | | | | | |
| Dsgn. L = 19.25 ft | 1 | 0.640 | 0.067 | 12.05 | | 12.05 | 31.43 | 18.82 | 1.14 | 1.00 | 2.50 | 56.17 | 37.44 |
| +D+0.750S | | | | | | | | | | | | | |
| Dsgn. L = 19.25 ft | 1 | 0.551 | 0.058 | 10.37 | | 10.37 | 31.43 | 18.82 | 1.14 | 1.00 | 2.16 | 56.17 | 37.44 |
| +0.60D | | | | | | | | | | | | | |
| Dsgn. L = 19.25 ft | 1 | 0.171 | 0.018 | 3.21 | | 3.21 | 31.43 | 18.82 | 1.14 | 1.00 | 0.67 | 56.17 | 37.44 |

### Overall Maximum Deflections

| Load Combination | Span | Max. "-" Defl | Location in Span | Load Combination | Max. "+" Defl | Location in Span |
|---|---|---|---|---|---|---|
| +D+S | 1 | 0.4497 | 9.680 | | 0.0000 | 0.000 |

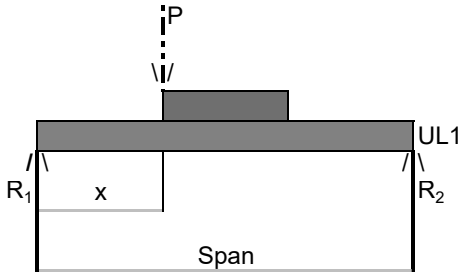
### Vertical Reactions

Support notation : Far left is #1 Values in KIPS

| Load Combination | Support 1 | Support 2 |
|---|---|---|
| Overall MAXimum | 2.503 | 2.503 |
| Overall MINimum | 0.668 | 0.668 |
| D Only | 1.113 | 1.113 |
| +D+S | 2.503 | 2.503 |
| +D+0.750S | 2.156 | 2.156 |
| +0.60D | 0.668 | 0.668 |
| S Only | 1.391 | 1.391 |

## RB09) GRID 1 GARAGE DOOR HEADER

SIMPLE SPAN - UNIFORM LOAD/PARTIAL LOAD/CONC. LD.




Span = 16.33 ft

| | Load | | |
|---|---|---|---|
| Uniform Load 1 ( full span) = | 221 lb/ft | | |
| Uniform Load 2 (lbs/ft) = | 0 | from x = 0 | 8.165 feet |
| Sum UL1 + UL2 = 221 | | | |
| Concentrated Load (lbs) = | 4500 | @ x = 8.165 | feet |

| | | Reactions | |
|---|---|---|---|
| $V_{max}$ = | 4054 lb | $R_1$ = | 4054 lb |
| $M_{max}$ = | 25738 lb-ft | $R_2$ = | 4054 lb |

Nominal Beam Size: b = 5.5 in. d= 13.5 in. Number of Sections = 1
$b_{act}$ = 5.50 in. $d_{act}$ = 13.50 in.

Lumber Species/Type:---------- GLB REPETITIVE MEMBER?---------- N
POST?: NO
Design Stresses and Factors:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | $C_L$= | 0.98 | Moisture > 19%? | N |
| Fv = | 240 | psi | | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 2,400 | psi | | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,650 | psi | | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 650 | psi | | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 |
| E = | 1.8E+06 | psi | | Delta = L/ | 360 | $C_{M(E)}$ = | 1.00 |
| Emin = | .93E+06 | psi | | | | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 76.89 | **240** |
| Fb (psi) | 1849 | **2341** |
| Delta (in.) | 0.52 | **0.54** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **23.8** | 74.3 |
| Sx (in3) | **132.0** | 167.1 |
| I (in4) | **1080.9** | 1127.7 |

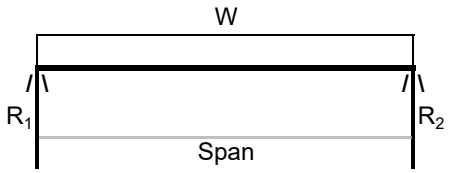
| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 1.13 inches
NOTCH DEPTH = 0 inches
$f_{V,NOTCH}$ (Tension Face) = N/A < Fv' = 240 psi

**USE: 5.5 x 13-1/2 IN. 24F-V4 GLB**

**RB10) GRID 2.2 BTWN. A:B**

**SIMPLE SPAN - UNIFORM LOAD**




Span = 17.22 ft

Uniform Load (full span), W = 656 lb/ft

Reactions

$V_{max}$ = 5648 lb — $R_1$ = 5648 lb

$M_{max}$ = 24315 lb-ft — $R_2$ = 5648 lb

Nominal Beam Size: b = 5.5 in. d= 15 in. Number of Sections = 1

$b_{act}$ = 5.50 in. $d_{act}$ = 15.00 in.

Lumber Species/Type:---------- GLB REPETITIVE MEMBER?---------- N

Post?: NO

Design Stresses and Factors:

| | | | | | | |
|---|---|---|---|---|---|---|
| | | $C_L$= | 0.97 | Moisture > 19%? | N | |
| Fv = | 240 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 | |
| Fb = | 2,400 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 | |
| Fc\|\| = | 1,650 psi | Cv = | 0.99 | $C_{M(c\|\|)}$ = | 1.00 | |
| Fc⊥ = | 650 psi | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 | |
| E = | 1.8E+06 psi | $\delta_{TOTAL}$=L/ | 360 | $C_{M(E)}$ = | 1.00 | |
| Emin = | .93E+06 psi | | | Incise Ci= | 1.00 | |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 87.8 | **240** |
| Fb (psi) | 1415 | **2303** |
| Delta (in.) | 0.47 | **0.57** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **30.18** | 82.5 |
| Sx (in3) | **126.68** | 206.25 |
| I (in4) | **1256.13** | 1546.9 |

| **0 INCH ϕ HOLE SEC. REDUC.** |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 1.58 inches

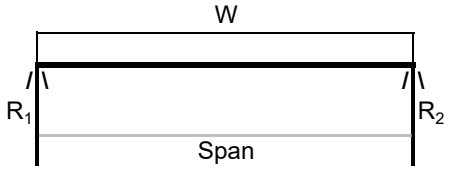
NOTCH DEPTH = 0 inches

$f_{V,NOTCH}$ (Tension Face) = < Fv' = 240 psi

**USE: 5.5 x 15 IN. 24F-V4 GLB**

## RR02) ROOF RAFTERS OVER OFFICE AND EXIST. BATH AND BED WING

**SIMPLE SPAN - UNIFORM LOAD**




Span = 13 ft
Spacing = 16 in o.c.
Uniform Load (full span), W = 73 lb/ft

Reactions
$R_1$ = 477 lb
$R_2$ = 477 lb

$V_{max}$ = 477 lb
$M_{max}$ = 1549 lb-ft

Nominal Beam Size: b = 2 in. d= 10 in. Number of Sections = 1
$b_{act}$ = 1.50 in. $d_{act}$ = 9.25 in.

Lumber Species/Type:---------- HF2 REPETITIVE MEMBER?---------- Y
Post?: NO
Design Stresses and Factors:

Moisture > 19%? N

| | | | | | |
|---|---|---|---|---|---|
| Fv = | 145 psi | $C_L$= | 0.88 | $C_{M(v)}$ = | 1.00 |
| Fb = | 850 psi | LDF = | 1.00 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,300 psi | Cr = | 1.15 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 405 psi | Cv = | 1.00 | $C_{M(c\perp)}$ = | 1.00 |
| 0 | 1.3E+06 psi | $CF_{(B)}$ = | 1.10 | $C_{M(E)}$ = | 1.00 |
| Emin = | .47E+06 psi | $\delta_{TOTAL}$=L/ | 360 | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 45.4 | **145** |
| Fb (psi) | 869 | **943** |
| Delta (in.) | 0.37 | **0.43** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **4.35** | 13.9 |
| Sx (in3) | **19.71** | 21.39 |
| I (in4) | **83.66** | 98.9 |

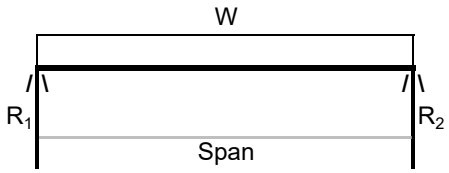
| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 0.78 inches
NOTCH DEPTH = 1.25 inches
$f_{V,NOTCH}$ (Tension Face) = 69 psi < Fv' = 145 psi

**USE: 2 x 10 HF2 @ 16 IN. O.C.**

**RB11) GRID B BTWN. 5.2:5.8**

**SIMPLE SPAN - UNIFORM LOAD**




Span = 6.25 ft

Uniform Load (full span), W = 303 lb/ft

Reactions

$V_{max}$ = 947 lb — $R_1$ = 947 lb

$M_{max}$ = 1479 lb-ft — $R_2$ = 947 lb

Nominal Beam Size: b = 2 in. d= 8 in. Number of Sections = 2

$b_{act}$ = 1.50 in. $d_{act}$ = 7.25 in.

Lumber Species/Type:---------- HF2 REPETITIVE MEMBER?---------- N

Post?: NO

Design Stresses and Factors:

$C_L$= 0.99 Moisture > 19%? N

| | | | | | |
|---|---|---|---|---|---|
| Fv = | 145 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 850 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,300 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 405 psi | $CF_{(B)}$ = | 1.20 | $C_{M(c\perp)}$ = | 1.00 |
| E = | 1.3E+06 psi | $\delta_{TOTAL}$=L/ | 360 | $C_{M(E)}$ = | 1.00 |
| Emin = | .47E+06 psi | | | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 52.7 | **145** |
| Fb (psi) | 676 | **1007** |
| Delta (in.) | 0.08 | **0.21** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **7.90** | 21.8 |
| Sx (in3) | **17.63** | 26.28 |
| I (in4) | **38.41** | 95.3 |

| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 0.78 inches

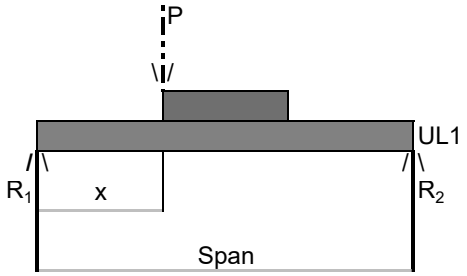
NOTCH DEPTH = 0 inches

$f_{V,NOTCH}$ (Tension Face) = < Fv' = 145 psi

**USE: (2) 2 x 8 HF2**

**RB12) GRID B.3 BTWN. 2.8:3.2**

SIMPLE SPAN - UNIFORM LOAD/PARTIAL LOAD/CONC. LD.




Span = 6.4 ft

| | Load | | |
|---|---|---|---|
| Uniform Load 1 ( full span) = | 0 lb/ft | | |
| Uniform Load 2 (lbs/ft) = | 0 | from x = 0 | 3.3 feet |
| Sum UL1 + UL2 = | 0 | | |
| Concentrated Load (lbs) = | 4200 | @ x = 3.3 | feet |

| | | Reactions | |
|---|---|---|---|
| $V_{max}$ = | 2166 lb | $R_1$ = | 2034 lb |
| $M_{max}$ = | 6510 lb-ft | $R_2$ = | 2166 lb |

Nominal Beam Size: b = 3.5 in. d= 9 in. Number of Sections = 1
$b_{act}$ = 3.50 in. $d_{act}$ = 9.00 in.

Lumber Species/Type:---------- GLB REPETITIVE MEMBER?---------- N
POST?: NO
Design Stresses and Factors:

| | | | | | |
|---|---|---|---|---|---|
| | | $C_L$= | 0.98 | Moisture > 19%? | N |
| Fv = | 240 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 2,400 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,650 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 650 psi | $CF_{(B)}$ = | 1.00 | $C_{M(c\perp)}$ = | 1.00 |
| E = | 1.8E+06 psi | Delta = L/ | 360 | $C_{M(E)}$ = | 1.00 |
| Emin = | .93E+06 psi | | | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 103.13 | **240** |
| Fb (psi) | 1653 | **2363** |
| Delta (in.) | 0.10 | **0.21** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **13.5** | 31.5 |
| Sx (in3) | **33.1** | 47.3 |
| I (in4) | **103.1** | 212.6 |

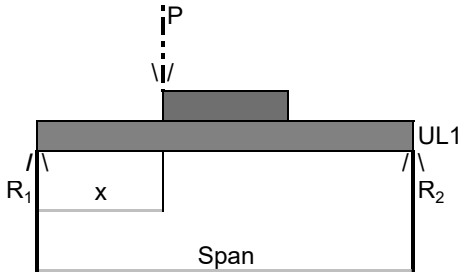
| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 0.95 inches
NOTCH DEPTH = 0 inches
$f_{V,NOTCH}$ (Tension Face) = N/A < Fv' = 240 psi

**USE: 3.5 x 9 IN. 24F-V4 GLB**

## RB13) GRID B HEADER @ GRID 2

SIMPLE SPAN - UNIFORM LOAD/PARTIAL LOAD/CONC. LD.




Span = 3.1 ft

| | Load | | |
|---|---|---|---|
| Uniform Load 1 ( full span) = | 303 lb/ft | | |
| Uniform Load 2 (lbs/ft) = | 0 | from x = 0 | 0.6 feet |
| Sum UL1 + UL2 = | 303 | | |
| Concentrated Load (lbs) = | 2600 | @ x = 0.6 | feet |

| | | Reactions | |
|---|---|---|---|
| $V_{max}$ = | 2566 lb | $R_1$ = | 2566 lb |
| $M_{max}$ = | 1481 lb-ft | $R_2$ = | 973 lb |

Nominal Beam Size: b = 4 in. d= 8 in. Number of Sections = 1
$b_{act}$ = 3.50 in. $d_{act}$ = 7.25 in.

Lumber Species/Type:---------- HF2 REPETITIVE MEMBER?---------- N
POST?: NO
Design Stresses and Factors:

| | | | | | |
|---|---|---|---|---|---|
| | | $C_L$= | 1.00 | Moisture > 19%? | N |
| Fv = | 145 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 850 psi | Cr = | 1.00 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,300 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 405 psi | $CF_{(B)}$ = | 1.20 | $C_{M(c\perp)}$ = | 1.00 |
| E = | 1.3E+06 psi | Delta = L/ | 360 | $C_{M(E)}$ = | 1.00 |
| Emin = | .47E+06 psi | | | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 140.89 | **145** |
| Fb (psi) | 580 | **1015** |
| Delta (in.) | 0.01 | **0.10** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **24.7** | 25.4 |
| Sx (in3) | **17.5** | 30.7 |
| I (in4) | **11.1** | 111.1 |

| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 1.81 inches
NOTCH DEPTH = 0 inches
$f_{V,NOTCH}$ (Tension Face) = N/A < Fv' = 145 psi

**USE: (1) 4 x 8 HF2**

CT ENGINEERING INC.

CALCULATION SECTION 3.0:

# FLOOR FRAMING

## Framing Notes

1. REFER TO S9.1 FOR TYPICAL FRAMING DETAILS
2. ROOF FRAMING – RAFTERS PER PLAN.
3. FLOOR FRAMING – 2x JOISTS PER PLAN. BLOCKING AT BEARING AND SHEARWALLS SHALL BE PER BEARING AND SHEARWALL SCHEDULE (VERIFY EXIST. BRG. LOC.). FLOOR SHEATHING SHALL BE GLUED AND NAILED.
4. WALLS INDICATED ARE BELOW THE FRAMING LEVEL (REFER TO SYMBOL KEY FOR TYPE). SEE BEARING WALL SCHEDULE THIS SHEET
5. PLUMBING, MECHANICAL, AND ELECTRICAL SYSTEMS SHALL BE DESIGNED AND BUILT TO ACCOMMODATE 3/8" PER FLOOR WOOD SHRINKAGE.
6. SEE DETAIL 1/S9.1 FOR TYPICAL HEADER/BUNDLED STUD CONSTRUCTION.
7. SEE ARCHITECTURAL FOR DRAFTSTOP AND VENTING LOCATIONS.
8. FRAMING MEMBERS AND SHEATHING SHALL BE PER STRUCTURAL NOTES AS NOTED ON SHEET S1.1
9. ALL UNLABELED EXTERIOR WALLS ARE TO BE TYPE 'P6'; SEE SHEARWALL SCHEDULE ON SHEET S1.2
10. HANGERS INDICATED ARE AS MANUFACTURED BY SIMPSON STRONG-TIE. SEE SEC. 06103/S1.1 FOR TYPICAL HANGERS, U.N.O..
11. PROVIDE JOIST OR BLOCKING ATOP SHEARWALLS.
12. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS AND TOP PLATE ELEVATIONS.
13. BUNDLED STUDS FROM THIS LEVEL SHALL BE CONTINUED DOWN TO FOUNDATION OR SUPPORTING BEAM. (RE: 4/S9.1)
14. ALL BEAMS AND HEADERS SHALL HAVE A MINIMUM OF (1) FULL HEIGHT STUD AT EACH END FOR BRACING TYPICAL UNLESS NOTED OTHERWISE.
15. PROVIDE MINIMUM (2) 2X BUNDLED STUDS UNDER EACH BEAM END, TYPICAL UNLESS NOTED OTHERWISE. (AT HEADERS: TRIMMER+KING=2 BUNDLED STUDS)

15. SEE DETAILS 19 & 20 ON SHEET S1.3 FOR TYPICAL CORNER FRAMING DETAILS AT HOLD DOWNS & SHEARWALLS.
16. HANGER OCCURS WHERE FLUSH BEAM HANGS TO SUPPORT BEAMS, TYP. U.N.O.

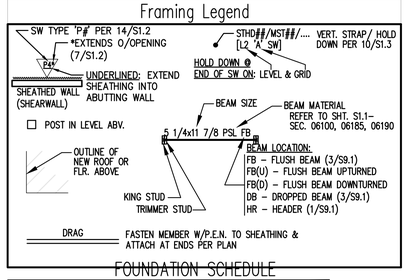
## Bearing Wall Stud Schedule

| BEARING WALL TYPE | STUD SIZE AND SPACING, U.N.O. |
|---|---|
| EXTERIOR | 2 X 6 AT 16" O.C., U.N.O. |
| INTERIOR NON-BEARING | 2 X 4 AT 16 O.C. |

BEARING WALL NOTES

1. SEE SHEARWALL SCHEDULE SHEET S1.2 FOR WALL SHEATHING, ADDITIONAL PLATE AND STUD REQUIREMENTS, BLOCKING AND PLATE NAILING. SEE SAWN LUMBER STRUCTURAL NOTES SHEET S1.1 FOR SPECIES AND GRADE OF WALL PLATES AND STUDS.
2. SECURE SILL PLATES TO CONCRETE WITH ⅝" DIA. ANCHOR BOLTS AT 48" ON CENTER TYPICAL UNLESS NOTED OTHERWISE. RE:S1.2. REFER TO SHEARWALL AND HOLDOWN SCHEDULE FOR ADDITIONAL ANCHOR BOLT REQUIREMENTS. WHERE PRESERVATIVE TREATED WOOD IS USED, REFER TO THAT NOTE SECTION FOR CORROSION PROTECTION REQUIREMENTS FOR CONNECTORS.
3. SEE 2/S9.1 FOR TOP PLATE SPLICE. PROVIDE ADDITIONAL CONNECTORS AT SHEARWALLS AS INDICATED ON THE PLANS.
4. ALIGN STUDS UNDER JOISTS

## Framing Legend




## FOUNDATION SCHEDULE

| MARK | DEPTH | WIDTH | LENGTH | REINFORCING |
|---|---|---|---|---|
| F1.5 | 10" | 1'-6" | CONT. | (2) #4B CONT. |
| F2.0 | 10" | 2'-0" | CONT. | (3) #4B CONT. |
| F18 | 10" | 1'-6" | 1'-6" | (2) #4B E/W |
| F36 | 10" | 3'-0" | 3'-0" | (4) #4B E/W. |
| F48 | 10" | 4'-0" | 4'-0" | (5) #4B E/W. |

## Foundation Notes

1. ALL SOIL BEARING SURFACES ARE SUBJECT TO INSPECTION AND APPROVAL BY THE GEOTECHNICAL ENGINEER PRIOR TO REINFORCING AND CONCRETE PLACEMENT.
2. CENTER INTERIOR FOOTINGS ON WALLS OR COLUMNS TYPICAL U.N.O.
3. SEE ARCHITECTURAL PLANS FOR DIMENSIONS.
4. NEW FOUNDATION WALLS TO BE 8" THICK TYPICAL U.N.O. W/#5 VERTS @ 18" O.C. BENT INTO FOOTINGS (ALT.) & #5 HORZ. BARS @ 18" O.C.; CENTER STL. IN STEM WALL. REFER TO DETAIL 5/S6.1
5. PROVIDE 4" DIAMETER PERFERATED FOOTING DRAINS AT PERIMETER OF FOUNDATIONS TYPICAL, CONNECT PER CIVIL. PROVIDE 4" DIAMETER TIGHTLINES FOR DOWNSPOUTS, CONNECT PER CIVIL.
6. FOR V.I.F. (VERIFY IN FIELD) CALLOUTS ON EXISTING FOOTINGS, THE CONTRACTOR MAY DIG TO EXPOSE FOOTING HEEL OR DRILL IN S.O.G. TO PROBE FOR THICKNESS & WIDTH (OR NON-DESTRUCTIVE SCAN BY SPECIAL INSPECTOR); IT MAY BE ASSUMED THAT EXISTING FOOTING IS CENTERED BELOW FOUNDATION WALL.

Note:
PLANS PREPARED USING ARCHITECTURAL BACKGROUNDS RECEIVED 12/15/2023

GRAPHIC SCALE
−4 0 2 4 8
( IN FEET )
1 inch = 4 ft.

CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555

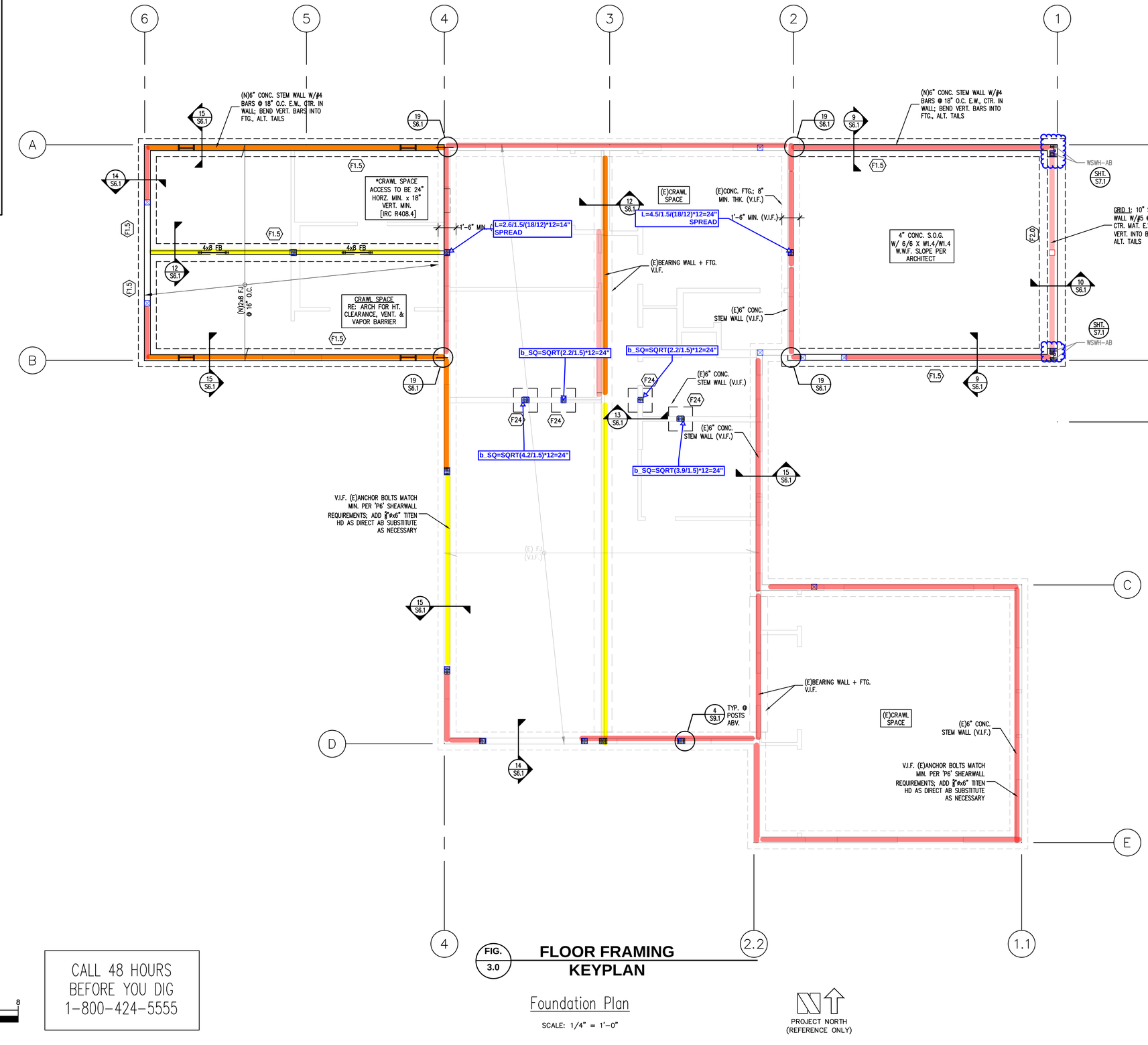



FIG. 3.0 **FLOOR FRAMING KEYPLAN**

Foundation Plan

SCALE: 1/4" = 1'-0"

PROJECT NORTH (REFERENCE ONLY)


FFWD LLC
5608 17TH Ave NW, Ste #42
Seattle, WA 98107
ffwdllc@gmail.com

CT ENGINEERING INC.
Structural Engineers
180 Nickerson Street Suite 302 Seattle, WA 98109
206.285.0616 (F)
206.285.4512 (V)


Selby Primary Suite & Garage Addition

4731 90th Ave SE
Mercer Island, WA 98040

Permit Set

| Date: | Description: |
|---|---|
| 12/21/23 | Permit Submit |

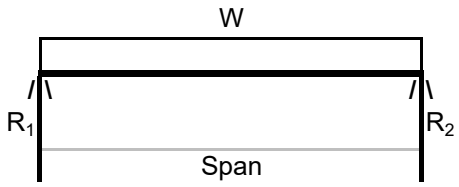
Project No.: CTE#23027
Drawn:

FOUNDATION & MAIN FLOOR FRAMING PLAN

Sheet No:
S2.1

## FJ1) FLOOR JOISTS

**SIMPLE SPAN - UNIFORM LOAD**




Span = 9.25 ft
Spacing = 16 in o.c.
Uniform Load (full span), W = 73 lb/ft

$V_{max}$ = 339 lb
$M_{max}$ = 784 lb-ft

Reactions
$R_1$ = 339 lb
$R_2$ = 339 lb

Nominal Beam Size: b = 2 in. d= 8 in. Number of Sections = 1
$b_{act}$ = 1.50 in. $d_{act}$ = 7.25 in.

Lumber Species/Type:---------- HF2 REPETITIVE MEMBER?---------- Y
Post?: NO
Design Stresses and Factors:

| | | | | | |
|---|---|---|---|---|---|
| | | $C_L$= | 0.67 | Moisture > 19%? | N |
| Fv = | 145 psi | LDF = | 1.00 | $C_{M(v)}$ = | 1.00 |
| Fb = | 850 psi | Cr = | 1.15 | $C_{M(b)}$ = | 1.00 |
| Fc\|\| = | 1,300 psi | Cv = | 1.00 | $C_{M(c\|\|)}$ = | 1.00 |
| Fc⊥ = | 405 psi | $CF_{(B)}$ = | 1.20 | $C_{M(c\|)}$ = | 1.00 |
| 0 | 1.3E+06 psi | $\delta_{TOTAL}$=L/ | 480 | $C_{M(E)}$ = | 1.00 |
| Emin = | .47E+06 psi | | | Incise Ci= | 1.00 |

| Stresses and Deflections | | |
|---|---|---|
| | Actual | Allowable |
| Fv (psi) | 40.7 | **145** |
| Fb (psi) | 716 | **784** |
| Delta (in.) | 0.20 | **0.23** |

| Section Properties | | |
|---|---|---|
| | Required | Provided |
| A (in2) | **3.05** | 10.9 |
| Sx (in3) | **12.00** | 13.14 |
| I (in4) | **40.18** | 47.6 |

| 0 INCH ϕ HOLE SEC. REDUC. |
|---|
| |
| 0.0 in3 |
| 0.0 in4 |

REQ'D END BEARING = 0.56 inches
NOTCH DEPTH = 1.25 inches
$f_{V,NOTCH}$ (Tension Face) = 68 psi < Fv' = 145 psi

**USE: 2 x 8 HF2 @ 16 IN. O.C.**

CT ENGINEERING INC.

CALCULATION

SECTION 7.0:

# LATERAL ENGINEERING

## Framing Notes

1. REFER TO S9.1 FOR TYPICAL FRAMING DETAILS
2. ROOF FRAMING – RAFTERS PER PLAN.
3. FLOOR FRAMING – 2x JOISTS PER PLAN. BLOCKING AT BEARING AND SHEARWALLS SHALL BE PER BEARING AND SHEARWALL SCHEDULE (VERIFY EXIST. BRG. LOC.). FLOOR SHEATHING SHALL BE GLUED AND NAILED.
4. WALLS INDICATED ARE BELOW THE FRAMING LEVEL (REFER TO SYMBOL KEY FOR TYPE). SEE BEARING WALL SCHEDULE THIS SHEET
5. PLUMBING, MECHANICAL, AND ELECTRICAL SYSTEMS SHALL BE DESIGNED AND BUILT TO ACCOMMODATE 3/8" PER FLOOR WOOD SHRINKAGE.
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7. SEE ARCHITECTURAL FOR DRAFTSTOP AND VENTING LOCATIONS.
8. FRAMING MEMBERS AND SHEATHING SHALL BE PER STRUCTURAL NOTES AS NOTED ON SHEET S1.1
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11. PROVIDE JOIST OR BLOCKING ATOP SHEARWALLS.
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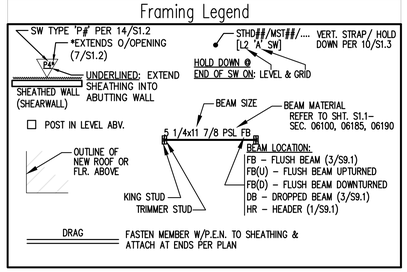
15. PROVIDE MINIMUM (2) 2X BUNDLED STUDS UNDER EACH BEAM END, TYPICAL UNLESS NOTED OTHERWISE. (AT HEADERS: TRIMMER+KING=2 BUNDLED STUDS)
15. SEE DETAILS 19 & 20 ON SHEET S1.3 FOR TYPICAL CORNER FRAMING DETAILS AT HOLD DOWNS & SHEARWALLS.
16. HANGER OCCURS WHERE FLUSH BEAM HANGS TO SUPPORT BEAMS, TYP. U.N.O.

## Bearing Wall Stud Schedule

| BEARING WALL TYPE | STUD SIZE AND SPACING, U.N.O. |
|---|---|
| EXTERIOR | 2 X 6 AT 16" O.C., U.N.O. |
| INTERIOR NON-BEARING | 2 X 4 AT 16 O.C. |

BEARING WALL NOTES
1. SEE SHEARWALL SCHEDULE SHEET S1.2 FOR WALL SHEATHING, ADDITIONAL PLATE AND STUD REQUIREMENTS, BLOCKING AND PLATE NAILING. SEE SAWN LUMBER STRUCTURAL NOTES SHEET S1.1 FOR SPECIES AND GRADE OF WALL PLATES AND STUDS.
2. SECURE SILL PLATES TO CONCRETE WITH ⅝" DIA. ANCHOR BOLTS AT 48" ON CENTER TYPICAL UNLESS NOTED OTHERWISE. RE:S1.2. REFER TO SHEARWALL AND HOLDOWN SCHEDULE FOR ADDITIONAL ANCHOR BOLT REQUIREMENTS. WHERE PRESERVATIVE TREATED WOOD IS USED, REFER TO THAT NOTE SECTION FOR CORROSION PROTECTION REQUIREMENTS FOR CONNECTORS.
3. SEE 2/S9.1 FOR TOP PLATE SPLICE. PROVIDE ADDITIONAL CONNECTORS AT SHEARWALLS AS INDICATED ON THE PLANS.
4. ALIGN STUDS UNDER JOISTS

## Framing Legend



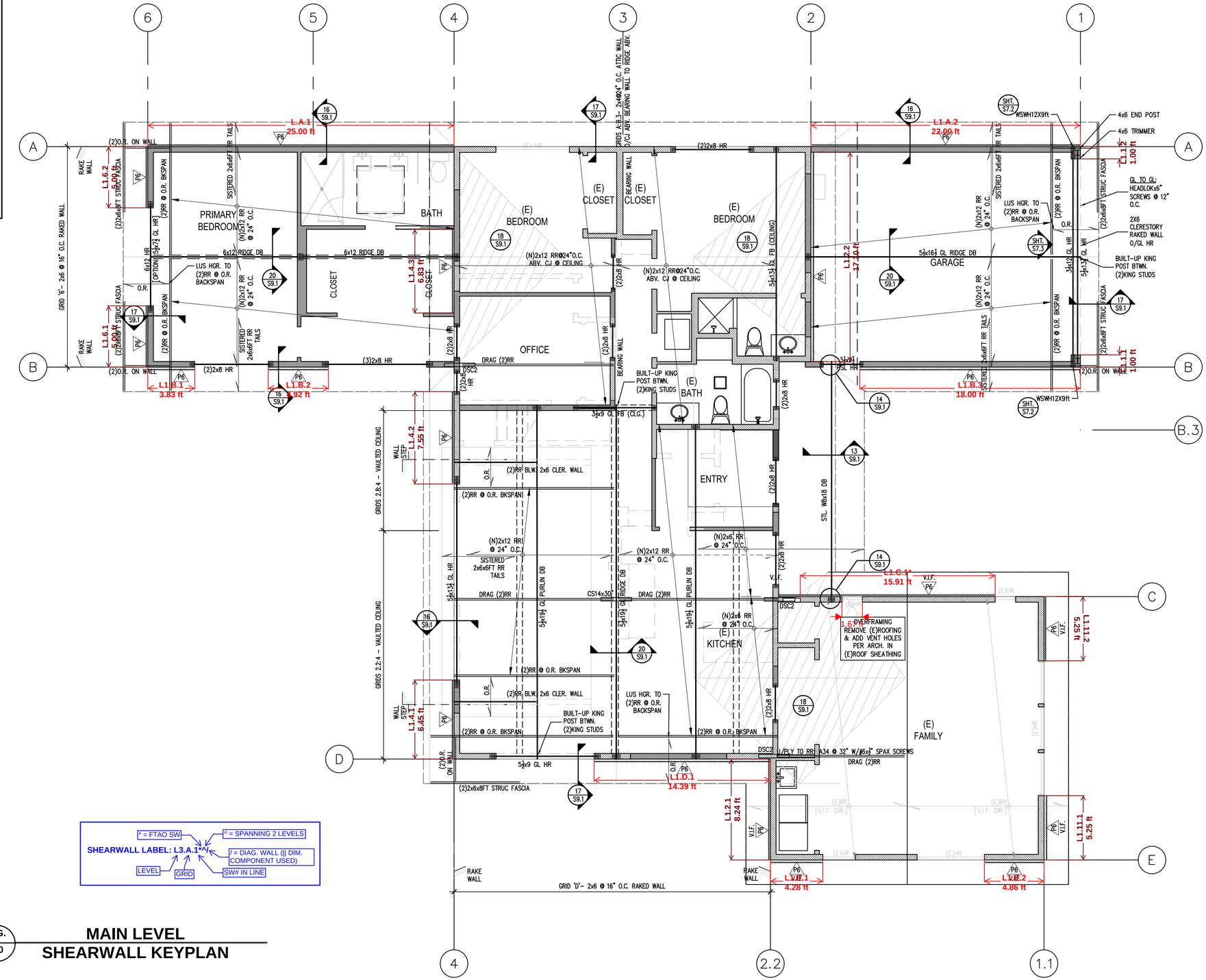







FIG. 7.0

**MAIN LEVEL SHEARWALL KEYPLAN**

Note:
PLANS PREPARED USING ARCHITECTURAL BACKGROUNDS RECEIVED 12/15/2023

GRAPHIC SCALE
−4 0 2 4 8
( IN FEET )
1 inch = 4 ft.

Roof Framing Plan
SCALE: 1/4" = 1'-0"

PROJECT NORTH (REFERENCE ONLY)


FFWD LLC
5608 17TH Ave NW, Ste #42
Seattle, WA 98107
ffwdllc@gmail.com

CT ENGINEERING INC.
Structural Engineers
180 Nickerson Street Suite 302 Seattle, WA 98109
206.285.0616 (F)
206.285.4512 (V)


Selby Primary Suite & Garage Addition
4731 90th Ave SE
Mercer Island, WA 98040

Permit Set

| Date: | Description: |
|---|---|
| 12/21/23 | Permit Submit |
| | |
| | |
| | |
| | |
| Project No.: | CTE#23027 |
| Drawn: | |

ROOF FRAMING PLAN

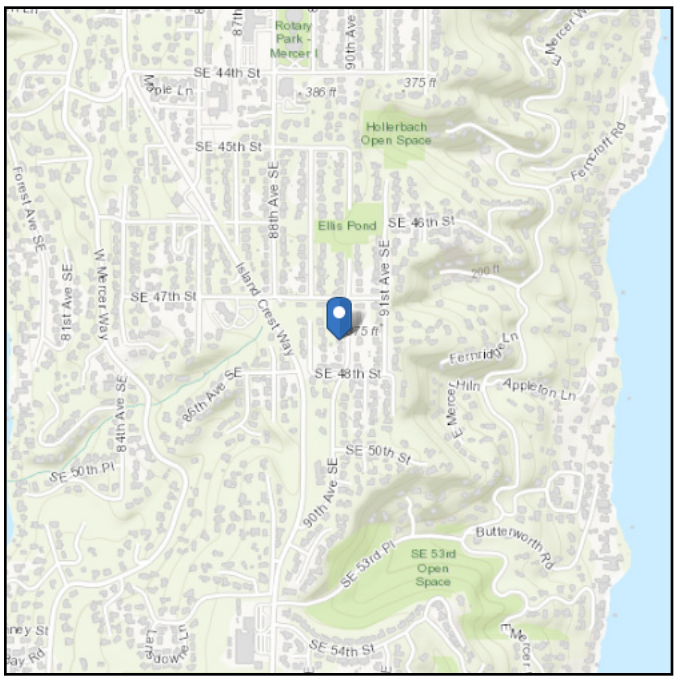
Sheet No:
S2.2

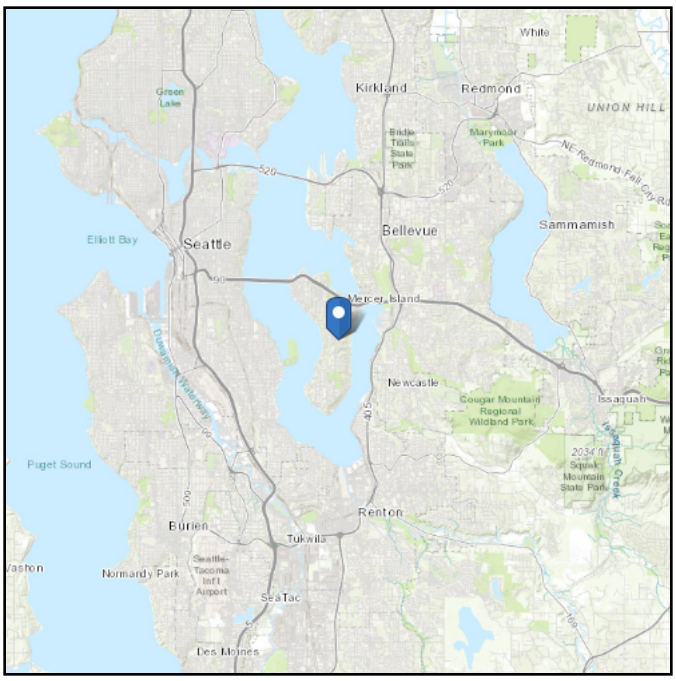
# ASCE 7 Hazards Report

**Address:**
4731 90th Ave SE
Mercer Island, Washington
98040

**Standard:** ASCE/SEI 7-16
**Risk Category:** II
**Soil Class:** D - Default (see Section 11.4.3)

**Latitude:** 47.560859
**Longitude:** -122.219275
**Elevation:** 368.6561852615645 ft (NAVD 88)




## Wind

**Results:**

| | |
|---|---|
| Wind Speed | 98 Vmph |
| 10-year MRI | 67 Vmph |
| 25-year MRI | 74 Vmph |
| 50-year MRI | 78 Vmph |
| 100-year MRI | 83 Vmph |

USE 110mph, Exp. C, Kzt=1.0

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Dec 19 2023

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

# Seismic

**Site Soil Class:** D - Default (see Section 11.4.3)

**Results:**

| | | | |
|---|---|---|---|
| $S_S$ : | 1.435 | $S_{D1}$ : | N/A |
| $S_1$ : | 0.498 | $T_L$ : | 6 |
| $F_a$ : | 1.2 | PGA : | 0.614 |
| $F_v$ : | N/A | $PGA_M$ : | 0.737 |
| $S_{MS}$ : | 1.722 | $F_{PGA}$ : | 1.2 |
| $S_{M1}$ : | N/A | $I_e$ : | 1 |
| $S_{DS}$ : | 1.148 | $C_v$ : | 1.387 |

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

**Data Accessed:** Tue Dec 19 2023

**Date Source:** USGS Seismic Design Maps

SHEET TITLE: **7.1) IBC SEISMIC OVERVIEW**
CT PROJECT # : **Selby Remodel**

| Step # | | | | IBC | ASCE 7 |
|---|---|---|---|---|---|
| 1. | OCCUPANCY CATEGORY | TYPE = | II | Table 1604.5 | Table 1.5-1 |
| 2. | IMPORTANCE FACTOR | $I_E$ = | 1.00 | Section 1613.1 -> ASCE | Table 1.5-2 |
| 3. | Site Class - Per Geo. Engr. | S.C. = | D | Section 1613.3.5<br>Table 1613.3.3(2) | Section 11.4.2 / Ch. 20<br>Table 20.3-1 |
| 4. | 0.2 Sec. Spectral Response | $S_S$ = | 1.4350 | Figure 1613.3.1(1) | Figure 22-1 |
| 5. | 1.0 Sec. Spectral Response | $S_1$ = | 0.4980 | Figure 1613.3.1(2) | Figure 22-2 |
| 6. | Site Coefficient (short period) | $F_a$ = | 1.20 | Figure 1613.3.3(1) | Table 11.4-1 |
| 7. | Site Coefficient (1.0 second) | Fv = | 0.00 | Figure 1613.3.3(2) | Table 11.4-2 |
| | $S_{MS} = F_a * S_S$ | $S_{MS}$ = | 1.7220 | EQ 16-37 | EQ 11.4-1 |
| | $S_{M1} = F_v * S_1$ | $S_{M1}$ = | 0.0000 | EQ 16-38 | EQ 11.4-2 |
| | $S_{DS} = 2/3 * S_{MS}$ | $S_{DS}$ = | **1.148** | EQ 16-39 | EQ 11.4-3 |
| | $S_{D1} = 2/3 * S_{M1}$ | $S_{D1}$ = | 0.000 | EQ 16-40 | EQ 11.4-4 |
| 8. | Seismic Design Category 0.2s | $SDC_S$ = | D | Table 1613.3.5(1) | Table 11.6-1 |
| 9. | Seismic Design Category 1.0s | $SDC_1$ = | C | Table 1613.3.5(2) | Table 11.6-2 |
| 10. | Seismic Design Category | SDC = | D | Max. | Max. |
| 11. | Wood structural panels | --- | --- | N/A | Table 12.2-1 |
| 12. | Response Modification Coef. | R = | 6.5 | N/A | Table 12.2-1 |
| 13. | Overstrength Factor | $\Omega_0$ = | 2.5 | N/A | Table 12.2-1 |
| 14. | Deflection Amplification Factor | $C_D$ = | 2.0 | N/A | Table 12.2-1 |
| 15. | Horizontal Structural Irregularitie | --- | NO | N/A | Table 12.3-1 |
| 16. | Vertical Structural Irregularities | --- | NO | N/A | Table 12.3-2 |
| 17. | Permitted Procedure | Equiv. Lateral Force | | --- | Table 12.6-1 |

SHEET TITLE: **7.2) IBC EQUIVALENT LATERAL FORCE PROCEDURE PER ASCE 7**
CT PROJECT # : Selby Remodel

| | | | | | |
|---|---|---|---|---|---|
| $S_{DS}$ = | 1.15 | $h_n$ = | 12.00 | (ft) | |
| $S_{D1}$ = | 0.00 | $x$ = | 0.75 | ASCE 7 (Table 12.8-2) | |
| R = | 6.5 | $C_t$ = | 0.020 | ASCE 7 (Table 12.8-2) | |
| $I_E$ = | 1.0 | T = | 0.129 | ASCE 7 (EQ 12.8-7) | |
| $S_1$ = | 0.50 | $k$ = | 1 | ASCE 7 (Section 12.8.3) | |
| | | $T_L$ = | 6 | ASCE 7 (Section 11.4.5: Figure 22-15) | |

| | | | | |
|---|---|---|---|---|
| $C_S = S_{DS} / (R/I_E)$ | | 0.177 | W | ASCE 7 (EQ 12.8-2) |
| $C_S = S_{D1} / (T^*(R/I_E))$ | *(for $T \le T_L$)* | 0.000 | W | ASCE 7 (EQ 12.8-3) (MAX.) |
| $C_S = (S_{D1} * T_L)/ (T^2*(R/I_E))$ | *(for $T \ge T_L$)* | 0.000 | W | ASCE 7 (EQ 12.8-4) (MAX.) |
| $C_S = 0.01$ | | 0.010 | W | ASCE 7 (EQ 12.8-5) (MIN.) |
| $C_S = (0.5\ S_1)/(R/I_E)$ | | 0.038 | W | ASCE 7 (EQ 12.8-6) (MIN.if S1> 0.6g) |

**CONTROLLING DESIGN BASE SHEAR = 0.177 W**

**VERTICAL DISTRIBUTION OF SEISMIC FORCES PER ASCE 7 SECTION 12.8.3**

(EQ 12.8-11)
(EQ 12.8-12)

| DIAPHR. LEVEL | Story Height | Elevation (ft) | Height $h_i$ (ft) | Area #1 AREA (sqft) | Area #1 DL (ksf) | Area #2 AREA (sqft) | Area #2 DL (ksf) | Area #3 AREA (sqft) | Area #3 DL (ksf) | $w_i$ (kips) | $w_i * h_i^k$ (kips) | $C_{vx}$ = $w_x * h_x^k$ / $\sum w_i * h_i^k$ | DESIGN Vi | SUM DESIGN V | $V_{wind}$ N-S | $V_{wind}$ E-W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Roof** | --- | 12.00 | 12.00 | 3393 | 0.023 | | | | | 78.0 | 936.5 | 1.00 | **9.84** | 9.84 | 9.00 | 8.00 |
| **2nd** | --- | | 0.00 | | 0.030 | | | | | 0.0 | 0.0 | 0.00 | **0.00** | 0.00 | | |
| **1st** | --- | | 0.00 | | 0.030 | | | | | 0.0 | 0.0 | 0.00 | **0.00** | 0.00 | | |
| **Ground** | --- | | | | | | | | | | | | | | | |
| | | | | | | | | | | 78.0 | 936.5 | 1.00 | **9.84** | | **9.00** | **8.00** |

**E = V = 13.78**
**E/1.4 = 9.84**

SHEET TITLE: **7.4) NDS SHEARWALL VALUES**
CT PROJECT # : Selby Remodel

| | | |
|---|---|---|
| SHEATHING THICKNESS | $t_{sheathing}$ = | **7/16** |
| NAIL SIZE | nail size = | 8d Com. |
| STUD SPECIES | SPECIES = | **HF** |
| SPECIFIC GRAVITY | S.G. = | 0.43 |
| ANCOR BOLT DIAMETER | Anc. Bolt dia. = | 0.625 |

| **SHEARWALL TYPE SDPW&S Table 4.3a** | **Seismic** | **Wind** |
|---|---|---|
| $v_{nominal}$ | $v_{s\ allowable}$ | $v_{w\ allowable}$ |
| (PER Table 4.3A) | modify per S. G. | modify per S. G. |
| 0.3 | | inc. 40% per 2306.3 |

| **SHEARWALL TYPE SDPW&S Table 4.3a** | | | **Seismic** | **Wind** |
|---|---|---|---|---|
| **---** | 0 | 0 | **1** | **1** |
| **P6TN** | 150 | 2 | **150** | **150** |
| **P6** | 520 | 151 | **242** | **339** |
| **P4** | 760 | 243 | **353** | **495** |
| **P3** | 980 | 354 | **456** | **638** |
| **P2** | 1280 | 457 | **595** | **833** |
| **2P4** | 1520 | 596 | **707** | **990** |
| **2P3** | 1960 | 708 | **911** | **1276** |
| **2P2** | 2560 | 912 | **1190** | **1667** |
| **N.G.** | 10000 | 1191 | **9300** | **13020** |

SHEET TITLE: **7.5.1) LATERAL N-S (front to back - up/down)**
CT PROJECT # : Selby Remodel

Diaph. Level: **Roof**
Direction: **N-S**
Typ. Panel Height = 8 ft.

**Seismic V i = 9.84 kips** **Design Wind N-S V i = 9.00 kips**
**Sum Seismic V i = 9.84 kips** **Sum Wind N-S V i = 9.00 kips**

**1) DISTRIBUTION TO SHEAR LINES**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | C15 | C16 |
| | Trib % | | V level | | Above Line Load | | | | V abv. | | V total | | Line | orm Shear, v | |
| Line | E | W | E [k] | W [k] | 1st Line | Trib | 2nd Line | Trib. | E [k] | W [k] | E [k] | W [k] | L [ft] | E [plf] | W [plf] |
| 1 | 11% | 11% | 1.083 | 0.99 | - | 100% | - | 100% | - | 0 | 1.08 | 0.99 | 2 | 541 | 495 |
| 11 | 11% | 11% | 1.083 | 0.99 | - | 100% | - | 100% | - | 0 | 1.08 | 0.99 | 10.5 | 103 | 94 |
| 2 | 34% | 34% | 3.347 | 3.06 | - | 100% | - | 100% | - | 0 | 3.35 | 3.06 | 25.34 | 132 | 121 |
| 4 | 27% | 27% | 2.658 | 2.43 | - | 100% | - | 100% | - | 0 | 2.66 | 2.43 | 20.83 | 128 | 117 |
| 6 | 17% | 17% | 1.674 | 1.53 | - | 100% | - | 100% | - | 0 | 1.67 | 1.53 | 10 | 167 | 153 |
| | | 0% | 0 | 0 | - | 100% | - | 100% | - | 0 | 0.00 | 0.00 | 0 | | |
| | | 0% | 0 | 0 | - | 100% | - | 100% | - | 0 | 0.00 | 0.00 | 0 | | |
| | | 0% | 0 | 0 | - | 100% | - | 100% | - | 0 | 0.00 | 0.00 | 0 | | |
| | | Σ= | 9.84 | 9.00 | | | | Σ= | 0.00 | 0.00 | 9.84 | 9.00 | | | |
| | | Balance Check: | ok | ok | | | | Balance Check: | ok | ok | ok | ok | | | |

**2) DISTRIBUTION TO SHEARWALLS**

| Line | ID | Lwall (ft) | $C_0$ | Lwall' (ft) | $H_{WALL}$ (ft) | E.Q. v (plf) | E.Q. V (k) | E.Q. Amplifiers ρ | E.Q. Amplifiers $2w/h^{(\perp)}$ | E.Q. v' (plf) | E.Q. Type | Wind Type | Wind v (plf) | Wind V (k) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REF#... | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 |
| 1 | L1.1.1 | 1 | 1.00 | 1.00 | 8.00 | 541 | 0.54 | | #VALUE! | | | | ***495*** | 0.495 |
| 1 | L1.1.2 | 1 | 1.00 | 1.00 | 8.00 | 541 | 0.54 | | #VALUE! | | | | ***495*** | 0.495 |
| 11 | L1.11.1 | 5.25 | 1.00 | 5.25 | 8.00 | 103 | 0.54 | | 1.00 | ***103*** | P6TN | P6TN | ***94*** | 0.495 |
| 11 | L1.11.2 | 5.25 | 1.00 | 5.25 | 8.00 | 103 | 0.54 | | 1.00 | ***103*** | P6TN | P6TN | ***94*** | 0.495 |
| 2 | L1.2.1 | 8.24 | 1.00 | 8.24 | 8.00 | 132 | 1.09 | | 1.00 | ***132*** | P6TN | P6TN | ***121*** | 0.995 |
| 2 | L1.2.2 | 17.1 | 1.00 | 17.10 | 8.00 | 132 | 2.26 | | 1.00 | ***132*** | P6TN | P6TN | ***121*** | 2.065 |
| 4 | L1.4.1 | 6.45 | 1.00 | 6.45 | 8.00 | 128 | 0.82 | | 1.00 | ***128*** | P6TN | P6TN | ***117*** | 0.752 |
| 4 | L1.4.2 | 7.55 | 1.00 | 7.55 | 8.00 | 128 | 0.96 | | 1.00 | ***128*** | P6TN | P6TN | ***117*** | 0.881 |
| 6 | L1.6.1 | 5 | 1.00 | 5.00 | 8.00 | 167 | 0.84 | | 1.00 | ***167*** | P6 | P6 | ***153*** | 0.765 |
| 6 | L1.6.2 | 5 | 1.00 | 5.00 | 8.00 | 167 | 0.84 | | 1.00 | ***167*** | P6 | P6 | ***153*** | 0.765 |
| 4 | L1.4.3 | 6.83 | 1.00 | 6.83 | 8.00 | 128 | 0.87 | | 1.00 | ***128*** | P6TN | P6TN | ***117*** | 0.797 |
| | | | 1.00 | 0.00 | 8.00 | 0 | 0.00 | | 1.00 | ***0*** | --- | --- | ***0*** | 0 |

**ρ= 1.00**

(⊥)Table 4.3.4 AF&PA SDPWS, Footnote 1

*Flr. Thk. (Add to OTM arm):* 0.0 ft **E.Q. DL Uplift Factor:* 43.9% *DL Uplift Factor w/Wind:* 60.0%

**3) OVERTURNING RESISTANCE**

| | | | | | | | Seismic Uplift | | | | | | | | Wind Uplift | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Resisted | Resisted | | | Reduced | Net OTM | | | | Add'l | | | Reduced | Net OTM | | | Add'l | | Max. | |
| Line | ID | $L_{DL\ eff.}$ (ft) | w dl (klf) | ID (#1) Above | ID (#2) Above | $L_{ARM}$ (ft) | OTM (kip-ft) | $R_{OTM}$* (kip-ft) | Level (kip-ft) | Abv. (kip-ft) | Total (kip-ft) | Ω | U (k) | $U_{sum}$ (kip) | OTM (kip-ft) | $R_{OTM}$ (kip-ft) | Level (kip-ft) | Abv. (kip-ft) | Total (kip-ft) | U (k) | $U_{sum}$ (kip) | **$U_{sum}$ (kip)** | HD |
| 1 | L1.1.1 | 3.0 | 0.15 | - | - | 0.75 | 4.33 | 0.25 | 4.08 | 0 | 4.08 | 1.00 | 0 | **5.44** | 3.96 | 0.29 | 3.68 | 0 | 3.68 | 0 | **4.90** | **5.44** | HDQ8-SDS |
| 1 | L1.1.2 | 3.0 | 0.15 | - | - | 0.75 | 4.33 | 0.25 | 4.08 | 0 | 4.08 | 1.00 | 0 | **5.44** | 3.96 | 0.29 | 3.68 | 0 | 3.68 | 0 | **4.90** | **5.44** | HDQ8-SDS |
| 11 | L1.11.1 | 7.3 | 0.15 | - | - | 5.00 | 4.33 | 3.16 | 1.17 | 0 | 1.17 | 1.00 | 0 | **0.23** | 3.96 | 3.62 | 0.34 | 0 | 0.34 | 0 | **0.07** | **0.23** | NONE |
| 11 | L1.11.2 | 7.3 | 0.15 | - | - | 5.00 | 4.33 | 3.16 | 1.17 | 0 | 1.17 | 1.00 | 0 | **0.23** | 3.96 | 3.62 | 0.34 | 0 | 0.34 | 0 | **0.07** | **0.23** | NONE |
| 2 | L1.2.1 | 10.2 | 0.15 | - | - | 7.99 | 8.71 | 7.00 | 1.71 | 0 | 1.71 | 1.00 | 0 | **0.21** | 7.96 | 8.02 | -0.06 | 0 | -0.06 | 0 | **-0.01** | **0.21** | NONE |
| 2 | L1.2.2 | 19.1 | 0.15 | - | - | 16.85 | 18.07 | 27.09 | -9.02 | 0 | -9.02 | 1.00 | 0 | **-0.54** | 16.52 | 31.03 | -14.51 | 0 | -14.51 | 0 | **-0.86** | **-0.54** | NONE |
| 4 | L1.4.1 | 8.5 | 0.15 | - | - | 6.20 | 6.58 | 4.52 | 2.06 | 0 | 2.06 | 1.00 | 0 | **0.33** | 6.02 | 5.18 | 0.84 | 0 | 0.84 | 0 | **0.14** | **0.33** | NONE |
| 4 | L1.4.2 | 9.6 | 0.15 | - | - | 7.30 | 7.71 | 5.98 | 1.73 | 0 | 1.73 | 1.00 | 0 | **0.24** | 7.05 | 6.85 | 0.20 | 0 | 0.20 | 0 | **0.03** | **0.24** | NONE |
| 6 | L1.6.1 | 7.0 | 0.15 | - | - | 4.75 | 6.69 | 2.90 | 3.79 | 0 | 3.79 | 1.00 | 0 | **0.80** | 6.12 | 3.33 | 2.80 | 0 | 2.80 | 0 | **0.59** | **0.80** | NONE |
| 6 | L1.6.2 | 7.0 | 0.15 | - | - | 4.75 | 6.69 | 2.90 | 3.79 | 0 | 3.79 | 1.00 | 0 | **0.80** | 6.12 | 3.33 | 2.80 | 0 | 2.80 | 0 | **0.59** | **0.80** | NONE |
| 4 | L1.4.3 | 8.8 | 0.15 | - | - | 6.58 | 6.97 | 5.00 | 1.97 | 0 | 1.97 | 1.00 | 0 | **0.30** | 6.37 | 5.73 | 0.64 | 0 | 0.64 | 0 | **0.10** | **0.30** | NONE |
| | | 0.0 | 0.15 | - | - | | | | | 0 | | 1.00 | 0 | | | | | 0 | | 0 | | **0.00** | NONE |
| | | | | | | | | | Σ= | 0.00 | 16.55 | | | | | | | | | | | | |

*Holdown Ctr. Offset from SW End:* 3 in

SHEET TITLE: **7.6.1) LATERAL E-W (side to side - left/right)**
CT PROJECT # : Selby Remodel

Diaph. Level: **Roof**
Direction: **E-W**
Typ. Panel Height = **8** ft.

**Seismic V i = 9.84 kips**
**Sum Seismic V i = 9.84 kips**
**Design Wind E-W V i = 8.00 kips**
**Sum Wind E-W V i = 8.00 kips**

**1) DISTRIBUTION TO SHEAR LINES**

| C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | C15 | C16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Trib % | | V level | | Above Line Load | | | | V abv. | | V total | | Line | Uniform Shear, v | |
| Line | E | W | E [k] | W [k] | 1st Line | Trib | 2nd Line | Trib. | E [k] | W [k] | E [k] | W [k] | L [ft] | E [plf] | W [plf] |
| A | 16% | 16% | 1.575 | 1.28 | - | 100% | - | 100% | - | 0 | 1.58 | 1.28 | 47 | 34 | 27 |
| B | 31% | 31% | 3.052 | 2.48 | - | 100% | - | 100% | - | 0 | 3.05 | 2.48 | 26.75 | 114 | 93 |
| C | 31% | 31% | 3.052 | 2.48 | - | 100% | - | 100% | - | 0 | 3.05 | 2.48 | 14.24 | 214 | 174 |
| D | 11% | 11% | 1.083 | 0.88 | - | 100% | - | 100% | - | 0 | 1.08 | 0.88 | 14.39 | 75 | 61 |
| E | 11% | 11% | 1.083 | 0.88 | - | 100% | - | 100% | - | 0 | 1.08 | 0.88 | 9.14 | 118 | 96 |
| | | 0% | 0 | 0 | - | 100% | - | 100% | - | 0 | 0.00 | 0.00 | 0 | | |
| | | 0% | 0 | 0 | - | 100% | - | 100% | - | 0 | 0.00 | 0.00 | 0 | | |
| | | 0% | 0 | 0 | - | 100% | - | 100% | - | 0 | 0.00 | 0.00 | 0 | | |
| | | Σ= | 9.84 | 8.00 | | | | Σ= | 0.00 | 0.00 | 9.84 | 8.00 | | | |
| | | Balance Check: | ok | ok | | | | Balance Check: | ok | ok | ok | ok | | | |

**2) DISTRIBUTION TO SHEARWALLS**

| Line | ID | Lwall (ft) | $C_0$ | Lwall' (ft) | $H_{WALL}$ (ft) | E.Q. v (plf) | E.Q. V (k) | E.Q. Amplifiers ρ | E.Q. Amplifiers 2w/h(-) | E.Q. v' (plf) | E.Q. Type | Wind Type | Wind v (plf) | Wind V (k) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | L.A.1 | 25 | 1.00 | 25.00 | 8.00 | 34 | 0.84 | | 1.00 | ***34*** | P6TN | P6TN | ***27*** | 0.680851 |
| A | L1.A.2 | 22 | 1.00 | 22.00 | 8.00 | 34 | 0.74 | | 1.00 | ***34*** | P6TN | P6TN | ***27*** | 0.599149 |
| B | L1.B.1 | 3.83 | 1.00 | 3.83 | 8.00 | 114 | 0.44 | | 1.04 | ***119*** | P6TN | P6TN | ***93*** | 0.35508 |
| B | L1.B.2 | 4.92 | 1.00 | 4.92 | 8.00 | 114 | 0.56 | | 1.00 | ***114*** | P6TN | P6TN | ***93*** | 0.456135 |
| B | L1.B.3 | 18 | 1.00 | 18.00 | 8.00 | 114 | 2.05 | | 1.00 | ***114*** | P6TN | P6TN | ***93*** | 1.668785 |
| C | L1.C.1 | 14.24 | 1.00 | 14.24 | 8.00 | 214 | 3.05 | | 1.00 | ***214*** | P6 | P6 | ***174*** | 2.48 |
| D | L1.D.1 | 14.39 | 1.00 | 14.39 | 8.00 | 75 | 1.08 | | 1.00 | ***75*** | P6TN | P6TN | ***61*** | 0.88 |
| E | L1.E.1 | 4.28 | 1.00 | 4.28 | 8.00 | 118 | 0.51 | | 1.00 | ***118*** | P6TN | P6TN | ***96*** | 0.412079 |
| E | L1.E.2 | 4.86 | 1.00 | 4.86 | 8.00 | 118 | 0.58 | | 1.00 | ***118*** | P6TN | P6TN | ***96*** | 0.467921 |
| | | 5.17 | 1.00 | 5.17 | 8.00 | 0 | 0.00 | | 1.00 | ***0*** | --- | --- | ***0*** | 0 |
| | | | 1.00 | 0.00 | 8.00 | 0 | 0.00 | | 1.00 | ***0*** | --- | --- | ***0*** | 0 |
| | | | 1.00 | 0.00 | 8.00 | 0 | 0.00 | | 1.00 | ***0*** | --- | --- | ***0*** | 0 |

**ρ= 1.00**

(-)Table 4.3.4 AF&PA SDPWS, Footnote 1

*Flr. Thk. (Add to OTM arm):* 0.0 ft **E.Q. DL Uplift Factor:* 43.9% *DL Uplift Factor w/Wind:* 60.0%

**3) OVERTURNING RESISTANCE**

| | | | | Resisted | Resisted | | Seismic Uplift | | | | | | | | Wind Uplift | | | | | | | Max. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Line | ID | $L_{DL\ eff.}$ (ft) | w dl (klf) | ID (#1) Above | ID (#2) Above | $L_{ARM}$ (ft) | OTM (kip-ft) | Reduced $R_{OTM}$* (kip-ft) | Net OTM Level (kip-ft) | Net OTM Abv. (kip-ft) | Net OTM Total (kip-ft) | Ω | Add'l U (k) | $U_{sum}$ (kip) | OTM (kip-ft) | Reduced $R_{OTM}$ (kip-ft) | Net OTM Level (kip-ft) | Net OTM Abv. (kip-ft) | Net OTM Total (kip-ft) | Add'l U (k) | $U_{sum}$ (kip) | $U_{sum}$ (kip) | HD |
| A | L.A.1 | 27.0 | 0.15 | - | - | 24.75 | 6.70 | 55.99 | -49.29 | 0 | -49.29 | 1.00 | 0 | **-1.99** | 5.45 | 64.13 | -58.68 | 0 | -58.68 | 0 | **-2.37** | **-1.99** | NONE |
| A | L1.A.2 | 24.0 | 0.15 | - | - | 21.75 | 5.90 | 43.80 | -37.90 | 0 | -37.90 | 1.00 | 0 | **-1.74** | 4.79 | 50.16 | -45.37 | 0 | -45.37 | 0 | **-2.09** | **-1.74** | NONE |
| B | L1.B.1 | 5.8 | 0.15 | - | - | 3.58 | 3.50 | 1.85 | 1.64 | 0 | 1.64 | 1.00 | 0 | **0.46** | 2.84 | 2.12 | 0.72 | 0 | 0.72 | 0 | **0.20** | **0.46** | NONE |
| B | L1.B.2 | 6.9 | 0.15 | - | - | 4.67 | 4.49 | 2.82 | 1.67 | 0 | 1.67 | 1.00 | 0 | **0.36** | 3.65 | 3.23 | 0.41 | 0 | 0.41 | 0 | **0.09** | **0.36** | NONE |
| B | L1.B.3 | 20.0 | 0.15 | - | - | 17.75 | 16.43 | 29.86 | -13.43 | 0 | -13.43 | 1.00 | 0 | **-0.76** | 13.35 | 34.20 | -20.85 | 0 | -20.85 | 0 | **-1.17** | **-0.76** | NONE |
| C | L1.C.1 | 16.2 | 0.15 | - | - | 13.99 | 24.42 | 19.18 | 5.23 | 0 | 5.23 | 1.00 | 0 | **0.37** | 19.84 | 21.97 | -2.13 | 0 | -2.13 | 0 | **-0.15** | **0.37** | NONE |
| D | L1.D.1 | 16.4 | 0.15 | - | - | 14.14 | 8.66 | 19.56 | -10.90 | 0 | -10.90 | 1.00 | 0 | **-0.77** | 7.04 | 22.41 | -15.37 | 0 | -15.37 | 0 | **-1.09** | **-0.77** | NONE |
| E | L1.E.1 | 6.3 | 0.15 | - | - | 4.03 | 4.06 | 2.23 | 1.83 | 0 | 1.83 | 1.00 | 0 | **0.45** | 3.30 | 2.55 | 0.74 | 0 | 0.74 | 0 | **0.18** | **0.45** | NONE |
| E | L1.E.2 | 6.9 | 0.15 | - | - | 4.61 | 4.61 | 2.77 | 1.84 | 0 | 1.84 | 1.00 | 0 | **0.40** | 3.74 | 3.17 | 0.58 | 0 | 0.58 | 0 | **0.12** | **0.40** | NONE |
| | | 0.0 | 0.15 | - | - | | | | | 0 | | 1.00 | 0 | | | | | 0 | | 0 | | **0.00** | NONE |
| | | 0.0 | 0.15 | - | - | | | | | 0 | | 1.00 | 0 | | | | | 0 | | 0 | | **0.00** | NONE |
| | | 0.0 | 0.15 | - | - | | | | | 0 | | 1.00 | 0 | | | | | 0 | | 0 | | **0.00** | NONE |

*Holdown Ctr. Offset from SW End:* 3 in Σ= 0.00 -99.30

**SIMPSON STRONG-TIE COMPANY INC.**
(800) 999-5099
5956 W. Las Positas Blvd., Pleasanton, CA 94588.
www.strongtie.com

**Job Name:** SELBY
**Wall Name:** GRID 1 GARAGE WALLS
**Application:** Standard Wall on Concrete

## Design Criteria:

* 2018 International Bldg Code
* Seismic R=6.5
* 2500 psi concrete
* ASD Design Shear = 1100 lbs
* Nominal wall height = 9 ft

## Selected Strong-Wall® Panel Solution:

| Model | Type | W (in) | H (in) | T (in) | Sill Anchor | End Anchor Bolts | Total Axial Load (lbs) | Actual Uplift (lbs) |
|---|---|---|---|---|---|---|---|---|
| WSWH12x9 | Wood | 12 | 105.25 | 3.5 | N/A | 2 - 1" | 0 | 7592 lb |
| WSWH12x9 | Wood | 12 | 105.25 | 3.5 | N/A | 2 - 1" | 0 | 7592 lb |

## Actual Shear & Drift Distribution:

| Model | RR Relative Rigidity | Actual Shear (lbs) | | Allowable Shear (lbs) | | Actual / Allow Shear | Actual Drift (in) | Drift Limit (in) |
|---|---|---|---|---|---|---|---|---|
| WSWH12x9 | 0.50 | 550 | ≤ | 850 | OK | 0.65 | 0.29 | 0.47 |
| WSWH12x9 | 0.50 | 550 | ≤ | 850 | OK | 0.65 | 0.29 | 0.47 |

## Notes:

1. Strong-Wall High-Strength Wood Shearwalls have been evaluated to the 2021 IBC/IRC. See www.strongtie.com for additional design and installation information.

2. Anchor templates are recommended for proper anchor bolt placement, and are required in some jurisdictions.

3. The applied vertical load shall be a concentric point load or a uniformly distributed load not exceeding the allowable vertical load. Alternatively, the load may be applied anywhere along the width of the panel if imposed by a continuous bearing vertical load transfer element such as a rimboard or beam. For eccentric axial loads applied directly to the panel, the allowable vertical load shall be divided by two.

4. Panels may be trimmed to a minimum height of 74½".

## Disclaimer:

**SIMPSON STRONG-TIE COMPANY INC.**
(800) 999-5099
5956 W. Las Positas Blvd., Pleasanton, CA 94588.
www.strongtie.com

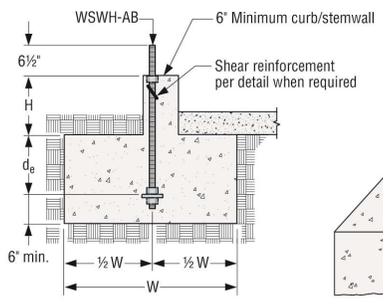
**Job Name:** SELBY
**Wall Name:** GRID 1 GARAGE WALLS
**Application:** Standard Wall on Concrete

## Design Criteria:

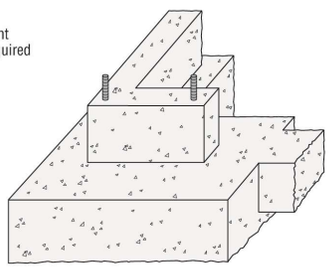
* Stemwall - Garage Front
* 2018 International Bldg Code
* Seismic R=6.5
* 2500 psi concrete

## Anchor Solution Details:

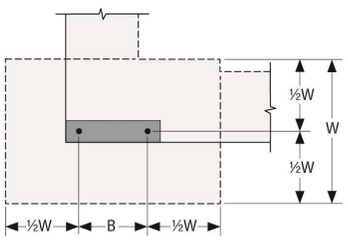
**Stemwall Installation**




Stemwall Section View

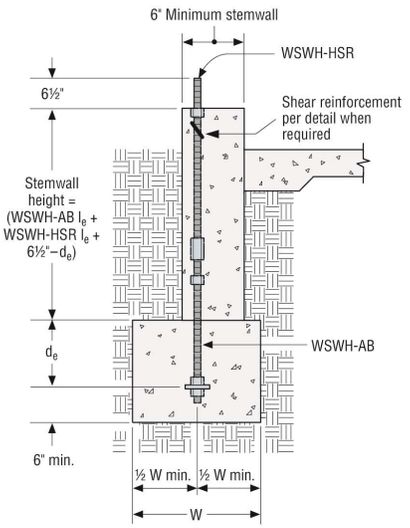


Perspective View
*(Slab not shown for clarity)*




Footing Plan

**Stemwall Extension Installation**




Section at Stemwall
WSWH-AB and WSWH-HSR
Extension Application

**Anchor Solution Assuming Cracked Concrete Design:**

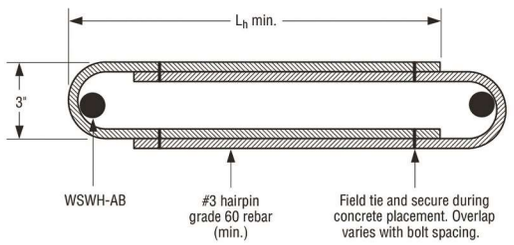
| Model | W | de | B | Anchor Bolt | Strength |
|---|---|---|---|---|---|
| WSWH12x9 | 33 | 11 | 8.125 | WSWH-AB | Standard |

**Anchor Solution Assuming Uncracked Concrete Design:**

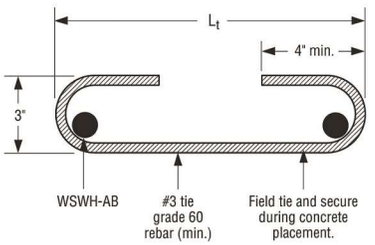
| Model | W | de | B | Anchor Bolt | Strength |
|---|---|---|---|---|---|
| WSWH12x9 | 28 | 10 | 8.125 | WSWH-AB | Standard |

## Notes:

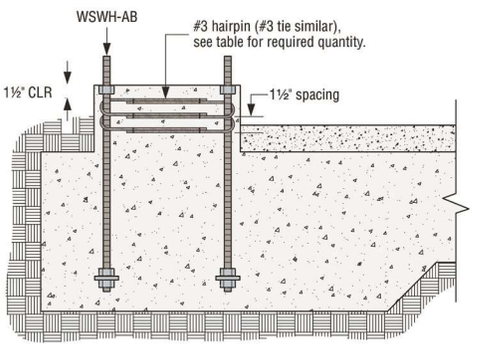
1. Anchorage designs conform to ACI 318-19, ACI 318-14 and 318-11 Appendix D with no supplementary reinforcement for cracked and uncracked concrete as noted.
2. Anchorage strength indicates required grade of anchor bolt. Standard (ASTM F1554 grade 36) or High Strength (HS)(ASTM A193 Grade B7).
3. Seismic indicates Seismic Design Category C though F. Detached 1 & 2 family dwellings in SDC C may use wind anchorage solutions. Seismic anchorage designs conform to ACI 318-11 section D.3.3.4.3 and ACI 318-14 section 17.2.3.4.3 and ACI 318-19 section 17.10.5.3.
4. Foundation dimensions are for anchorage only. Foundation design (size and reinforcement) by others. The registered design professional may specify alternate embedment, footing size or anchor bolt.




Hairpin Shear Reinforcement




Tie Shear Reinforcement




Hairpin Installation
*(Garage curb shown, other footing types similar)*

## Shear Anchorage Solutions

| Strong-Wall High-Strength Wood Shearwall Model No. | $L_t$ or $L_h$ (in.) | Seismic [3] | | Wind [4] | | | |
|---|---|---|---|---|---|---|---|
| | | Shear Reinforcement | Minimum Curb/ Stemwall Width (in.) | Shear Reinforcement | Minimum Curb/ Stemwall Width (in.) | ASD Allowable Shear Load, V (lb.) [7] | |
| | | | | | | Uncracked | Cracked |
| WSWH12 | 10¼ | (1) #3 Tie | 6 | See Note 7 | 6 | 1,080 | 770 |
| WSWH18 | 15 | (2) #3 hairpins[5, 6] | 6 | (1) #3 hairpin | 6 | Hairpin reinforcement achieves maximum allowable shear load of the Strong-Wall® WSWH | |
| WSWH24 | 19 | (2) #3 hairpins[5] | 6 | (2) #3 hairpins[5] | 6 | | |

1. Shear anchorage designs conform to ACI 318-14 Chapter 17 and ACI 318-11 and assume minimum 2,500 psi concrete.
2. Shear reinforcement is not required for interior foundation applications (panel installed away from edge of concrete), or braced wall panel applications.
3. Seismic indicates seismic design category C through F. Detached one- and two-family dwellings in SDC C may use wind anchorage solutions. Seismic shear reinforcement designs conform to ACI 318-14, section 17.2.3.5.3 and ACI 318-11 section D.3.3.5.
4. Wind includes seismic design category A and B and detached one- and two-family dwellings in SDC C.
5. Additional ties may be required at garage curb or stemwall installations below anchor reinforcement per designer.
6. Use (1) #3 hairpin for WSWH18 when standard strength anchor is used.
7. Use (1) #3 tie for WSWH12 when panel design shear force exceeds tabulated anchorage allowable shear load.
8. No. 4 grade 40 shear reinforcement may be substituted for WSWH shear anchorage solutions.
9. Concrete edge distance for anchors must comply with ACI 318-14 section 17.7.2 and ACI 318-11 section D.8.2.
10. The designer may specify alternate shear anchorage.

# STRONG-WALL® WSWH SHEAR ANCHORAGE SCHEDULE AND DETAILS

CT ENGINEERING INC.

CALCULATION

SECTION 8.0:

# FOUNDATION ENGINEERING

## Framing Notes

1. REFER TO S9.1 FOR TYPICAL FRAMING DETAILS
2. ROOF FRAMING – RAFTERS PER PLAN.
3. FLOOR FRAMING – 2x JOISTS PER PLAN. BLOCKING AT BEARING AND SHEARWALLS SHALL BE PER BEARING AND SHEARWALL SCHEDULE (VERIFY EXIST. BRG. LOC.). FLOOR SHEATHING SHALL BE GLUED AND NAILED.
4. WALLS INDICATED ARE BELOW THE FRAMING LEVEL (REFER TO SYMBOL KEY FOR TYPE). SEE BEARING WALL SCHEDULE THIS SHEET
5. PLUMBING, MECHANICAL, AND ELECTRICAL SYSTEMS SHALL BE DESIGNED AND BUILT TO ACCOMMODATE 3/8" PER FLOOR WOOD SHRINKAGE.
6. SEE DETAIL 1/S9.1 FOR TYPICAL HEADER/BUNDLED STUD CONSTRUCTION.
7. SEE ARCHITECTURAL FOR DRAFTSTOP AND VENTING LOCATIONS.
8. FRAMING MEMBERS AND SHEATHING SHALL BE PER STRUCTURAL NOTES AS NOTED ON SHEET S1.1
9. ALL UNLABELED EXTERIOR WALLS ARE TO BE TYPE 'P6'; SEE SHEARWALL SCHEDULE ON SHEET S1.2
10. HANGERS INDICATED ARE AS MANUFACTURED BY SIMPSON STRONG-TIE. SEE SEC. 06103/S1.1 FOR TYPICAL HANGERS, U.N.O..
11. PROVIDE JOIST OR BLOCKING ATOP SHEARWALLS.
12. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS AND TOP PLATE ELEVATIONS.
13. BUNDLED STUDS FROM THIS LEVEL SHALL BE CONTINUED DOWN TO FOUNDATION OR SUPPORTING BEAM. (RE: 4/S9.1)
14. ALL BEAMS AND HEADERS SHALL HAVE A MINIMUM OF (1) FULL HEIGHT STUD AT EACH END FOR BRACING TYPICAL UNLESS NOTED OTHERWISE.
15. PROVIDE MINIMUM (2) 2X BUNDLED STUDS UNDER EACH BEAM END, TYPICAL UNLESS NOTED OTHERWISE. (AT HEADERS: TRIMMER+KING=2 BUNDLED STUDS)

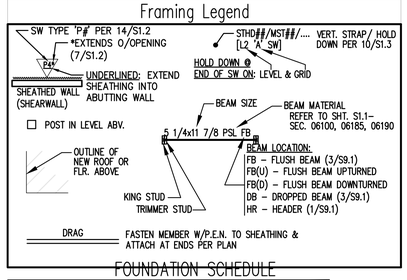
15. SEE DETAILS 19 & 20 ON SHEET S1.3 FOR TYPICAL CORNER FRAMING DETAILS AT HOLD DOWNS & SHEARWALLS.
16. HANGER OCCURS WHERE FLUSH BEAM HANGS TO SUPPORT BEAMS, TYP. U.N.O.

## Bearing Wall Stud Schedule

| BEARING WALL TYPE | STUD SIZE AND SPACING, U.N.O. |
|---|---|
| EXTERIOR | 2 X 6 AT 16" O.C., U.N.O. |
| INTERIOR NON-BEARING | 2 X 4 AT 16 O.C. |

BEARING WALL NOTES
1. SEE SHEARWALL SCHEDULE SHEET S1.2 FOR WALL SHEATHING, ADDITIONAL PLATE AND STUD REQUIREMENTS, BLOCKING AND PLATE NAILING. SEE SAWN LUMBER STRUCTURAL NOTES SHEET S1.1 FOR SPECIES AND GRADE OF WALL PLATES AND STUDS.
2. SECURE SILL PLATES TO CONCRETE WITH ⅝" DIA. ANCHOR BOLTS AT 48" ON CENTER TYPICAL UNLESS NOTED OTHERWISE. RE:S1.2. REFER TO SHEARWALL AND HOLDOWN SCHEDULE FOR ADDITIONAL ANCHOR BOLT REQUIREMENTS. WHERE PRESERVATIVE TREATED WOOD IS USED, REFER TO THAT NOTE SECTION FOR CORROSION PROTECTION REQUIREMENTS FOR CONNECTORS.
3. SEE 2/S9.1 FOR TOP PLATE SPLICE. PROVIDE ADDITIONAL CONNECTORS AT SHEARWALLS AS INDICATED ON THE PLANS.
4. ALIGN STUDS UNDER JOISTS

## Framing Legend




## FOUNDATION SCHEDULE

| MARK | DEPTH | WIDTH | LENGTH | REINFORCING |
|---|---|---|---|---|
| F1.5 | 10" | 1'-6" | CONT. | (2) #4B CONT. |
| F2.0 | 10" | 2'-0" | CONT. | (3) #4B CONT. |
| F18 | 10" | 1'-6" | 1'-6" | (2) #4B E/W |
| F36 | 10" | 3'-0" | 3'-0" | (4) #4B E/W. |
| F48 | 10" | 4'-0" | 4'-0" | (5) #4B E/W. |

## Foundation Notes

1. ALL SOIL BEARING SURFACES ARE SUBJECT TO INSPECTION AND APPROVAL BY THE GEOTECHNICAL ENGINEER PRIOR TO REINFORCING AND CONCRETE PLACEMENT.
2. CENTER INTERIOR FOOTINGS ON WALLS OR COLUMNS TYPICAL U.N.O.
3. SEE ARCHITECTURAL PLANS FOR DIMENSIONS.
4. NEW FOUNDATION WALLS TO BE 8" THICK TYPICAL U.N.O. W/#5 VERTS @ 18" O.C. BENT INTO FOOTINGS (ALT.) & #5 HORZ. BARS @ 18" O.C.; CENTER STL. IN STEM WALL. REFER TO DETAIL 5/S6.1
5. PROVIDE 4" DIAMETER PERFERATED FOOTING DRAINS AT PERIMETER OF FOUNDATIONS TYPICAL, CONNECT PER CIVIL. PROVIDE 4" DIAMETER TIGHTLINES FOR DOWNSPOUTS, CONNECT PER CIVIL.
6. FOR V.I.F. (VERIFY IN FIELD) CALLOUTS ON EXISTING FOOTINGS, THE CONTRACTOR MAY DIG TO EXPOSE FOOTING HEEL OR DRILL IN S.O.G. TO PROBE FOR THICKNESS & WIDTH (OR NON-DESTRUCTIVE SCAN BY SPECIAL INSPECTOR); IT MAY BE ASSUMED THAT EXISTING FOOTING IS CENTERED BELOW FOUNDATION WALL.

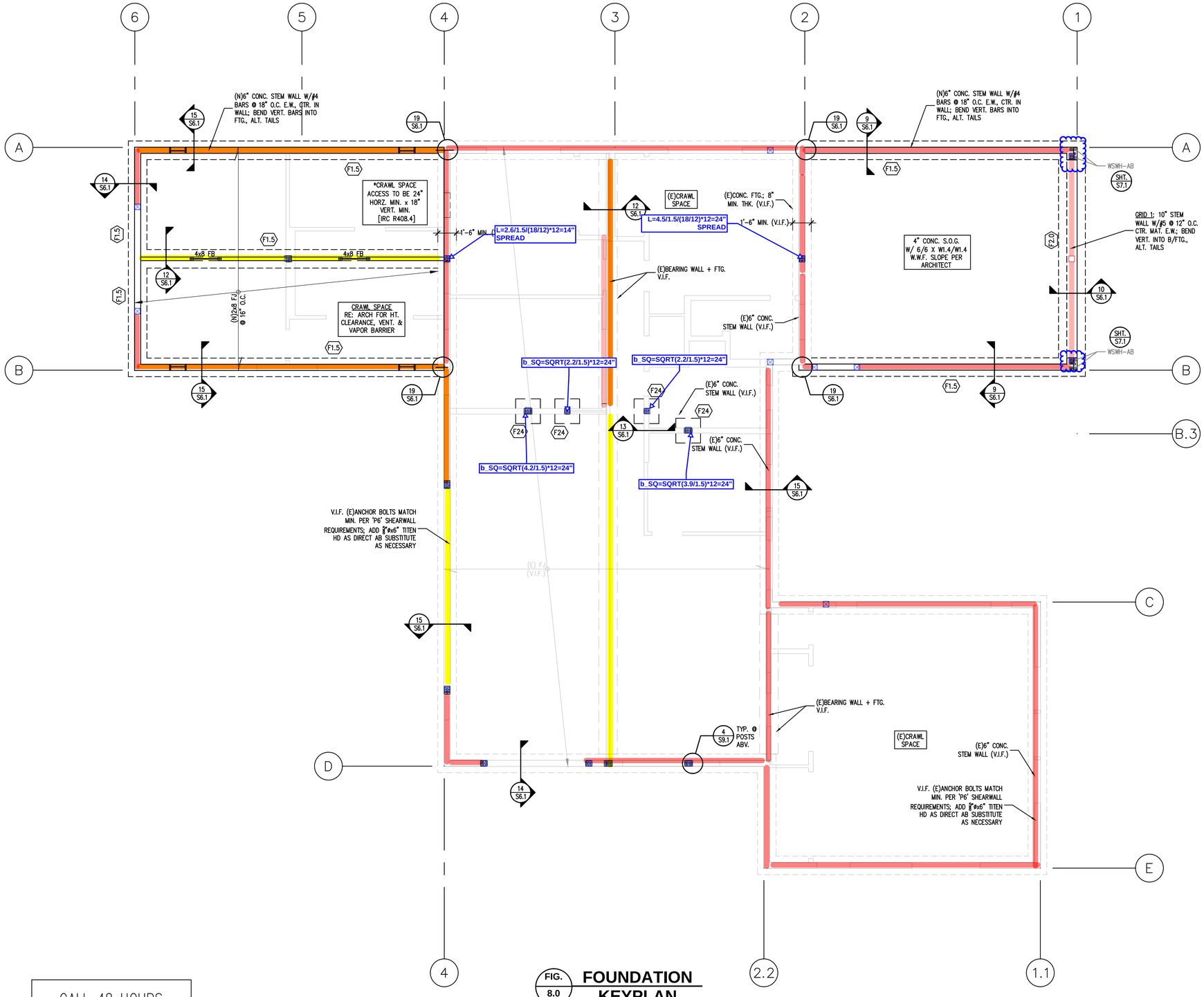



FIG. 8.0 **FOUNDATION KEYPLAN**

## Foundation Plan

SCALE: 1/4" = 1'-0"

PROJECT NORTH (REFERENCE ONLY)

Note:
PLANS PREPARED USING ARCHITECTURAL BACKGROUNDS RECEIVED 12/15/2023

GRAPHIC SCALE
−4 0 2 4 8
( IN FEET )
1 inch = 4 ft.

CALL 48 HOURS BEFORE YOU DIG 1-800-424-5555


FFWD LLC
5608 17TH Ave NW, Ste #42
Seattle, WA, 98107
ffwdllc@gmail.com

CT ENGINEERING INC.
Structural Engineers
180 Nickerson Street Suite 302 Seattle, WA 98109
206.285.0616 (F)
206.285.4512 (V)


Selby Primary Suite & Garage Addition
4731 90th Ave SE
Mercer Island, WA 98040

Permit Set

| Date: | Description: |
|---|---|
| 12/21/23 | Permit Submit |

Project No.: CTE#23027
Drawn:

FOUNDATION & MAIN FLOOR FRAMING PLAN

Sheet No:
S2.1

# General Footing



Description : F2.0: 24"x24" Footing with 1500psf ASBP

## General Information

Calculations per ACI 318-08, IBC 2009, CBC 2010, ASCE 7-05

### Material Properties

| | | | |
|---|---|---|---|
| f'c : Concrete 28 day strength | = | 2.50 | ksi |
| fy : Rebar Yield | = | 40.0 | ksi |
| Ec : Concrete Elastic Modulus | = | 3,122.0 | ksi |
| Concrete Density | = | 145.0 | pcf |
| φ Values Flexure | = | 0.90 | |
| Shear | = | 0.750 | |

### Analysis Settings

| | | |
|---|---|---|
| Min Steel % Bending Reinf. | = | 0.00140 |
| Min Allow % Temp Reinf. | = | 0.00180 |
| Min. Overturning Safety Factor | = | 1.0 : 1 |
| Min. Sliding Safety Factor | = | 1.0 : 1 |
| Add Ftg Wt for Soil Pressure | : | Yes |
| Use ftg wt for stability, moments & shears | : | Yes |
| Include Pedestal Weight as DL | : | No |

### Soil Design Values

| | | | |
|---|---|---|---|
| Allowable Soil Bearing | = | 1.50 | ksf |
| Increase Bearing By Footing Weight | = | No | |
| Soil Passive Resistance (for Sliding) | = | 250.0 | pcf |
| Soil/Concrete Friction Coeff. | = | 0.30 | |

Increases based on footing Depth

| | | | |
|---|---|---|---|
| Footing base depth below soil surface | = | 0.0 | ft |
| Allowable pressure increase per foot of deptl | = | 0.0 | ksf |
| when footing base is below | = | 0.0 | ft |

Increases based on footing plan dimension

| | | | |
|---|---|---|---|
| Allowable pressure increase per foot of dept | = | 0.0 | ksf |
| when maximum length or width is greater | = | 0.0 | ft |

## Dimensions

| | | | |
|---|---|---|---|
| Width parallel to X-X Axis | = | 2.0 | ft |
| Length parallel to Z-Z Axis | = | 2.0 | ft |
| Footing Thickness | = | 10.0 | in |

Load location offset from footing center...

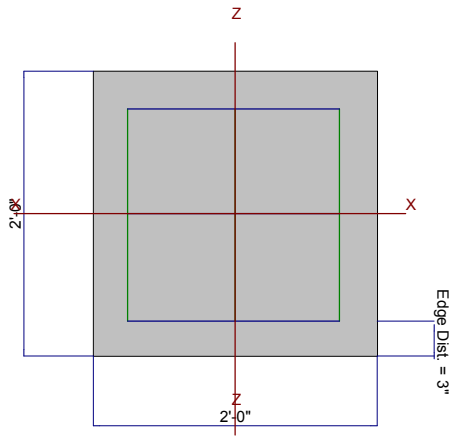
| | | | |
|---|---|---|---|
| ex : parallel to X-X Axis | = | 0 | in |
| ez : parallel to Z-Z Axis | = | 0 | in |

Pedestal dimensions...

| | | | |
|---|---|---|---|
| px : parallel to X-X Axis | = | 0.0 | in |
| pz : parallel to Z-Z Axis | = | 0.0 | in |
| Height | = | 0.0 | in |

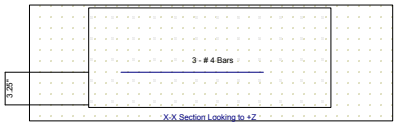
Rebar Centerline to Edge of Concrete..

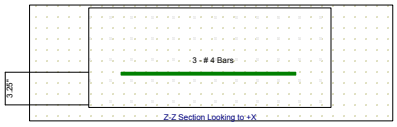
| | | | |
|---|---|---|---|
| at Bottom of footing | = | 3.250 | in |




## Reinforcing

| | | | |
|---|---|---|---|
| Bars parallel to X-X Axis | | | |
| Number of Bars | = | 3.0 | |
| Reinforcing Bar Size | = | # 4 | |
| Bars parallel to Z-Z Axis | | | |
| Number of Bars | = | 3.0 | |
| Reinforcing Bar Size | = | # 4 | |




### Bandwidth Distribution Check (ACI 15.4.4.2)

| | |
|---|---|
| Direction Requiring Closer Separation | n/a |
| # Bars required within zone | n/a |
| # Bars required on each side of zone | n/a |

## Applied Loads

| | | D | Lr | L | S | W | E | H | |
|---|---|---|---|---|---|---|---|---|---|
| P : Column Load | = | 0.0 | 0.0 | 5.50 | 0.0 | 0.0 | 0.0 | 0.0 | k |
| OB : Overburden | = | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ksf |
| M-xx | = | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | k-ft |
| M-zz | = | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | k-ft |
| V-x | = | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | k |
| V-z | = | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | k |

# General Footing

File: g:\Nels\Calc Catalog\nels std calc catalog.ec6
ENERCALC, INC. 1983-2011, Build:6.11.5.3, Ver:6.11.5.3

Lic. # : KW-06002997 — Licensee : C.T. ENGINEERING

Description : F2.0: 24"x24" Footing with 1500psf ASBP

## DESIGN SUMMARY

Design OK

| | Min. Ratio | Item | Applied | Capacity | Governing Load Combination |
|---|---|---|---|---|---|
| PASS | 0.9973 | Soil Bearing | 1.496 ksf | 1.50 ksf | +D+L+H |
| PASS | n/a | Overturning - X-X | 0.0 k-ft | 0.0 k-ft | No Overturning |
| PASS | n/a | Overturning - Z-Z | 0.0 k-ft | 0.0 k-ft | No Overturning |
| PASS | n/a | Uplift | 0.0 k | 0.0 k | No Uplift |
| PASS | 0.1876 | Z Flexure (+X) | 1.10 k-ft | 5.863 k-ft | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.1876 | Z Flexure (-X) | 1.10 k-ft | 5.863 k-ft | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.1876 | X Flexure (+Z) | 1.10 k-ft | 5.863 k-ft | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.1876 | X Flexure (-Z) | 1.10 k-ft | 5.863 k-ft | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.1545 | 1-way Shear (+X) | 11.588 psi | 75.0 psi | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.1545 | 1-way Shear (-X) | 11.588 psi | 75.0 psi | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.1545 | 1-way Shear (+Z) | 11.588 psi | 75.0 psi | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.1545 | 1-way Shear (-Z) | 11.588 psi | 75.0 psi | +1.20D+0.50Lr+1.60L+1.60H |
| PASS | 0.2967 | 2-way Punching | 44.50 psi | 150.0 psi | +1.20D+0.50Lr+1.60L+1.60H |

## Detailed Results

### Soil Bearing

| Rotation Axis & Load Combination... | Gross Allowable | Xecc | Zecc | Actual Soil Bearing Stress +Z | +Z | -X | -X | Actual / Allowable Ratio |
|---|---|---|---|---|---|---|---|---|
| X-X, +D | 1.50 | n/a | 0.0 | 0.1208 | 0.1208 | n/a | n/a | 0.081 |
| X-X, +D+L+H | 1.50 | n/a | 0.0 | 1.496 | 1.496 | n/a | n/a | 0.997 |
| X-X, +D+0.750Lr+0.750L+H | 1.50 | n/a | 0.0 | 1.152 | 1.152 | n/a | n/a | 0.768 |
| X-X, +D+0.750L+0.750S+H | 1.50 | n/a | 0.0 | 1.152 | 1.152 | n/a | n/a | 0.768 |
| X-X, +D+0.750Lr+0.750L+0.750W+H | 1.50 | n/a | 0.0 | 1.152 | 1.152 | n/a | n/a | 0.768 |
| X-X, +D+0.750L+0.750S+0.750W+H | 1.50 | n/a | 0.0 | 1.152 | 1.152 | n/a | n/a | 0.768 |
| X-X, +D+0.750Lr+0.750L+0.5250E+H | 1.50 | n/a | 0.0 | 1.152 | 1.152 | n/a | n/a | 0.768 |
| X-X, +D+0.750L+0.750S+0.5250E+H | 1.50 | n/a | 0.0 | 1.152 | 1.152 | n/a | n/a | 0.768 |
| Z-Z, +D | 1.50 | 0.0 | n/a | n/a | n/a | 0.1208 | 0.1208 | 0.081 |
| Z-Z, +D+L+H | 1.50 | 0.0 | n/a | n/a | n/a | 1.496 | 1.496 | 0.997 |
| Z-Z, +D+0.750Lr+0.750L+H | 1.50 | 0.0 | n/a | n/a | n/a | 1.152 | 1.152 | 0.768 |
| Z-Z, +D+0.750L+0.750S+H | 1.50 | 0.0 | n/a | n/a | n/a | 1.152 | 1.152 | 0.768 |
| Z-Z, +D+0.750Lr+0.750L+0.750W+H | 1.50 | 0.0 | n/a | n/a | n/a | 1.152 | 1.152 | 0.768 |
| Z-Z, +D+0.750L+0.750S+0.750W+H | 1.50 | 0.0 | n/a | n/a | n/a | 1.152 | 1.152 | 0.768 |
| Z-Z, +D+0.750Lr+0.750L+0.5250E+H | 1.50 | 0.0 | n/a | n/a | n/a | 1.152 | 1.152 | 0.768 |
| Z-Z, +D+0.750L+0.750S+0.5250E+H | 1.50 | 0.0 | n/a | n/a | n/a | 1.152 | 1.152 | 0.768 |

### Overturning Stability

| Rotation Axis & Load Combination... | Overturning Moment | Resisting Moment | Stability Ratio | Status |
|---|---|---|---|---|

Footing Has NO Overturning

### Footing Flexure

| Flexure Axis & Load Combination | Mu k-ft | Which Side ? | Tension @ Bot. or Top ? | As Req'd in^2 | Gvrn. As in^2 | Actual As in^2 | Phi*Mn k-ft | Status |
|---|---|---|---|---|---|---|---|---|
| X-X, +1.40D | 0 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.40D | 0 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50Lr+1.60L+1.60H | 1.1 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50Lr+1.60L+1.60H | 1.1 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+1.60L+0.50S+1.60H | 1.1 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+1.60L+0.50S+1.60H | 1.1 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+1.60Lr+0.50L | 0.3437 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+1.60Lr+0.50L | 0.3437 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50L+1.60S | 0.3437 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50L+1.60S | 0.3437 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50Lr+0.50L+1.60W | 0.3437 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50Lr+0.50L+1.60W | 0.3437 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50L+0.50S+1.60W | 0.3437 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50L+0.50S+1.60W | 0.3437 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| X-X, +1.20D+0.50L+0.20S+E | 0.3437 | +Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |

## General Footing



Description : F2.0: 24"x24" Footing with 1500psf ASBP

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X-X, +1.20D+0.50L+0.20S+E | 0.3437 | -Z | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |

# General Footing

File: g:\Nels\Calc Catalog\nels std calc catalog.ec6
ENERCALC, INC. 1983-2011, Build:6.11.5.3, Ver:6.11.5.3

Lic. # : KW-06002997
Licensee : C.T. ENGINEERING

Description : F2.0: 24"x24" Footing with 1500psf ASBP

## Footing Flexure

| Flexure Axis & Load Combination | Mu k-ft | Which Side ? | Tension @ Bot. or Top ? | As Req'd in^2 | Gvrn. As in^2 | Actual As in^2 | Phi*Mn k-ft | Status |
|---|---|---|---|---|---|---|---|---|
| Z-Z, +1.40D | 0 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.40D | 0 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50Lr+1.60L+1.60H | 1.1 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50Lr+1.60L+1.60H | 1.1 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+1.60L+0.50S+1.60H | 1.1 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+1.60L+0.50S+1.60H | 1.1 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+1.60Lr+0.50L | 0.3437 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+1.60Lr+0.50L | 0.3437 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50L+1.60S | 0.3437 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50L+1.60S | 0.3437 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50Lr+0.50L+1.60W | 0.3437 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50Lr+0.50L+1.60W | 0.3437 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50L+0.50S+1.60W | 0.3437 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50L+0.50S+1.60W | 0.3437 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50L+0.20S+E | 0.3437 | -X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |
| Z-Z, +1.20D+0.50L+0.20S+E | 0.3437 | +X | Bottom | 0.22 | Bending | 0.3 | 5.863 | OK |

## One Way Shear

| Load Combination... | Vu @ -X | Vu @ +X | Vu @ -Z | Vu @ +Z | Vu:Max | Phi Vn | Vu / Phi*Vn | Status |
|---|---|---|---|---|---|---|---|---|
| +1.40D | 0 psi | 0 psi | 0 psi | 0 psi | 0 psi | 75 psi | 0 | OK |
| +1.20D+0.50Lr+1.60L+1.60H | 11.588 psi | 11.588 psi | 11.588 psi | 11.588 psi | 11.588 psi | 75 psi | 0.1545 | OK |
| +1.20D+1.60L+0.50S+1.60H | 11.588 psi | 11.588 psi | 11.588 psi | 11.588 psi | 11.588 psi | 75 psi | 0.1545 | OK |
| +1.20D+1.60Lr+0.50L | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 75 psi | 0.04829 | OK |
| +1.20D+0.50L+1.60S | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 75 psi | 0.04829 | OK |
| +1.20D+0.50Lr+0.50L+1.60W | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 75 psi | 0.04829 | OK |
| +1.20D+0.50L+0.50S+1.60W | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 75 psi | 0.04829 | OK |
| +1.20D+0.50L+0.20S+E | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 3.621 psi | 75 psi | 0.04829 | OK |

## Punching Shear

All units k

| Load Combination... | Vu | Phi*Vn | Vu / Phi*Vn | Status |
|---|---|---|---|---|
| +1.40D | 0 psi | 150 psi | 0 | OK |
| +1.20D+0.50Lr+1.60L+1.60H | 44.5 psi | 150 psi | 0.2967 | OK |
| +1.20D+1.60L+0.50S+1.60H | 44.5 psi | 150 psi | 0.2967 | OK |
| +1.20D+1.60Lr+0.50L | 13.906 psi | 150 psi | 0.09271 | OK |
| +1.20D+0.50L+1.60S | 13.906 psi | 150 psi | 0.09271 | OK |
| +1.20D+0.50Lr+0.50L+1.60W | 13.906 psi | 150 psi | 0.09271 | OK |
| +1.20D+0.50L+0.50S+1.60W | 13.906 psi | 150 psi | 0.09271 | OK |
| +1.20D+0.50L+0.20S+E | 13.906 psi | 150 psi | 0.09271 | OK |