Structural Calculations

for

Ankeny Woods Lower Floor Roof Canopy
11930 SE Ankeny St. Portland, Oregon 97216

Prepared for
KASA Architects, inc.

January 24, 2022

JOB NUMBER: KAS-10

Limitations
Engineer was retained in limited capacity for this project. Design is based upon information provided by the client, who is solely responsible for the accuracy of same. No responsibility and/or liability is assumed by, or is to be assigned to the engineer for items beyond that shown on these sheets.
___9___ sheets total including this cover sheet.

HHPR **Harper Houf Peterson Righellis Inc.**

ENGINEERS ◆ PLANNERS
LANDSCAPE ARCHITECTS ◆ SURVEYORS

205 SE Spokane St. Suite 200 ◆ **Portland, OR 97202** ◆ **[P] 503.221.1131** ◆ **[F] 503.221.1171**
530 Center Street NE, Suite 240 ◆ Salem, OR 97301 ◆ [P] 503.365.1131 ◆ [F] 503.221.1171
250 NW Franklin Ave. Suite 404 ◆ Bend, OR 97703 ◆ [P] 541.318.1161 ◆ [F] 541.318.1141
1220 Main St. Suite 150 ◆ Vancouver, WA 98660 ◆ [P] 360.750.1141 ◆ [F] 360.750.1141
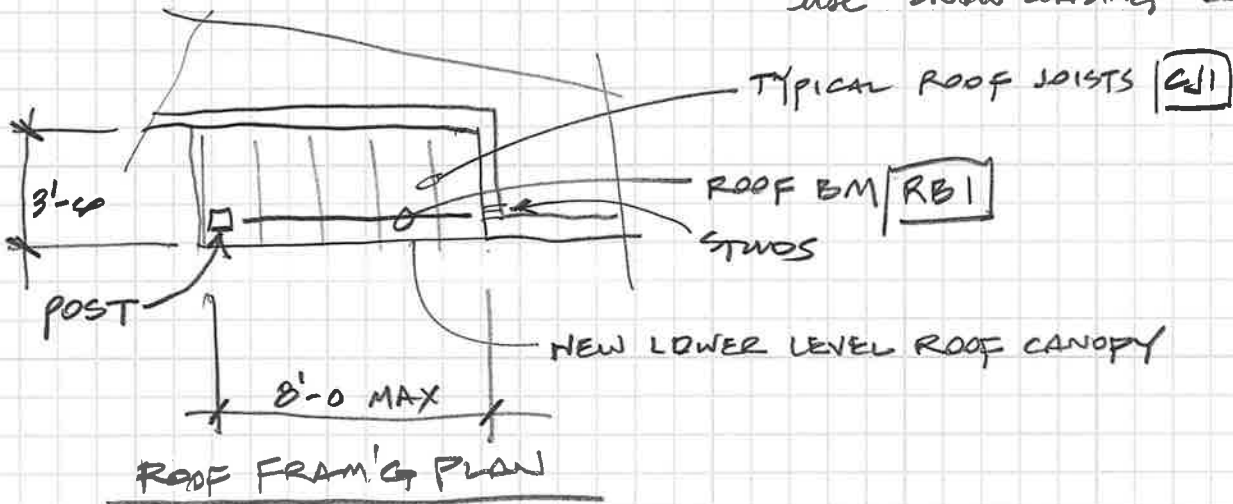
Building D - East Elevation
$1/8" = 1'-0"$

(2)

(E) EXTERIOR DECKS @ 2ND & 3RD FLOORS TO BE REMOVED TYP.

(E) PLANTER FOOTINGS

POST TYP.

8'-8"

7'-11"

7'-11"

TYP.

A5.8 / 3

A8.2 / 1

OSE BIBB, TYP, TYP. SEE 5/A5.7

LIDING GLASS DOOR, TYP.

PROJECT: ANKENY WOODS APTS

RE: NEW FIRST FLR ROOF CANOPIES

CANOPY DL = 12 PSF

use SNOW LOADING = 60 PSF

TYPICAL ROOF JOISTS [RJ1]

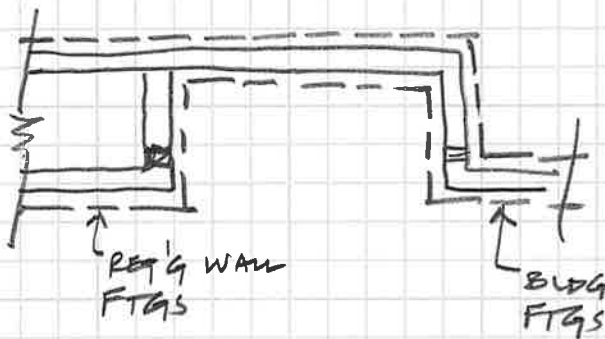ROOF BM [RB1]

STUDS

3'-6

POST

8'-0 MAX

NEW LOWER LEVEL ROOF CANOPY

ROOF FRAM'G PLAN

NOTE: EXIST'G 2ND FLOOR DECK TO BE REMOVED & REPLACED WITH THIS NEW ROOF CANOPY.

THEREFORE NO CONCERNS ON EITHER GRAVITY OR LATERAL LOADS.

(SEE PAGES FOLLOW FOR FRAM'G DESIGN) ⟶

RET'G WALL FTGS

BLDG FTGS

PARTIAL FDN PLAN

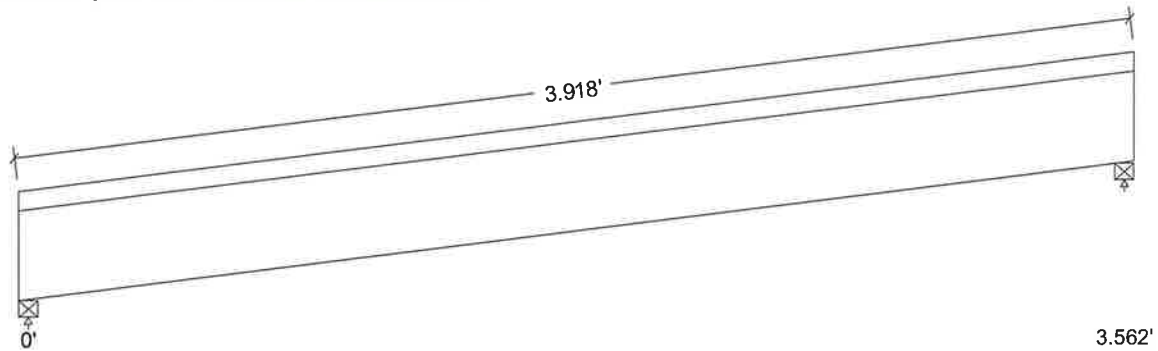| COMPANY	PROJECT
	Typical Roof Joists CJ1
Jan. 24, 2022 13:15	

Design Check Calculation Sheet
WoodWorks Sizer 11.1

Loads:

Load	Type	Distribution	Pat- tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full Area			12.00(24.0")	psf
Load2	Snow	Full Area			60.00(24.0")	psf
Self-weight	Dead	Full UDL			1.1	plf

Maximum Reactions (lbs) and Bearing Lengths (in) :

3.918'

0'   3.562'

Unfactored:			
Dead	48		48
Snow	217		217
Factored:			
Total	265		265
Bearing:			
Length	0.75		0.75
Min req'd	0.75		0.75

;Canopy Roof Joists CJ1
Lumber-soft, Hem-Fir, No.2, 2x4 (1-1/2"x3-1/2")
Supports: All - Timber-soft Beam, D.Fir-L No.2
Roof joist spaced at 24.0" c/c; Total length: 3.92'; Clear span: 3.689'; volume = 0.1 cu.ft.; Pitch: 4/12
Service: wet; Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2015 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	f_v = 59	F_v' = 134	psi	f_v/F_v' = 0.44
Bending(+)	f_b = 910	F_b' = 997	psi	f_b/F_b' = 0.91
Live Defl'n	0.08 = L/555	0.19 = L/240	in	0.43
Total Defl'n	0.12 = L/385	0.25 = L/180	in	0.47

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
4. SLOPED BEAMS: level bearing is required for all sloped beams.

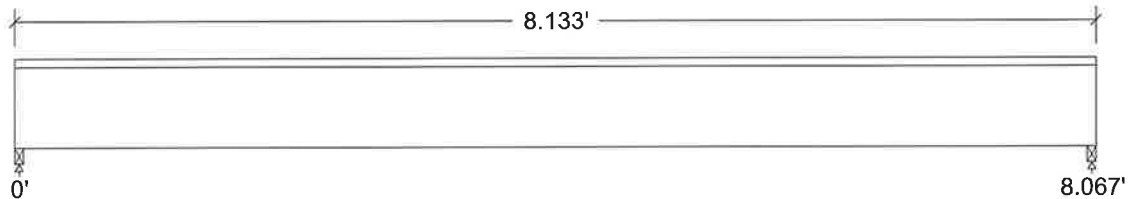| WoodWorks® SOFTWARE FOR WOOD DESIGN	COMPANY	PROJECT	
	Jan. 24, 2022 13:14	Beam1 RB1	

Design Check Calculation Sheet
WoodWorks Sizer 11.1

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Full Area			12.00(24.0")	psf
Load2	Snow	Full Area			60.00(24.0")	psf
Self-weight	Dead	Full UDL			5.2	plf

Maximum Reactions (lbs) and Bearing Lengths (in) :

```
|<----------------------- 8.133' -----------------------|
_____
|                                                        |
|_____|
X                                                        X
0'                                                    8.067'
```

Unfactored:			
Dead	119		119
Snow	488		488
Factored:			
Total	607		607
Bearing:			
Length	0.80		0.80
Min req'd	0.80		0.80

;Canopy Beam RB1
Lumber-soft, Hem-Fir, No.2, 4x8 (3-1/2"x7-1/4")
Supports: All - Timber-soft Beam, D.Fir-L No.2
Roof joist spaced at 24.0" c/c; Total length: 8.13'; Clear span: 8.0'; volume = 1.4 cu.ft.
Service: wet; Lateral support: top= full, bottom= at supports;

Analysis vs. Allowable Stress and Deflection using NDS 2015 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 30	Fv' = 134	psi	fv/Fv' = 0.22
Bending(+)	fb = 475	Fb' = 1017	psi	fb/Fb' = 0.47
Live Defl'n	0.09 = <L/999	0.40 = L/240	in	0.23
Total Defl'n	0.14 = L/703	0.54 = L/180	in	0.26

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.

COMPANY	PROJECT
Jan. 24, 2022 13:22	Canopy Post

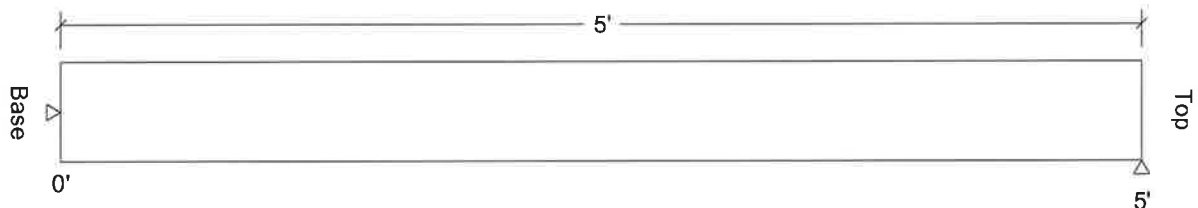**WoodWorks®**
SOFTWARE FOR WOOD DESIGN

Design Check Calculation Sheet
WoodWorks Sizer 11.1

Loads:

Load	Type	Distribution	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Axial	(Ecc. = 0.92")	150	lbs
Load2	Snow	Axial	(Ecc. = 0.92")	500	lbs
Self-weight	Dead	Axial		31	lbs

Lateral Reactions (lbs):

Unfactored:			
Dead	2		-2
Snow	8		-8
Factored:			
R->L			-10
Load comb			#2
L->R	10		

Canopy Post
Timber-soft, Hem-Fir, No.2, 6x6 (5-1/2"x5-1/2")
Support: Non-wood
Total length: 5.0'; Clear span: 5.0'; volume = 1.1 cu.ft.; Post and timber
Pinned base; Load face = width(b); Service: wet; Ke x Lb: 1.0 x 5.0 = 5.0 [ft]; Ke x Ld: 1.0 x 5.0 = 5.0 [ft];

Analysis vs. Allowable Stress and Deflection using NDS 2015 :

Criterion	Analysis Value	Design	Value	Unit	Analysis/Design
Shear	fv = 0	Fv' =	129	psi	fv/Fv' = 0.00
Bending(+)	fb = 22	Fb' =	529	psi	fb/Fb' = 0.04
Axial	fc = 23	Fc' =	457	psi	fc/Fc' = 0.05
Combined (axial + eccentric moment)					Eq.15.4-3 = 0.04
Axial Bearing	fc = 23	Fc* =	481	psi	fc/Fc* = 0.05
Live Defl'n	0.00 = <L/999	0.50 =	L/120	in	0.00
Total Defl'n	0.00 = <L/999	0.50 =	L/120	in	0.00

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. FIRE RATING: may be conservative relative to approved code provisions for "short" columns.
4. Axial load eccentricity applied in direction of load face only. It is the designers responsibility to check for effect of eccentricity in the other direction.

	COMPANY	PROJECT
WoodWorks® SOFTWARE FOR WOOD DESIGN		
	Jan. 24, 2022 13:40	Bearing Studs in Wall

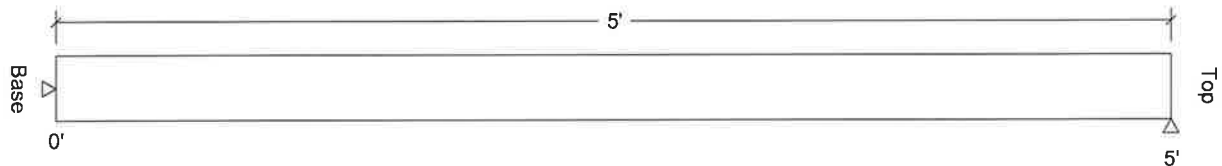## Design Check Calculation Sheet
WoodWorks Sizer 11.1

Loads:

Load	Type	Distribution	Location [ft] Start End	Magnitude Start End	Unit
Load1	Dead	Axial UDL	(Ecc. = 0.58")	75	plf
Load3	Wind	Full Area		25.00(12.0")	psf
Load4	Snow	Axial UDL	(Ecc. = 0.58")	500	plf
Self-weight	Dead	Axial UDL		12	plf

Lateral Reactions (lbs):

```
                         |------------------- 5' -------------------|
         Base  ▷ |--------------------------------------------------| Top
               0'                                                   ▽
                                                                    5'
```

Unfactored:			
Dead	1		-1
Snow	5		-5
Wind	63		63
Factored:			
R->L			-6
Load comb			#2
L->R	38		37

Canopy Sujpport Studs in Wall
Lumber n-ply, D.Fir-L, No.2, 2x4, 2-ply (3"x3-1/2")
Support: Lumber n-ply Bottom plate, D.Fir-L No.2; Bearing length = stud thickness; continuous lower support
Spaced at 12.0" c/c; Total length: 5.0'; Clear span: 4.75'; volume = 0.4 cu.ft.
Pinned base; Load face = width(b); Ke x Lb: 1.0 x 0.0 = 0.0 [ft]; Ke x Ld: 1.0 x 5.0 = 5.0 [ft]; Repetitive factor: applied where permitted (refer to online help);
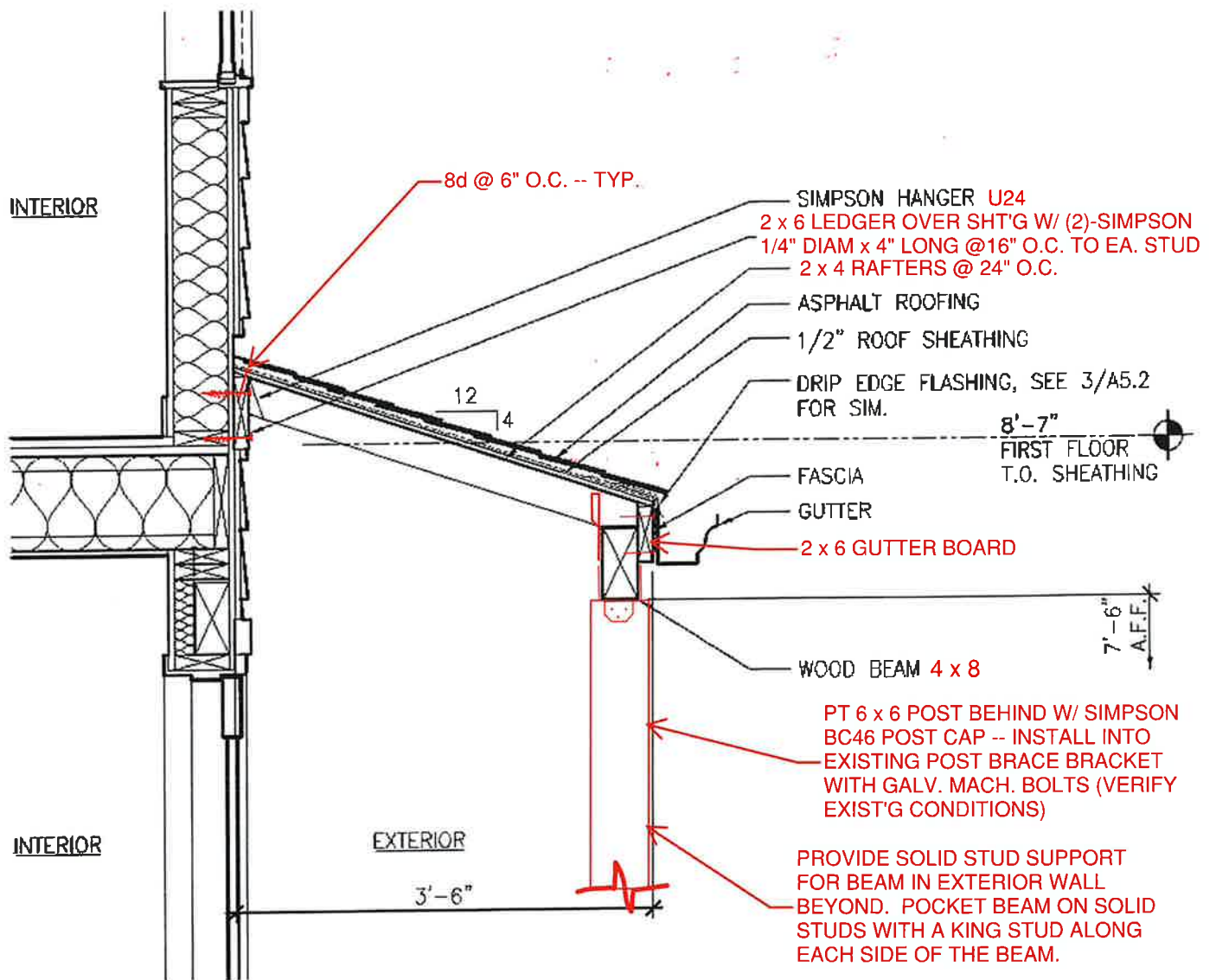
Analysis vs. Allowable Stress and Deflection using NDS 2015 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	f_v = 5	F_v' = 288	psi	f_v/F_v' = 0.02
Bending(+)	f_b = 95	F_b' = 2484	psi	f_b/F_b' = 0.04
Axial	f_c = 56	F_c' = 1173	psi	f_c/F_c' = 0.05
Combined (axial + eccentric & side load bending)				Eq.15.4-1= 0.05
Axial Bearing	f_c = 56	F_c^* = 1785	psi	f_c/F_c^* = 0.03
Support Bearing	f_{cp} = 56	F_{cp} = 703	psi	f_{cp}/F_{cp} = 0.08
Live Defl'n	0.01 = <L/999	0.50 = L/120	in	0.02
Total Defl'n	0.01 = <L/999	0.50 = L/120	in	0.03

Design Notes:
1. WoodWorks analysis and design are in accordance with the ICC International Building Code (IBC 2015), the National Design Specification (NDS 2015), and NDS Design Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. BUILT-UP COLUMNS: nailed or bolted built-up columns shall conform to the provisions of NDS Clause 15.3.
4. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.

INTERIOR

8d @ 6" O.C. -- TYP.

SIMPSON HANGER U24
2 x 6 LEDGER OVER SHT'G W/ (2)-SIMPSON
1/4" DIAM x 4" LONG @16" O.C. TO EA. STUD
2 x 4 RAFTERS @ 24" O.C.

ASPHALT ROOFING

1/2" ROOF SHEATHING

DRIP EDGE FLASHING, SEE 3/A5.2
FOR SIM.

12
4

8'-7"
FIRST FLOOR
T.O. SHEATHING

FASCIA

GUTTER

2 x 6 GUTTER BOARD

7'-6" A.F.F.

WOOD BEAM 4 x 8

PT 6 x 6 POST BEHIND W/ SIMPSON
BC46 POST CAP -- INSTALL INTO
EXISTING POST BRACE BRACKET
WITH GALV. MACH. BOLTS (VERIFY
EXIST'G CONDITIONS)

PROVIDE SOLID STUD SUPPORT
FOR BEAM IN EXTERIOR WALL
BEYOND. POCKET BEAM ON SOLID
STUDS WITH A KING STUD ALONG
EACH SIDE OF THE BEAM.

INTERIOR

EXTERIOR

3'-6"

A Canopy at Patio Doors

3/4" = 1'-0"   1710 07 3113 13a