

STRUCTURAL CALCULATIONS

Single-Family Residence Remodel and Addition

Site Address:

9756 S.E. 40th Street
Mercer Island, WA 98040

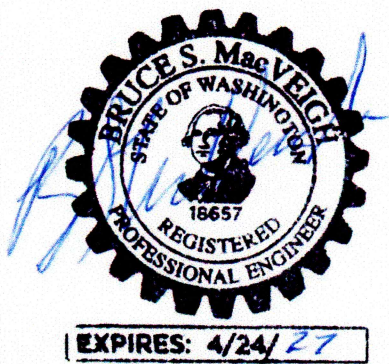
(PN: 265550-0167)

Owner:

Danny Tran

April 3, 2025

Prepared by:
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TranRemodelStruct040325/2509

Structural Discussion

This is an existing one-story residence with crawlspace which will be generally remodeled and will have a second floor added.

The existing first floor and the added second floor will be wood-frame.

The foundation is concrete stemwall with footing. It is existing.

Garage has slab-on-grade floor. It is existing.

The new roof structure is manufactured trusses.

Structural evaluation is per current 2021 IBC or relevant Washington State Code.

BEAMS, JOISTS AND HEADERS

Evaluated are:

Joists

Beams

Major Headers

The wood-frame floor joists and beams have a Live Load of 40 psf.

The Live Load used for the roof is 25 psf for snow loading. This is to check upper floor outer wall headers for regular roof truss loading.

The evaluation for the upper floor headers and wall posts for girder truss loading is prepared separately by the truss manufacturer.

The building will have no significant deck loading locations. (Note, floor structures shown in the limited deck locations are integral with interior floor structure and substantially meet the LL 60 psf requirement.)

(Truss design by The Truss Company is provided in a separate document.)

3 APR '25 1/1
BSM

NEW GARAGE DOOR HEADER BEAM

$$\text{SPAN} = 16'$$

$$\text{LOADING - FLOOR} \quad \text{TL} = 10 + 40 = 50 \text{ PSF}$$

$$\text{LOADING - ROOF} \quad \text{TL} = 10 + 25 = 35 \text{ PSF}$$

$$\text{ROOF/FLOOR SPANS} = 26'$$

$$\therefore W = 26/2 \times (50 + 35) = 1,105 \text{ PLF}$$

$$\begin{aligned} \therefore M_{\text{BEAM}} &= w \cdot l^2 / 8 \\ &= 1,105 \cdot 16^2 / 8 = 35,360 \text{ '}\# \end{aligned}$$

$$= 424,320 \text{ '}\#$$

$$\text{TRY: } 5\frac{1}{2}" \times 18" \text{ GLB}$$

$$S = bd^2/6 = 5.5 \cdot 18^2 / 6 = 297 \text{ IN}^3$$

$$\begin{aligned} F_b &= 2,400 \text{ PSI} \\ \text{GLB} \end{aligned}$$

$$\begin{aligned} \therefore M_{\text{CAP}} &= F_b \cdot S = 2,400 \cdot 297 \\ &= 712,800 \text{ '}\# \\ &\quad \underline{7424,320} \checkmark \end{aligned}$$

3 APR '25
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GREAT ROOM - FRONT 8' WINDOW

$$\text{SPAN} = 8'$$

$$\text{LOADING} - \text{FLOOR} \quad TL = 50 \text{ PSF}$$

$$\text{LOADING} - \text{ROOF} \quad TL = 35 \text{ PSF}$$

$$\Sigma \text{LOADING} = 85 \text{ PSF}$$

$$W = \frac{31'}{2} \times 85 \text{ PSF} = 1,318 \text{ PCF}$$

$$\begin{aligned} \therefore M &= W \cdot l^2 / 8 = 1,318 \cdot 8^2 / 8 \\ &= 10,544 \text{ \#} \\ &= 126,528 \text{ \#} \end{aligned}$$

$$\text{TRY: } 6" \times 12" \text{ DF-SEL} \quad F_b = 1,450 \text{ PSI}$$

$$S = 5.5 \cdot 11\frac{1}{4}^2 / 6 = 116.0 \text{ in}^3$$

$$\begin{aligned} \therefore M_{\text{CAP}} &= F_b \cdot S = 1,450 \cdot 116.0 \\ &= 168,200 \text{ \#} \\ &> 126,528 \text{ \#} \end{aligned}$$

$\therefore$ OKAY

3 APR 1/1
BSM

LIVING ROOM RAFTERS

SPAN 14'
@ 2' SPACING

ROOF ONLY TL =
10 + 25 =
= 35 PSF

$$W = 2' \cdot 35 \text{ PSF} \\ = 70 \text{ PLF}$$

TRY 2" X 12" DF #2 $F_b = 875 \text{ PSI}$

$$S = 1.5 \cdot 11.25^2 / 6 = 31.64 \text{ IN}^3$$

$$M_{CAP} = F_b \cdot S = 875 \cdot 31.64 \\ = \underline{27,686} \text{ IN} \cdot \text{#}$$

$$M_{LOAD} = W \cdot l^2 / 8 = 70 \cdot 14^2 / 8 \\ = 1,715 \text{ IN} \cdot \text{#} \\ = \underline{20,580} \text{ IN} \cdot \text{#} \\ \underline{27,686} \text{ IN} \cdot \text{#}$$

$\therefore$ OKAY

2 APR '25
BSM

1/2

FULL-WIDTH TJI FLOOR JOISTS
NO ROOF LOAD

$$\text{MAX. SPAN} = 31' \text{ (USE ALL LOC'S)}$$

$$\text{SPACING} = 16" = 1.33'$$

$$DL = 10 \text{ PSF} \quad LL = 40 \text{ PSF} \quad TL = 50 \text{ PSF}$$

$$W = 50 \cdot 1.33 = 67 \text{ PLF}$$

REF. TJI CHART

$$\begin{aligned} M &= W \cdot L^2 / 8 = 67 \times 31^2 / 8 \\ &= 8,048 \text{ l}\cdot\text{ft} \end{aligned}$$

$$\text{DEPTH} = 11\frac{7}{8}" \quad \#560 \quad M_{\text{MAX.}} = 9,500 \text{ l}\cdot\text{ft}$$
$$> 8,048 \text{ l}\cdot\text{ft}$$

\therefore \text{OKAY}

Design Properties (100% Load Duration)

Depth	TJI®	Basic Properties				Reaction Properties		
		Joist Weight (lbs/ft)	Maximum Resistive Moment ⁽¹⁾ (ft-lbs)	Joist Only EI x 10 ⁶ (in. ² -lbs)	Maximum Vertical Shear (lbs)	1½" End Reaction (lbs)	3½" Intermediate Reaction (lbs)	
9½"	110	2.3	2,380	140	1,220	885	1,935	N.A.
	210	2.6	2,860	167	1,330	980	2,145	N.A.
	230	2.7	3,175	183	1,330	1,035	2,410	N.A.
11"	110	2.5	3,015	238	1,560	885	1,935	2,295
	210	2.8	3,620	283	1,655	980	2,145	2,505
	230	3.0	4,015	310	1,655	1,035	2,410	2,765
11½"	360	3.0	6,180	419	1,705	1,080	2,460	2,815
	560	4.0	9,500	636	2,050	1,265	3,000	3,475
14"	110	2.8	3,565	351	1,860	885	1,935	2,295
	210	3.1	4,280	415	1,945	980	2,145	2,505
	230	3.3	4,755	454	1,945	1,035	2,410	2,765
14½"	360	3.3	7,335	612	1,955	1,080	2,460	2,815
	560	4.2	11,275	926	2,390	1,265	3,000	3,475
16"	210	3.3	4,895	566	2,190	980	2,145	2,505
	230	3.5	5,440	618	2,190	1,035	2,410	2,765
	360	3.5	8,405	830	2,190	1,080	2,460	2,815
16½"	560	4.5	12,925	1,252	2,710	1,265	3,000	3,475

(1) Caution: Do not increase joist moment design properties by a repetitive member use factor.

General Notes

- Design reaction includes all loads on the joist. Design shear is computed at the face of supports including all loads on the span(s). Allowable shear may sometimes be increased at interior supports in accordance with pending ICC ESR-1153 and these increases are reflected in span tables.
- The following formulas approximate the uniform load deflection of Δ (inches):

For
TJI® 110, 210, 230, and 360 Joists

$$\Delta = \frac{22.5 WL^4}{EI} + \frac{2.67 WL^2}{d \times 10^5}$$

W = uniform load in pounds per linear foot
L = span in feet
d = out-to-out depth of the joist in inches
EI = value from table above

For
TJI® 560 Joists

$$\Delta = \frac{22.5 WL^4}{EI} + \frac{2.29 WL^2}{d \times 10^5}$$

TJI® joists are intended for dry-use applications

Material Weights

(Include TJI® weights in dead load calculations—see Design Properties table at left for joist weights).

Floor Panels

Southern Pine

½" plywood	1.7 psf
¾" plywood	2.0 psf
¾" plywood	2.5 psf
1½" plywood	3.8 psf
½" OSB	1.8 psf
¾" OSB	2.2 psf
¾" OSB	2.7 psf
¾" OSB	3.1 psf
1½" OSB	4.1 psf

Based on: Southern pine – 40 pcf for plywood, 44 pcf for OSB

Roofing

Asphalt shingles	2.5 psf
Wood shingles	2.0 psf
Clay tile	9.0 to 14.0 psf
Slate (¾" thick)	15.0 psf

Roll or Batt Insulation (1" thick):

Rock wool	0.2 psf
Glass wool	0.1 psf

Floor Finishes

Hardwood (nominal 1")	4.0 psf
Sheet vinyl	0.5 psf
Carpet and pad	1.0 psf
¾" ceramic or quarry tile	10.0 psf

Concrete:

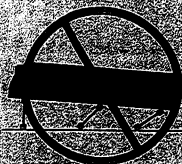
Regular (1")	12.0 psf
Lightweight (1")	8.0 to 10.0 psf
Gypsum concrete (¾")	6.5 psf

Ceilings

Acoustical fiber tile	1.0 psf
½" gypsum board	2.2 psf
¾" gypsum board	2.8 psf
Plaster (1" thick)	8.0 psf



DO NOT allow workers to walk on joists until braced. INJURY MAY RESULT.



DO NOT stack building materials on unbraced joists. Stack only over beams or walls.

WARNING

Joists are unstable until braced laterally

Bracing Includes:

- Blocking
- Hangers
- Rim Board
- Sheathing
- Rim Joist
- Strut Lines

WARNING NOTES:

Lack of concern for proper bracing during construction can result in serious accidents. Under normal conditions if the following guidelines are observed, accidents will be avoided.

- All blocking, hangers, rim boards, and rim joists at the end supports of the TJI® joists must be completely installed and properly nailed.
- Lateral strength, like a braced end wall or an existing deck, must be established at the ends of the bay. This can also be accomplished by a temporary or permanent deck (sheathing) fastened to the first 4 feet of joists at the end of the bay.
- Safety bracing lines of 1x4 (minimum) must be nailed to a braced end wall or sheathed area as in note 2 and to each joist. Without this bracing, buckling sideways or rollover is highly probable under light construction loads—like a worker or one layer of unnailed sheathing.
- Sheathing must be totally attached to each TJI® joist before additional loads can be placed on the system.
- Ends of cantilevers require safety bracing on both the top and bottom flanges.
- The flanges must remain straight within a tolerance of ½" from true alignment.

SHEAR EVALUATION

Shear Discussion - The exterior walls and interior garage walls are evaluated by the current Woodworks program. A printout is attached. The resulting wall specifications are shown to be adequate.

Note, this office does not use the program hold down call-outs. Used is the older but accepted method of providing a rated hold down at locations with an uplift of 1,000 pounds or more. This allows a more flexible and building-specific locating of needed hold downs.

Note that hold down uplift and story deflection, along with the program hold down locating, are completely ignored as being irrelevant for this structure.

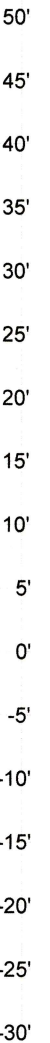
Using this method and based on computed corner uplifts as guidance, hold down locations are noted on the plan. In many cases, due to the relatively crude blocks used in the program, we have very conservatively located additional hold downs based on experience along with the computer corner uplift locations shown on the floor loading diagrams. This method is very conservative and safe.

See Shear Wall results in printout.

Pages 11, 28, 47 and 60

Engineer's note reference printout results. Walls are checked for both Wind and Seismic, and for each for Flexible and Rigid design.

55'



- | | | | |
|-----|----------------------------------|---|---|
| → | Factored shearline force (lbs) |  | Unfactored applied shear load (plf) |
| ▲ | Factored hold-down force (lbs) |  | Unfactored dead load (plf, lbs) |
| ● C | Factored compression force (lbs) |  | Unfactored uplift wind load (plf, lbs) |
| ■ | Vertical element required |  | Applied point load or discontinuous shearline force (lbs) |

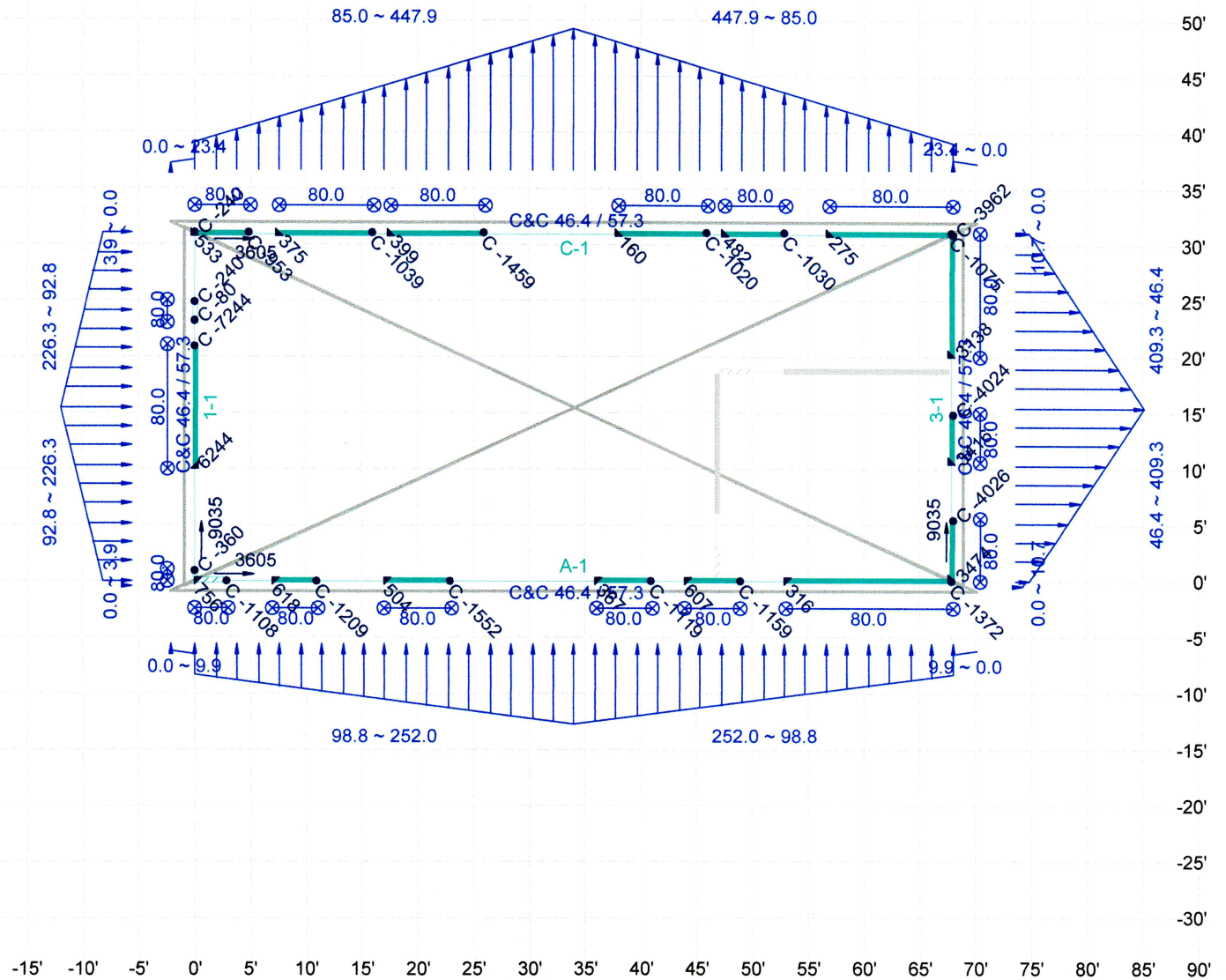
Loads: Directional Case 1 Wind (W); Forces: $0.6W + 0.6D$; Flexible distribution

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WoodWorks® Shearwalls 13.1.2

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Level 2 of 2



→ Factored shearline force (lbs)
▲ Factored hold-down force (lbs)
● C Factored compression force (lbs)
■ Vertical element required

↑↑↑ Unfactored applied shear load (plf)
⊗ Unfactored dead load (plf, lbs)
⊙ Unfactored uplift wind load (plf, lbs)
→|| Applied point load or discontinuous shearline force (lbs)

Loads: Directional Case 1 Wind (W); Forces: 0.6W + 0.6D; Flexible distribution

WoodWorks® Shearwalls 13.1.2

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Project Information

DESIGN SETTINGS

Design Code		Wind Standard		Seismic Standard	
IBC 2021/AWC SDPWS 2021		ASCE 7-16 Directional (All heights)		ASCE 7-16	
Load Combinations			Building Code Capacity Modification		
For Design and MWFRS Deflection		For Deflection (Wind:Serviceability)		Wind	Seismic
0.7 Seismic + 0.6 Dead		1.0 Seismic + 0.9 Dead		1.00	1.00
0.6 Basic wind + 0.6 Dead		1.0 MRI wind + 1.0 Dead			
Service Conditions and Load Duration			Max Shearwall Offset [ft]		
Duration	Temperature	Moisture Content		Plan	Elevation
Factor	Range	Fabrication	Service	(within story)	(between stories)
1.60	T<=100F	19% (<=19%)	10% (<=19%)	0.50	0.83
Maximum Height-to-width Ratio					
Wood panels		Fiberboard	Lumber	Gypsum	
Blocked	Unblocked		Wind	Seismic	Blocked
3.5	2.0	-	-	-	2.0
					Unblocked
					1.5
Ignore shear resistance contribution of...				Forces based on...	
Wall segments		Seismic		Hold-downs	Applied loads
Side with invalid aspect ratio		Don't ignore		Drag struts	Applied loads
Shearwall relative rigidity: Deflection-based stiffness of wall segments					
Non-identical materials and construction on the shearline: Allowed, except for material type					
Deflection Equation: 3-term from SDPWS 4.3-1					
Drift limit for wind design: 1 / 500 story height					
FTAO strap: Continuous at top of highest opening and bottom of lowest					
Dead load in chord force for overturning design					
Tension end		Compression end		When completely counteracts overturning	
Wall length / 2		Wall length / 2		Wall length / 2	

SITE INFORMATION

Wind			Seismic		
ASCE 7-16 Directional (All heights)			ASCE 7-16 12.8 Equivalent Lateral Force Procedure		
Design Wind Speed	130 mph		Risk Category	Category II - All others	
Serviceability Wind Speed	100 mph		Structure Type	Regular	
Exposure	Exposure C		Building System	Bearing Wall	
Enclosure	Partially open		Design Category	D	
Min Wind Loads: Walls	16 psf		Site Class	D	
Roofs	8 psf		Spectral Response Acceleration		
Topographic Information [ft]			S1: 0.400g Ss: 0.750g		
Shape	Height	Length	Fundamental Period	E-W	N-S
-	-	-	T Used	0.241s	0.241s
Site Location: -			Approximate Ta	0.241s	0.241s
Elev: 0ft			Maximum T	0.338s	0.338s
Rigid building - Static analysis			Response Factor R	6.50	2.00
Case 2	E-W loads	N-S loads	Fa: 1.20 Fv: 1.90		
Eccentricity (%)	15	15			
Loaded at	75%				

Structural Data

STORY INFORMATION

	Story Elev [ft]	Floor/Ceiling Depth [in]	Wall Height [ft]	Hold-down Length subject to shrinkage [in]	Bolt length [in]
Ceiling	20.67	0.0			
Level 2	12.67	10.0	8.00	13.75	14.5
Level 1	2.83	10.0	9.00	13.75	14.5
Foundation	2.00				

BLOCK and ROOF INFORMATION

Block Dimensions [ft]			Face	Type	Slope	Overhang [ft]
Block 1	2 Story	N-S Ridge				
Location X,Y =	0.00	0.00	North	Hip	40.0	1.00
Extent X,Y =	68.00	31.00	South	Hip	40.0	1.00
Ridge X Location, Offset	34.00	0.00	East	Side	30.0	1.00
Ridge Elevation, Height	40.30	19.63	West	Side	30.0	1.00

SHEATHING MATERIALS by WALL GROUP

Grp	Surf	Material	Ratng	Sheathing					Size	Fasteners					Apply Notes
				Thick in	GU in	Ply	Or	Gvtv lbs/in		Type	RS	Eg in	Fd in	Bk	
1	Ext	Struct Sh OSB	24/16	7/16	-	-	Horz	83500	8d	Common	N	3	6	Y	2,3
2	Both	Struct Sh OSB	24/16	7/16	-	-	Horz	83500	8d	Common	N	3	6	Y	2,3
3	1	Struct Sh OSB	24/16	7/16	-	-	Horz	83500	8d	Common	N	3	6	Y	2,3
	2	Gyp. wallboard		1/2	-	1	Horz	40000	5d	Cooler	N	7	7	Y	

Legend:

Grp – Wall Design Group number, used to reference wall in other tables (created by program)

Surf – Exterior or interior surface when applied to exterior wall

Ratng – Span rating, see SDPWS Table C4.2.3C

Thick – Nominal panel thickness

GU – Gypsum underlay thickness

Ply – Number of plies (or layers) in construction of plywood sheets

Or – Orientation of longer dimension of sheathing panels or lumber planks. Dbl. = Double diagonal.

Gvtv – Shear stiffness in lb/in. of depth from SDPWS Tables C4.2.3A-B

Type – Fastener type from SDPWS Tables 4.3A-D:

Common: common wire nail; Box: galvanized box nail; Casing: casing nail; Roof: galvanized roofing nail; Cooler: cooler nail; WBoard: wallboard nail; Screw: drywall screw; Gauge: nail measured by gauge; Galv: galvanized gauge nail; GWB: Gypsum wallboard blued nail

Size - From Tables 4.3A-D and Table A1; shown in Wall Input fastener dropdown

Common nails: 6d = 0.113 x 2", 8d = 0.131 x 2.5", 10d = 0.148 x 3", 12d = 0.148 x 3.5"

Box or casing nails: 6d = 0.099 x 2", 8d = 0.113 x 2.5", 10d = 0.128 x 3", 12d = 0.126 x 3.5"

Gauge, roofing and GWB nails: 13 ga = 0.92" x 1-1/8"; 11 ga = 0.120" x 1-1/8" (GWB nail for gypsum lath & plaster), 1-1/4" (gyp. L&P), 1-1/2" (wire lath & plaster, 1/2" fiberboard, 1/2" GWB), 1-3/4" (GSB, 5/8" GWB, 25/32" fiberboard, 2-ply GWB base), 2-3/8" (2-ply GWB face)

Cooler or wallboard nail: 5d = .086" x 1-5/8"; 6d = .092" x 1-7/8"; 8d = .113" x 2-3/8"; 6/8d = 6d base ply, 8d face ply for 2-ply GWB.

Drywall screws: No. 6, 1-1/4" long.

RS – Ring-shank nails (non-shearwalls only), with increased withdrawal capacity as per NDS 12.2.3.2.

Eg – Panel edge fastener spacing. For lumber sheathing, no. of nails per board at shear wall boundary. For 2-ply GWB, spacing of all nails in face ply.

Fd – Field spacing interior to panels. For lumber sheathing, no. of nails per board at interior studs. For 2-ply GWB, spacing of all nails in face ply.

Bk – Sheathing is nailed to blocking at all panel edges; Y(es) or N(o)

Apply Notes – Notes below table legend which apply to sheathing side

Notes:

2. Framing at adjoining panel edges must be 3" nominal or wider with staggered nailing according to SDPWS 4.3.7.1 (5)

3. Shear capacity for current design has been increased to the value for 15/32" sheathing with same nailing because stud spacing is 16" max. or panel orientation is horizontal. See SDPWS Table 4.3A Note 2.

FRAMING MATERIALS and STANDARD WALL by WALL GROUP

Wall Grp	Species	Grade	b in	d in	Spcg in	SG	E psi^6	Fcp	Standard Wall
1	D.Fir-L	Stud	1.50	5.50	16	0.50	1.40	625	
2	D.Fir-L	Stud	1.50	5.50	16	0.50	1.40	625	
3	D.Fir-L	Stud	1.50	5.50	16	0.50	1.40	625	

Legend:

Wall Grp – Wall Design Group

b – Stud breadth (thickness)

d – Stud depth (width)

Spcg – Maximum on-centre spacing of studs for design, actual spacing may be less.

SG – Specific gravity

E – Modulus of elasticity

Standard Wall - Standard wall designed as group.

Fcp - Compressive strength perpendicular to grain

Notes:

Check manufacture requirements for stud size, grade and specific gravity (G) for all shearwall hold-downs.

The following factors are applied to Fcp for compressive design and deformation under wall segment end studs :

Bearing area factor Cb from NDS 3.10.4, under window openings.

SHEARLINE, WALL and OPENING DIMENSIONS

North-south Shearlines	Type	Wall Group	Location X [ft]	Extent [ft]		Length [ft]	FHS [ft]	Aspect Ratio	Height [ft]	Studs	
				Start	End					S	N
Line 1											
Level 2											
Line 1		2	0.00	0.00	31.00	31.00	11.00	-	8.00	-	-
Wall 1-1	Seg	2	0.00	0.00	31.00	31.00	11.00	-	-	2	2
Segment 1	-	-	-	0.00	1.00	1.00	-	8.00	-	2	2
Opening 1	-	-	-	1.00	10.00	9.00	-	-	7.00	2	2
Segment 2	-	-	-	10.00	21.00	11.00	10.75	0.73	-	2	2
Opening 2	-	-	-	21.00	23.00	2.00	-	-	7.00	2	2
Segment 3	-	-	-	23.00	25.00	2.00	-	4.00	-	2	2
Opening 3	-	-	-	25.00	31.00	6.00	-	-	7.00	2	2
Segment 4	-	-	-	31.00	31.00	0.00	-	-	-	2	2
Level 1											
Line 1		2	0.00	0.00	31.00	31.00	24.00	-	9.00	-	-
Wall 1-1	Seg	2	0.00	0.00	31.00	31.00	24.00	-	-	2	2
Segment 1	-	-	-	0.00	11.00	11.00	10.75	0.82	-	2	2
Opening 1	-	-	-	11.00	16.00	5.00	-	-	7.00	2	2
Segment 2	-	-	-	16.00	20.00	4.00	3.75	2.25	-	2	2
Opening 2	-	-	-	20.00	22.00	2.00	-	-	7.00	2	2
Segment 3	-	-	-	22.00	31.00	9.00	8.75	1.00	-	2	2
Line 2											
Level 1											
Line 2		3	46.92	0.00	31.00	31.00	15.75	-	9.00	-	-
Wall 2-1	Seg	3	46.92	0.00	18.75	18.75	15.75	-	-	2	2
Segment 1	-	-	-	0.00	3.00	3.00	2.75	3.00	-	2	2
Opening 1	-	-	-	3.00	6.00	3.00	-	-	7.00	2	2
Segment 2	-	-	-	6.00	18.75	12.75	12.50	0.71	-	2	2
Line 3											
Level 2											
Line 3		1	68.00	0.00	31.00	31.00	21.00	-	8.00	-	-
Wall 3-1	Seg	1	68.00	0.00	31.00	31.00	21.00	-	-	2	2
Segment 1	-	-	-	0.00	5.50	5.50	5.25	1.45	-	2	2
Opening 1	-	-	-	5.50	10.50	5.00	-	-	7.00	2	2
Segment 2	-	-	-	10.50	15.00	4.50	4.25	1.78	-	2	2
Opening 2	-	-	-	15.00	20.00	5.00	-	-	7.00	2	2
Segment 3	-	-	-	20.00	31.00	11.00	10.75	0.73	-	2	2
Level 1											
Line 3		2	68.00	0.00	31.00	31.00	22.00	-	9.00	-	-
Wall 3-1	Seg	2	68.00	0.00	31.00	31.00	22.00	-	-	2	2
Segment 1	-	-	-	0.00	3.00	3.00	2.75	3.00	-	2	2
Opening 1	-	-	-	3.00	7.50	4.50	-	-	7.00	2	2
Segment 2	-	-	-	7.50	18.00	10.50	10.25	0.86	-	2	2
Opening 2	-	-	-	18.00	22.50	4.50	-	-	7.00	2	2
Segment 3	-	-	-	22.50	31.00	8.50	8.25	1.06	-	2	2
East-west Shearlines	Type	Wall Group	Location Y [ft]	Extent [ft]		Length [ft]	FHS [ft]	Aspect Ratio	Height [ft]	Studs	
				Start	End					W	E
Line A											
Level 2											
Line A		1	0.00	0.00	68.00	68.00	38.00	-	8.00	-	-
Wall A-1	Seg	1	0.00	0.00	68.00	68.00	38.00	-	-	2	2
Segment 1	-	-	-	0.00	3.00	3.00	2.75	2.67	-	2	2
Opening 1	-	-	-	3.00	7.00	4.00	-	-	7.00	2	2
Segment 2	-	-	-	7.00	11.00	4.00	3.75	2.00	-	2	2
Opening 2	-	-	-	11.00	17.00	6.00	-	-	7.00	2	2
Segment 3	-	-	-	17.00	23.00	6.00	5.75	1.33	-	2	2
Opening 3	-	-	-	23.00	36.00	13.00	-	-	7.00	2	2
Segment 4	-	-	-	36.00	41.00	5.00	4.75	1.60	-	2	2
Opening 4	-	-	-	41.00	44.00	3.00	-	-	7.00	2	2
Segment 5	-	-	-	44.00	49.00	5.00	4.75	1.60	-	2	2
Opening 5	-	-	-	49.00	53.00	4.00	-	-	7.00	2	2
Segment 6	-	-	-	53.00	68.00	15.00	14.75	0.53	-	2	2
Level 1											
Line A		1	0.00	0.00	68.00	68.00	31.00	-	9.00	-	-
Wall A-1	Seg	1	0.00	0.00	68.00	68.00	31.00	-	-	2	2
Segment 1	-	-	-	0.00	6.00	6.00	5.75	1.50	-	2	2
Opening 1	-	-	-	6.00	14.00	8.00	-	-	7.00	2	2
Segment 2	-	-	-	14.00	21.00	7.00	6.75	1.29	-	2	2
Opening 2	-	-	-	21.00	26.00	5.00	-	-	7.00	2	2
Segment 3	-	-	-	26.00	32.00	6.00	5.75	1.50	-	2	2
Opening 3	-	-	-	32.00	40.00	8.00	-	-	7.00	2	2
Segment 4	-	-	-	40.00	49.00	9.00	8.75	1.00	-	2	2

SHEARLINE, WALL and OPENING DIMENSIONS (continued)

Opening 4	-	-	49.00	65.00	16.00	-	-	7.00	2	2
Segment 5	-	-	65.00	68.00	3.00	2.75	3.00	-	2	2
Line B										
Level 1										
Line B		1	18.67	0.00	68.00	68.00	18.08	-	9.00	-
Wall B-1	Seg	1	18.67	46.92	68.00	21.08	18.08	-	-	2
Segment 1	-	-	-	46.92	49.92	3.00	2.75	3.00	-	2
Opening 1	-	-	-	49.92	52.92	3.00	-	-	7.00	2
Segment 2	-	-	-	52.92	68.00	15.08	14.83	0.60	-	2
Line C										
Level 2										
Line C		1	31.00	0.00	68.00	68.00	46.50	-	8.00	-
Wall C-1	Seg	1	31.00	0.00	68.00	68.00	46.50	-	-	2
Segment 1	-	-	-	0.00	5.00	5.00	4.75	1.60	-	2
Opening 1	-	-	-	5.00	7.50	2.50	-	-	7.00	2
Segment 2	-	-	-	7.50	16.00	8.50	8.25	0.94	-	2
Opening 2	-	-	-	16.00	17.50	1.50	-	-	7.00	2
Segment 3	-	-	-	17.50	26.00	8.50	8.25	0.94	-	2
Opening 3	-	-	-	26.00	38.00	12.00	-	-	7.00	2
Segment 4	-	-	-	38.00	46.00	8.00	7.75	1.00	-	2
Opening 4	-	-	-	46.00	47.50	1.50	-	-	7.00	2
Segment 5	-	-	-	47.50	53.00	5.50	5.25	1.45	-	2
Opening 5	-	-	-	53.00	57.00	4.00	-	-	7.00	2
Segment 6	-	-	-	57.00	68.00	11.00	10.75	0.73	-	2
Level 1										
Line C		1	31.00	0.00	68.00	68.00	49.00	-	9.00	-
Wall C-1	Seg	1	31.00	0.00	68.00	68.00	49.00	-	-	2
Segment 1	-	-	-	0.00	3.00	3.00	2.75	3.00	-	2
Opening 1	-	-	-	3.00	6.00	3.00	-	-	7.00	2
Segment 2	-	-	-	6.00	10.00	4.00	3.75	2.25	-	2
Opening 2	-	-	-	10.00	13.00	3.00	-	-	7.00	2
Segment 3	-	-	-	13.00	24.00	11.00	10.75	0.82	-	2
Opening 3	-	-	-	24.00	27.00	3.00	-	-	7.00	2
Segment 4	-	-	-	27.00	35.00	8.00	7.75	1.12	-	2
Opening 4	-	-	-	35.00	42.00	7.00	-	-	7.00	2
Segment 5	-	-	-	42.00	50.00	8.00	7.75	1.12	-	2
Opening 5	-	-	-	50.00	53.00	3.00	-	-	7.00	2
Segment 6	-	-	-	53.00	68.00	15.00	14.75	0.60	-	2

Legend:

Type – Seg: Segmented, Prf: Perforated, FT: FTAO (force transfer around openings), NSW: Non-shearwall, NW: Non-wood/Proprietary, ND: Not designed

Location – Position in structure perpendicular to wall

Length – Shear line: Distance between exterior perpendicular walls defining the shear line extent

Wall, segment, or opening: End-to-end length of the element

FHS – Depending on element, shows different definitions of full-height sheathing length (FHS):

Shear lines with multiple walls, segmented walls, or FTAO walls: Total shear-resisting FHS

Individual wall segments or walls without openings: Distance between hold-downs beff

Perforated walls: Sum of factored segment lengths bi defined in SDPWS 4.3.5.6

Aspect Ratio – Ratio of wall height to segment length (h/b); for FTAO walls, the aspect ratio of the central pier

Wall Group – Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall

Studs: Number of end studs at the south and north or west and east ends of a wall segment or a perforated or FTAO wall.

Loads

WIND SHEAR LOADS (as entered or generated)

Level 2 Block	F	Element	Load Case	Wnd Dir	Surf Dir	Prof	Location [ft]		Magnitude [lbs,plf,psf]		Trib Ht [ft]
							Start	End	Start	End	
Block 1	W	L Roof	1	W->E	Wind	Line	-0.45	15.50	0.0	137.4	
Block 1	W	Wall	1	W->E	Wind	Line	0.00	31.00	88.9		
Block 1	W	R Roof	1	W->E	Wind	Line	15.50	31.46	137.4	0.0	
Block 1	E	L Roof	1	W->E	Lee	Line	-0.45	15.50	0.0	373.5	
Block 1	E	Wall	1	W->E	Lee	Line	0.00	31.00	35.8		
Block 1	E	R Roof	1	W->E	Lee	Line	15.50	31.46	373.5	0.0	
Block 1	W	L Roof	1	E->W	Lee	Line	-0.45	15.50	0.0	373.5	
Block 1	W	Wall	1	E->W	Lee	Line	0.00	31.00	35.8		
Block 1	W	R Roof	1	E->W	Lee	Line	15.50	31.46	373.5	0.0	
Block 1	E	L Roof	1	E->W	Wind	Line	-0.45	15.50	0.0	137.4	
Block 1	E	Wall	1	E->W	Wind	Line	0.00	31.00	88.9		
Block 1	E	R Roof	1	E->W	Wind	Line	15.50	31.46	137.4	0.0	
Block 1	S	L Roof	1	S->N	Wind	Line	-2.19	34.00	0.0	163.1	
Block 1	S	Wall	1	S->N	Wind	Line	0.00	68.00	88.9		
Block 1	S	R Roof	1	S->N	Wind	Line	34.00	70.19	163.1	0.0	
Block 1	N	L Roof	1	S->N	Lee	Line	-2.19	34.00	0.0	386.2	
Block 1	N	Wall	1	S->N	Lee	Line	0.00	68.00	61.6		
Block 1	N	R Roof	1	S->N	Lee	Line	34.00	70.19	386.2	0.0	
Block 1	S	L Roof	1	N->S	Lee	Line	-2.19	34.00	0.0	386.2	
Block 1	S	Wall	1	N->S	Lee	Line	0.00	68.00	61.6		
Block 1	S	R Roof	1	N->S	Lee	Line	34.00	70.19	386.2	0.0	
Block 1	N	L Roof	1	N->S	Wind	Line	-2.19	34.00	0.0	163.1	
Block 1	N	Wall	1	N->S	Wind	Line	0.00	68.00	88.9		
Block 1	N	R Roof	1	N->S	Wind	Line	34.00	70.19	163.1	0.0	
Level 1 Block	F	Element	Load Case	Wnd Dir	Surf Dir	Prof	Location [ft]		Magnitude [lbs,plf,psf]		Trib Ht [ft]
							Start	End	Start	End	
Block 1	W	Wall	1	W->E	Wind	Line	0.00	31.00	85.3		
Block 1	W	Wall	1	W->E	Wind	Line	0.00	31.00	113.2		
Block 1	E	Wall	1	W->E	Lee	Line	0.00	31.00	47.7		
Block 1	E	Wall	1	W->E	Lee	Line	0.00	31.00	35.8		
Block 1	W	Wall	1	E->W	Lee	Line	0.00	31.00	35.8		
Block 1	W	Wall	1	E->W	Lee	Line	0.00	31.00	47.7		
Block 1	E	Wall	1	E->W	Wind	Line	0.00	31.00	85.3		
Block 1	E	Wall	1	E->W	Wind	Line	0.00	31.00	113.2		
Block 1	S	Wall	1	S->N	Wind	Line	0.00	68.00	85.3		
Block 1	S	Wall	1	S->N	Wind	Line	0.00	68.00	113.2		
Block 1	N	Wall	1	S->N	Lee	Line	0.00	68.00	61.6		
Block 1	N	Wall	1	S->N	Lee	Line	0.00	68.00	82.2		
Block 1	S	Wall	1	N->S	Lee	Line	0.00	68.00	82.2		
Block 1	S	Wall	1	N->S	Lee	Line	0.00	68.00	61.6		
Block 1	N	Wall	1	N->S	Wind	Line	0.00	68.00	113.2		
Block 1	N	Wall	1	N->S	Wind	Line	0.00	68.00	85.3		

Legend:

Block - Block used in load generation

Accum. = loads from one block combined with another

Manual = user-entered loads (so no block)

F - Building face (north, south, east or west)

Element - Building surface on which loads generated or entered

Load Case - One of the following:

ASCE 7 All Heights: Case 1 or 2 from Fig 27.3-8 or minimum loads from 27.1.5

ASCE 7 Low-rise: Reference corner and Case A or B from Fig 28.3-1 or minimum loads from 28.3.4

Wind Dir - Direction of wind for loads with positive magnitude, also direction of MWFRS.

Surf Dir - Windward or leeward side of the building for loads in given direction

Prof - Profile (distribution)

Location - Start and end points on building element

Magnitude - Start = intensity of uniform and point loads or leftmost intensity of trapezoidal load, End = right intensity of trap load

Trib Ht - Tributary height of area loads only

Notes:

All loads entered by the user or generated by program are specified (unfactored) loads. The program applies a load factor of 0.60 to wind loads before distributing them to the shearlines.

WIND C&C LOADS

Block	Building Face	Wind Direction	Level	Magnitude [psf]	
				Interior	End Zone
Block 1	West	Windward	2	46.4	57.3
Block 1	East	Leeward	2	46.4	57.3
Block 1	West	Leeward	2	46.4	57.3
Block 1	East	Windward	2	46.4	57.3
Block 1	South	Windward	2	46.4	57.3
Block 1	North	Leeward	2	46.4	57.3
Block 1	South	Leeward	2	46.4	57.3
Block 1	North	Windward	2	46.4	57.3
Block 1	West	Windward	1	46.4	57.3
Block 1	East	Leeward	1	46.4	57.3
Block 1	West	Leeward	1	46.4	57.3
Block 1	East	Windward	1	46.4	57.3
Block 1	South	Windward	1	46.4	57.3
Block 1	North	Leeward	1	46.4	57.3
Block 1	South	Leeward	1	46.4	57.3
Block 1	North	Windward	1	46.4	57.3

DEAD LOADS (for hold-down calculations)

Shear Line	Level	Profile	Tributary Width [ft]	Location [ft]		Mag [lbs,psf,psi]	
				Start	End	Start	End
A	2	Line		0.00	68.00	80.0*	
C	2	Line		0.00	68.00	80.0*	
1	2	Line		0.00	31.00	80.0*	
3	2	Line		0.00	31.00	80.0*	
A	1	Line		0.00	68.00	90.0*	
B	1	Line		46.92	68.00	54.0*	
C	1	Line		0.00	68.00	90.0*	
1	1	Line		0.00	31.00	90.0*	
2	1	Line		0.00	18.75	54.0*	
3	1	Line		0.00	31.00	90.0*	

BUILDING MASSES

Level 2				Magnitude					Trib
Force Dir	Building Element	Block	Wall Line	Profile	Location [ft]		[lbs,plf,psf]		Width [ft]
					Start	End	Start	End	
E-W	Roof	Block 1	1	Line	-1.00	32.00	350.0	350.0	
E-W	Roof	Block 1	3	Line	-1.00	32.00	350.0	350.0	
N-S	Roof	Block 1	A	Line	-1.00	69.00	165.0	165.0	
N-S	Roof	Block 1	C	Line	-1.00	69.00	165.0	165.0	
Both	Wall 1-1	n/a	1	Line	0.00	31.00	40.0	40.0	
Both	Wall 3-1	n/a	3	Line	0.00	31.00	40.0	40.0	
Both	Wall A-1	n/a	A	Line	0.00	68.00	40.0	40.0	
Both	Wall C-1	n/a	C	Line	0.00	68.00	40.0	40.0	
Level 1				Magnitude					Trib
Force Dir	Building Element	Block	Wall Line	Profile	Location [ft]		[lbs,plf,psf]		Width [ft]
					Start	End	Start	End	
Both	Wall 1-1	n/a	1	Line	0.00	31.00	40.0	40.0	
E-W	Floor F1	n/a	1	Line	0.00	31.00	340.0	340.0	
E-W	Floor F1	n/a	3	Line	0.00	31.00	340.0	340.0	
Both	Wall 3-1	n/a	3	Line	0.00	31.00	40.0	40.0	
Both	Wall A-1	n/a	A	Line	0.00	68.00	40.0	40.0	
N-S	Floor F1	n/a	A	Line	0.00	68.00	155.0	155.0	
N-S	Floor F1	n/a	C	Line	0.00	68.00	155.0	155.0	
Both	Wall C-1	n/a	C	Line	0.00	68.00	40.0	40.0	
Both	Wall 1-1	n/a	1	Line	0.00	31.00	45.0	45.0	
Both	Wall 2-1	n/a	2	Line	0.00	18.75	27.0	27.0	
Both	Wall 3-1	n/a	3	Line	0.00	31.00	45.0	45.0	
Both	Wall A-1	n/a	A	Line	0.00	68.00	45.0	45.0	
Both	Wall B-1	n/a	B	Line	46.92	68.00	27.0	27.0	
Both	Wall C-1	n/a	C	Line	0.00	68.00	45.0	45.0	

Legend:

Force Dir - Direction in which the mass is used for seismic load generation, E-W, N-S, or Both

Building element - Roof, gable end, wall or floor area used to generate mass, wall line for user-applied masses, Floor F# - refer to Plan View for floor area number

Wall line - Shearline that equivalent line load is assigned to

Location - Start and end points of equivalent line load on wall line

Trib Width - Tributary width; for user applied area loads only

SEISMIC LOADS

Level 2					
Force Dir	Profile	Location [ft]		Mag [lbs,plf,psf]	
		Start	End	Start	End
E-W	Line	-1.00	0.00	86.1	86.1
E-W	Point	0.00	0.00	335	335
E-W	Line	0.00	31.00	96.0	96.0
E-W	Point	31.00	31.00	335	335
E-W	Line	31.00	32.00	86.1	86.1
N-S	Line	-1.00	0.00	132.0	132.0
N-S	Point	0.00	0.00	496	496
N-S	Line	0.00	68.00	164.0	164.0
N-S	Point	68.00	68.00	496	496
N-S	Line	68.00	69.00	132.0	132.0
Level 1					
Force Dir	Profile	Location [ft]		Mag [lbs,plf,psf]	
		Start	End	Start	End
E-W	Point	0.00	0.00	392	392
E-W	Line	0.00	18.75	59.5	59.5
E-W	Point	18.67	18.67	39	39
E-W	Line	18.75	31.00	57.7	57.7
E-W	Point	31.00	31.00	392	392
N-S	Point	0.00	0.00	581	581
N-S	Line	0.00	46.92	105.8	105.8
N-S	Point	46.92	46.92	112	112
N-S	Line	46.92	68.00	111.8	111.8
N-S	Point	68.00	68.00	581	581

Legend:

Loads in table can be accumulation of loads from several building masses, so they do not correspond with a particular building element.

Location - Start and end of load in direction perpendicular to seismic force direction

Notes:

All loads entered by the user or generated by program are specified (unfactored) loads. The program applies a load factor of 0.70 and redundancy factor to seismic loads before distributing them to the shearlines.

Design Summary

SHEARWALL DESIGN**Wind Shear Loads, Flexible Diaphragm**

All shearwalls have sufficient design capacity.

Wind Shear Loads, Rigid Diaphragm

All shearwalls have sufficient design capacity.

Components and Cladding Wind Loads, Out-of-plane Sheathing

All shearwalls have sufficient design capacity.

Components and Cladding Wind Loads, Nail Withdrawal

All shearwalls have sufficient design capacity.

Seismic Loads, Flexible Diaphragm

All shearwalls have sufficient design capacity.

Seismic Loads, Rigid Diaphragm

All shearwalls have sufficient design capacity.

HOLD-DOWN DESIGN**Wind Loads, Flexible Diaphragm**

Under-capacity hold-downs were found on the following walls:

Level 1: 1-1, 3-1

Level 2: 1-1

Wind Loads, Rigid Diaphragm

Under-capacity hold-downs were found on the following walls:

Level 1: 1-1, 3-1

Level 2: 1-1

Seismic Loads, Flexible Diaphragm

All hold-downs have sufficient design capacity.

Seismic Loads, Rigid Diaphragm

All hold-downs have sufficient design capacity.

COMPRESSION FORCE DESIGN**Wind Loads, Flexible Diaphragm**

Bottom plate has sufficient perpendicular-to-grain compressive capacity under all wall end studs.

Wind Loads, Rigid Diaphragm

Bottom plate has sufficient perpendicular-to-grain compressive capacity under all wall end studs.

Seismic Loads, Flexible Diaphragm

Bottom plate has sufficient perpendicular-to-grain compressive capacity under all wall end studs.

Seismic Loads, Rigid Diaphragm

Bottom plate has sufficient perpendicular-to-grain compressive capacity under all wall end studs.

This Design Summary does not include failures that occur due to excessive story drift from ASCE 7 CC.2.2 (wind) or 12.12 (seismic). Refer to Story Drift table in this report to verify this design criterion.

Refer to the Deflection table for possible issues regarding fastener slippage (SDPWS Table C4.2.3D).

Flexible Diaphragm Wind Design
ASCE 7 Directional (All Heights) Loads

SHEAR RESULTS

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]					Resp. Ratio	
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb		V [lbs]
Line 1														
Level 2														
Ln1, Lev2	-	Both	-	-	9035	-	-	-	-	-	-	-	15070	-
Wall 1-1	2	Both	-	-	9035	1.0	1.0	685	685	-	A	-	15070	-
Seg. 1	-	Both	0.0	-	0	1.0	1.0	685	685	-	-	1370	-	-
Seg. 2	-	Both	821.3	-	9035	1.0	1.0	685	685	-	-	1370	15070	0.60
Seg. 3	-	Both	0.0	-	0	1.0	1.0	685	685	-	-	1370	-	-
Seg. 4	-	Both	0.0	-	0	1.0	1.0	685	685	-	-	1370	-	-
Level 1														
Ln1, Lev1	-	Both	-	-	13853	-	-	-	-	-	-	-	32709	-
Wall 1-1	2	Both	-	-	13853	1.0	1.0	685	685	-	A	-	32709	-
Seg. 1	-	S->N	573.7	-	6310	1.0	1.0	685	685	-	-	1370	15070	0.42
	-	N->S	764.4	-	8409	1.0	1.0	685	685	-	-	1370	15070	0.56
Seg. 2	-	S->N	26.8	-	107	.97	.97	664	664	-	-	1327	5309	0.02
	-	N->S	0.0	-	0	.97	.97	664	664	-	-	1327	5309	0.00
Seg. 3	-	S->N	826.1	-	7435	1.0	1.0	685	685	-	-	1370	12330	0.60
	-	N->S	604.9	-	5444	1.0	1.0	685	685	-	-	1370	12330	0.44
Line 2														
Ln2, Lev1	-	Both	-	-	6983	-	-	-	-	-	-	-	12454	-
Wall 2-1	3	Both	-	-	6983	1.0	1.0	125	685	-	A	-	12454	-
Seg. 1	-	S->N	151.6	-	455	.88	.88	109	599	-	-	709	2126	0.21
	-	N->S	13.2	-	40	.88	.88	109	599	-	-	709	2126	0.02
Seg. 2	-	S->N	512.0	-	6528	1.0	1.0	125	685	-	-	810	10328	0.63
	-	N->S	544.6	-	6943	1.0	1.0	125	685	-	-	810	10328	0.67
Line 3														
Level 2														
Ln3, Lev2	-	Both	-	-	9035	-	-	-	-	-	-	-	14385	-
Wall 3-1	1	Both	-	-	9035	-	1.0	-	685	-	-	-	14385	-
Seg. 1	-	S->N	220.3	-	1212	-	1.0	-	685	-	-	685	3768	0.32
	-	N->S	230.5	-	1268	-	1.0	-	685	-	-	685	3768	0.34
Seg. 2	-	S->N	117.2	-	527	-	1.0	-	685	-	-	685	3083	0.17
	-	N->S	117.4	-	528	-	1.0	-	685	-	-	685	3083	0.17
Seg. 3	-	S->N	663.3	-	7296	-	1.0	-	685	-	-	685	7535	0.97
	-	N->S	658.1	-	7239	-	1.0	-	685	-	-	685	7535	0.96
Level 1														
Ln3, Lev1	-	Both	-	-	11200	-	-	-	-	-	-	-	29626	-
Wall 3-1	2^	Both	-	-	11200	1.0	1.0	685	685	-	A	-	29626	-
Seg. 1	-	Both	0.0	-	0	.88	.88	599	599	-	-	1199	3596	0.00
Seg. 2	-	S->N	876.5	-	9203	1.0	1.0	685	685	-	-	1370	14385	0.64
	-	N->S	937.6	-	9845	1.0	1.0	685	685	-	-	1370	14385	0.68
Seg. 3	-	S->N	234.9	-	1997	1.0	1.0	685	685	-	-	1370	11645	0.17
	-	N->S	159.4	-	1355	1.0	1.0	685	685	-	-	1370	11645	0.12
E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]					Resp. Ratio	
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line A														
Level 2														
LnA, Lev2	-	Both	-	-	3605	-	-	-	-	-	-	-	25859	-
Wall A-1	1	Both	-	-	3605	-	1.0	-	685	-	-	-	25859	-
Seg. 1	-	W->E	76.0	-	228	-	.92	-	628	-	-	628	1884	0.12
	-	E->W	281.6	-	845	-	.92	-	628	-	-	628	1884	0.45
Seg. 2	-	W->E	62.7	-	251	-	1.0	-	685	-	-	685	2740	0.09
	-	E->W	280.0	-	1120	-	1.0	-	685	-	-	685	2740	0.41
Seg. 3	-	W->E	132.4	-	794	-	1.0	-	685	-	-	685	4110	0.19
	-	E->W	50.8	-	305	-	1.0	-	685	-	-	685	4110	0.07
Seg. 4	-	W->E	152.8	-	764	-	1.0	-	685	-	-	685	3425	0.22
	-	E->W	41.5	-	208	-	1.0	-	685	-	-	685	3425	0.06
Seg. 5	-	W->E	138.4	-	692	-	1.0	-	685	-	-	685	3425	0.20
	-	E->W	47.5	-	237	-	1.0	-	685	-	-	685	3425	0.07
Seg. 6	-	W->E	58.3	-	875	-	1.0	-	685	-	-	685	10275	0.09
	-	E->W	59.4	-	891	-	1.0	-	685	-	-	685	10275	0.09
Level 1														
LnA, Lev1	-	Both	-	-	5184	-	-	-	-	-	-	-	20978	-
Wall A-1	1	Both	-	-	5184	-	1.0	-	685	-	-	-	20978	-
Seg. 1	-	W->E	31.1	-	186	-	1.0	-	685	-	-	685	4110	0.05
	-	E->W	74.7	-	448	-	1.0	-	685	-	-	685	4110	0.11
Seg. 2	-	W->E	165.6	-	1159	-	1.0	-	685	-	-	685	4795	0.24

SHEAR RESULTS (flexible wind design, continued)

	-	E->W	155.8	-	1091	-	1.0	-	685	-	685	4795	0.23
Seg. 3	-	W->E	215.2	-	1291	-	1.0	-	685	-	685	4110	0.31
	-	E->W	104.4	-	626	-	1.0	-	685	-	685	4110	0.15
Seg. 4	-	W->E	274.5	-	2470	-	1.0	-	685	-	685	6165	0.40
	-	E->W	335.5	-	3019	-	1.0	-	685	-	685	6165	0.49
Seg. 5	-	W->E	25.7	-	77	-	.88	-	599	-	599	1798	0.04
	-	E->W	0.0	-	0	-	.88	-	599	-	599	1798	0.00
Line B													
LnB, Lev1	-	Both	-	-	2623	-	-	-	-	-	-	12130	-
Wall B-1	1	Both	-	-	2623	-	1.0	-	685	-	-	12130	-
Seg. 1	-	W->E	51.5	-	155	-	.88	-	599	-	599	1798	0.09
	-	E->W	17.2	-	52	-	.88	-	599	-	599	1798	0.03
Seg. 2	-	W->E	163.6	-	2468	-	1.0	-	685	-	685	10332	0.24
	-	E->W	170.5	-	2571	-	1.0	-	685	-	685	10332	0.25
Line C													
Level 2													
LnC, Lev2	-	Both	-	-	3605	-	-	-	-	-	-	31853	-
Wall C-1	1	Both	-	-	3605	-	1.0	-	685	-	-	31853	-
Seg. 1	-	W->E	119.1	-	596	-	1.0	-	685	-	685	3425	0.17
	-	E->W	13.5	-	67	-	1.0	-	685	-	685	3425	0.02
Seg. 2	-	W->E	149.6	-	1271	-	1.0	-	685	-	685	5823	0.22
	-	E->W	130.4	-	1109	-	1.0	-	685	-	685	5823	0.19
Seg. 3	-	W->E	130.8	-	1112	-	1.0	-	685	-	685	5823	0.19
	-	E->W	132.5	-	1126	-	1.0	-	685	-	685	5823	0.19
Seg. 4	-	W->E	24.2	-	194	-	1.0	-	685	-	685	5480	0.04
	-	E->W	112.1	-	897	-	1.0	-	685	-	685	5480	0.16
Seg. 5	-	W->E	13.9	-	77	-	1.0	-	685	-	685	3768	0.02
	-	E->W	15.1	-	83	-	1.0	-	685	-	685	3768	0.02
Seg. 6	-	W->E	32.4	-	356	-	1.0	-	685	-	685	7535	0.05
	-	E->W	29.4	-	323	-	1.0	-	685	-	685	7535	0.04
Level 1													
LnC, Lev1	-	Both	-	-	4648	-	-	-	-	-	-	33223	-
Wall C-1	1	Both	-	-	4648	-	1.0	-	685	-	-	33223	-
Seg. 1	-	W->E	0.0	-	0	-	.88	-	599	-	599	1798	0.00
	-	E->W	37.8	-	113	-	.88	-	599	-	599	1798	0.06
Seg. 2	-	W->E	125.4	-	502	-	.97	-	664	-	664	2654	0.19
	-	E->W	7.6	-	30	-	.97	-	664	-	664	2654	0.01
Seg. 3	-	W->E	110.4	-	1215	-	1.0	-	685	-	685	7535	0.16
	-	E->W	0.0	-	0	-	1.0	-	685	-	685	7535	0.00
Seg. 4	-	W->E	143.5	-	1148	-	1.0	-	685	-	685	5480	0.21
	-	E->W	358.8	-	2871	-	1.0	-	685	-	685	5480	0.52
Seg. 5	-	W->E	141.0	-	1128	-	1.0	-	685	-	685	5480	0.21
	-	E->W	6.4	-	51	-	1.0	-	685	-	685	5480	0.01
Seg. 6	-	W->E	43.7	-	656	-	1.0	-	685	-	685	10275	0.06
	-	E->W	105.5	-	1583	-	1.0	-	685	-	685	10275	0.15

Legend:

W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "A" means that this wall is critical for all walls in the Standard Wall group.

For Dir - Direction of wind force along shearline.

v - Design shear force on segment = ASD-factored shear force per unit length of full-height sheathing (FHS)

v_{max}/v_f - Perforated walls: Collector and in-plane anchorage force as per SDPWS eqn. 4.3-9 = V/FHS/Co. FHS is factored for narrow segments as per 4.3.3.4

FTAO walls: Shear force in piers above and below either openings or piers beside opening(s). Aspect ratio factor does not apply to these piers.

V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment

Asp/Cub - Unblocked wood structural panel factor Cub from SDPWS 4.3.5.3 or Aspect Ratio factor from 4.3.3.2, which for perforated walls is sum b_i / FHS from 4.3.5.6 with b_i defined in 4.3.3.4. For multi-segment walls, wall row shows Cub and segment rows show Asp. For single-segment walls and perforated walls, value shown is Asp for blocked walls and Cub for unblocked walls.

Int, Ext - Nominal unit shear capacity of interior and exterior sheathing, factored by Table 4.3-1 Note 3 for framing specific gravity and Note 10 for presence of hold-downs. For wall segments, also include unblocked factor Cub and aspect ratio adjustments.

Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-6.

C - Sheathing combination rule, A = Add capacities, S = Strongest side or twice weakest, G = Stiffness-based using Eqns. 4.3-3,-4.

Cmb - Combined interior and exterior unit shear capacity including perforated wall factor Co.

V - Total factored shear capacity of shearline, wall or segment.

Crit Resp - Response ratio = v/Cmb = design shear force/unit shear capacity. "S" indicates that the seismic design criterion was critical in selecting wall.

Notes:

Refer to Elevation View diagrams for individual level for uplift anchorage force t for perforated walls given by SDPWS 4.3.6.4.2,1.

Hold-Down and Compression Design (flexible wind design)

Level 1					Tensile Hold-down or Compressive Stud Force [lbs]				Hold-down	Cap [lbs]	Crit Resp.
Line- Wall	Posit'n	Location [ft]		Load Case	Shear	Dead	Uplift	Cmb'd			
Line 1											
1-1	L End	0.00	0.12	1	5283	343		4940	HDU5-SDS	5645	0.88
1-1	L End	0.00	0.12	1	7040	571		7611	Compression	10312	0.74
	V Elem	0.00	0.88	1	0	360		360	Compression		
	V Elem	0.00	10.13	1	6724	480		6244	Refer to upper level		
	V Elem	0.00	10.13	1	6724	800		7524	Compression		
1-1	L Op 1	0.00	10.88	1	7040	434		6606	HDU5-SDS	5645	1.17*
1-1	L Op 1	0.00	10.88	1	5283	724		6007	Compression	10312	0.58
1-1	R Op 1	0.00	16.13	1	258	243		15	HDU5-SDS	5645	0.00
1-1	R Op 1	0.00	16.13	1	0	405		405	Compression	10312	0.04
	V Elem	0.00	19.88	1	3782	338		3445	HDU5-SDS	5645	0.61
1-1	L Op 2	0.00	19.88	1	4040	563		4602	Compression	10312	0.45
1-1	R Op 2	0.00	22.13	1	4706	508		4198	HDU5-SDS	5645	0.74
1-1	R Op 2	0.00	22.13	1	2658	847		3505	Compression	10312	0.34
	V Elem	0.00	23.13	1	0	80		80	Compression		
	V Elem	0.00	24.88	1	0	240		240	Compression		
1-1	R End	0.00	30.88	1	5600	264		5335	HDU5-SDS	5645	0.95
1-1	R End	0.00	30.88	1	7647	441		8088	Compression	10312	0.78
	V Elem	0.00	31.13	1	0	240		240	Compression		
Line 2											
2-1	L End	46.92	0.12	1	1488	49		1440	HDU5-SDS	5645	0.26
2-1	L End	46.92	0.12	1	130	81		211	Compression	10312	0.02
2-1	L Op 1	46.92	2.88	1	130	97		33	HDU5-SDS	5645	0.01
2-1	L Op 1	46.92	2.88	1	1488	162		1650	Compression	10312	0.16
2-1	R Op 1	46.92	6.13	1	4700	255		4445	HDU5-SDS	5645	0.79
2-1	R Op 1	46.92	6.13	1	4999	425		5424	Compression	10312	0.53
2-1	R End	46.92	18.63	1	4999	207		4793	HDU5-SDS	5645	0.85
2-1	R End	46.92	18.63	1	4700	344		5044	Compression	10312	0.49
Line 3											
	V Elem	68.00	0.12	1	1846	213		1633	Refer to upper level		
	V Elem	68.00	0.12	1	1932	355		2287	Compression		
	V Elem	68.00	2.88	1	912	322		591	Refer to upper level		
	V Elem	68.00	2.88	1	872	536		1408	Compression		
3-1	R Op 1	68.00	7.63	1	7106	538		6568	HDU5-SDS	5645	1.16*
3-1	R Op 1	68.00	7.63	1	7625	897		8522	Compression	10312	0.83
	V Elem	68.00	10.63	1	993	228		765	Refer to upper level		
	V Elem	68.00	10.63	1	994	380		1374	Compression		
	V Elem	68.00	14.88	1	994	228		766	Refer to upper level		
	V Elem	68.00	14.88	1	993	380		1372	Compression		
3-1	L Op 2	68.00	17.87	1	5801	608		5194	HDU5-SDS	5645	0.92
3-1	L Op 2	68.00	17.87	1	5215	1013		6228	Compression	10312	0.60
3-1	R Op 2	68.00	22.63	1	4743	532		4210	HDU5-SDS	5645	0.75
3-1	R Op 2	68.00	22.63	1	4022	887		4909	Compression	10312	0.48
3-1	R End	68.00	30.88	1	6865	494		6371	HDU5-SDS	5645	1.13*
3-1	R End	68.00	30.88	1	7608	823		8431	Compression	10312	0.82
Line A											
A-1	L End	0.12	0.00	1	955	234		721	HDU5-SDS	5645	0.13
A-1	L End	0.12	0.00	1	3158	120		3278	Compression	10312	0.32
	V Elem	2.88	0.00	1	2457	168		2289	Refer to upper level		
	V Elem	2.88	0.00	1	663	280		943	Compression		
A-1	L Op 1	5.88	0.00	1	41	1061		1102	Compression	10312	0.11
A-1	R Op 1	14.13	0.00	1	1295	578		717	HDU5-SDS	5645	0.13
A-1	R Op 1	14.13	0.00	1	335	984		1318	Compression	10312	0.13
	V Elem	17.13	0.00	1	1105	288		817	Refer to upper level		
	V Elem	17.13	0.00	1	424	427		851	Compression		
A-1	L Op 2	20.88	0.00	1	1720	636		1083	HDU5-SDS	5645	0.19
A-1	L Op 2	20.88	0.00	1	2236	1015		3251	Compression	10312	0.32
A-1	R Op 2	26.13	0.00	1	1606	468		1138	HDU5-SDS	5645	0.20
A-1	R Op 2	26.13	0.00	1	821	768		1589	Compression	10312	0.15
A-1	L Op 3	31.88	0.00	1	811	587		223	HDU5-SDS	5645	0.04
A-1	L Op 3	31.88	0.00	1	1397	979		2376	Compression	10312	0.23
A-1	R Op 3	40.12	0.00	1	3204	682		2523	HDU5-SDS	5645	0.45
A-1	R Op 3	40.12	0.00	1	3286	1136		4422	Compression	10312	0.43
	V Elem	40.88	0.00	1	350	192		158	Refer to upper level		
	V Elem	40.88	0.00	1	1287	320		1607	Compression		
	V Elem	44.13	0.00	1	1166	192		974	Refer to upper level		
	V Elem	44.13	0.00	1	400	320		720	Compression		
A-1	L Op 4	48.88	0.00	1	3147	1229		1917	HDU5-SDS	5645	0.34
A-1	L Op 4	48.88	0.00	1	3354	2049		5403	Compression	10312	0.52
	V Elem	65.13	0.00	1	125	1051		1175	Compression		-
	V Elem	67.88	0.00	1	483	441		42	Refer to upper level		
A-1	R End	67.88	0.00	1	727	600		1327	Compression		

Hold-Down and Compression Design (flexible wind design, continued)

Line B											
B-1	L End	47.04	18.67	1	506	49	457	HDU5-SDS	5645	0.08	
B-1	L End	47.04	18.67	1	169	81	250	Compression	10312	0.02	
B-1	L Op 1	49.79	18.67	1	169	97	72	HDU5-SDS	5645	0.01	
B-1	L Op 1	49.79	18.67	1	506	162	668	Compression	10312	0.06	
B-1	R Op 1	53.04	18.67	1	1497	293	1205	HDU5-SDS	5645	0.21	
B-1	R Op 1	53.04	18.67	1	1560	488	2048	Compression	10312	0.20	
B-1	R End	67.88	18.67	1	1560	244	1316	HDU5-SDS	5645	0.23	
B-1	R End	67.88	18.67	1	1497	407	1905	Compression	10312	0.18	
Line C											
	V Elem	0.12	31.00	1	1003	201	802	HDU5-SDS	5645	0.14	
C-1	L End	0.12	31.00	1	485	291	775	Compression	10312	0.08	
C-1	L Op 1	2.88	31.00	1	414	279	135	Refer to upper level			
	V Elem	2.88	31.00	1	376	383	759	Compression			
C-1	R Op 1	6.13	31.00	1	577	302	276	HDU5-SDS	5645	0.05	
C-1	R Op 1	6.13	31.00	1	2	284	286	Compression	10312	0.03	
	V Elem	7.63	31.00	1	1233	264	969	Refer to upper level			
	V Elem	7.63	31.00	1	1075	440	1515	Compression			
C-1	L Op 2	9.87	31.00	1	1204	315	1519	Compression	10312	0.15	
C-1	R Op 2	13.13	31.00	1	1017	378	639	HDU5-SDS	5645	0.11	
C-1	R Op 2	13.13	31.00	1	0	375	375	Compression	10312	0.04	
	V Elem	15.88	31.00	1	1075	240	835	Refer to upper level			
	V Elem	15.88	31.00	1	1233	400	1633	Compression			
	V Elem	17.63	31.00	1	1078	240	838	Refer to upper level			
	V Elem	17.63	31.00	1	1092	400	1492	Compression			
	V Elem	23.88	31.00	1	410	410	0	Refer to upper level			
C-1	L Op 3	23.88	31.00	1	1421	938	2359	Compression			
C-1	R Op 3	27.13	31.00	1	659	605	55	HDU5-SDS	5645	0.01	
C-1	R Op 3	27.13	31.00	1	2651	1008	3658	Compression	10312	0.35	
C-1	L Op 4	34.88	31.00	1	2821	671	2150	HDU5-SDS	5645	0.38	
C-1	L Op 4	34.88	31.00	1	1222	1035	2257	Compression	10312	0.22	
C-1	R Op 4	42.13	31.00	1	1399	821	579	HDU5-SDS	5645	0.10	
C-1	R Op 4	42.13	31.00	1	473	672	1145	Compression	10312	0.11	
	V Elem	45.88	31.00	1	926	228	698	Refer to upper level			
	V Elem	45.88	31.00	1	200	60	260	Compression			
	V Elem	47.63	31.00	1	117	117	0	Refer to upper level			
	V Elem	47.63	31.00	1	126	111	237	Compression			
C-1	L Op 5	49.88	31.00	1	1315	699	2014	Compression	10312	0.20	
C-1	R Op 5	53.13	31.00	1	288	288	0	Not required	5645	0.00	
C-1	R Op 5	53.13	31.00	1	845	1133	1977	Compression	10312	0.19	
	V Elem	57.13	31.00	1	265	265	0	Refer to upper level			
	V Elem	57.13	31.00	1	240	561	801	Compression			
C-1	R End	67.88	31.00	1	1206	675	531	HDU5-SDS	5645	0.09	
C-1	R End	67.88	31.00	1	665	300	965	Compression	10312	0.09	
Level 2					Tensile Hold-down						
Line-Wall	Posit'n	Location [ft]		Load Case	or Compressive Stud Force [lbs]					Cap	Crit
		X	Y		Shear	Dead	Uplift	Cmb'd	Hold-down	[lbs]	Resp.
Line 1											
	V Elem	0.00	0.88	1	0	360		360	Compression		
1-1	R Op 1	0.00	10.13	1	6724	480		6244	HDU5-SDS	5645	1.11*
1-1	R Op 1	0.00	10.13	1	6724	800		7524	Compression	10312	0.73
1-1	L Op 2	0.00	20.88	1	6724	312		6412	HDU5-SDS	5645	1.14*
1-1	L Op 2	0.00	20.88	1	6724	520		7244	Compression	10312	0.70
	V Elem	0.00	23.13	1	0	80		80	Compression		
	V Elem	0.00	24.88	1	0	240		240	Compression		
	V Elem	0.00	31.13	1	0	240		240	Compression		
Line 3											
3-1	L End	68.00	0.12	1	1846	132		1714	HDU5-SDS	5645	0.30
3-1	L End	68.00	0.12	1	1932	220		2152	Compression	10312	0.21
3-1	L Op 1	68.00	5.38	1	1932	252		1680	HDU5-SDS	5645	0.30
3-1	L Op 1	68.00	5.38	1	1846	420		2266	Compression	10312	0.22
3-1	R Op 1	68.00	10.63	1	993	228		765	HDU5-SDS	5645	0.14
3-1	R Op 1	68.00	10.63	1	994	380		1374	Compression	10312	0.13
3-1	L Op 2	68.00	14.88	1	994	228		766	HDU5-SDS	5645	0.14
3-1	L Op 2	68.00	14.88	1	993	380		1372	Compression	10312	0.13
3-1	R Op 2	68.00	20.13	1	5430	384		5046	HDU5-SDS	5645	0.89
3-1	R Op 2	68.00	20.13	1	5387	640		6027	Compression	10312	0.58
3-1	R End	68.00	30.88	1	5387	264		5123	HDU5-SDS	5645	0.91
3-1	R End	68.00	30.88	1	5430	440		5870	Compression	10312	0.57
Line A											
A-1	L End	0.12	0.00	1	663	72		591	HDU5-SDS	5645	0.10
A-1	L End	0.12	0.00	1	2457	120		2577	Compression	10312	0.25
A-1	L Op 1	2.88	0.00	1	2457	168		2289	HDU5-SDS	5645	0.41
A-1	L Op 1	2.88	0.00	1	663	280		943	Compression	10312	0.09

Hold-Down and Compression Design (flexible wind design, continued)

A-1	R Op 1	7.13	0.00	1	535	192	343	HDU5-SDS	5645	0.06
A-1	R Op 1	7.13	0.00	1	2389	320	2709	Compression	10312	0.26
A-1	L Op 2	10.88	0.00	1	2389	240	2149	HDU5-SDS	5645	0.38
A-1	L Op 2	10.88	0.00	1	535	400	935	Compression	10312	0.09
A-1	R Op 2	17.13	0.00	1	1105	288	817	HDU5-SDS	5645	0.14
A-1	R Op 2	17.13	0.00	1	424	427	851	Compression	10312	0.08
A-1	L Op 3	22.88	0.00	1	424	424	0	Not required	5645	0.00
A-1	L Op 3	22.88	0.00	1	1105	760	1865	Compression	10312	0.18
A-1	R Op 3	36.13	0.00	1	1287	432	855	HDU5-SDS	5645	0.15
A-1	R Op 3	36.13	0.00	1	350	720	1070	Compression	10312	0.10
A-1	L Op 4	40.88	0.00	1	350	192	158	HDU5-SDS	5645	0.03
A-1	L Op 4	40.88	0.00	1	1287	320	1607	Compression	10312	0.16
A-1	R Op 4	44.13	0.00	1	1166	192	974	HDU5-SDS	5645	0.17
A-1	R Op 4	44.13	0.00	1	400	320	720	Compression	10312	0.07
A-1	L Op 5	48.88	0.00	1	400	216	184	HDU5-SDS	5645	0.03
A-1	L Op 5	48.88	0.00	1	1166	360	1526	Compression	10312	0.15
A-1	R Op 5	53.13	0.00	1	475	456	19	HDU5-SDS	5645	0.00
A-1	R Op 5	53.13	0.00	1	483	760	1243	Compression	10312	0.12
A-1	R End	67.88	0.00	1	483	360	123	HDU5-SDS	5645	0.02
A-1	R End	67.88	0.00	1	475	600	1075	Compression	10312	0.10
Line C										
C-1	L End	0.12	31.00	1	1003	120	883	HDU5-SDS	5645	0.16
C-1	L End	0.12	31.00	1	113	89	202	Compression	10312	0.02
C-1	L Op 1	4.88	31.00	1	113	113	0	Not required	5645	0.00
C-1	L Op 1	4.88	31.00	1	1003	300	1303	Compression	10312	0.13
C-1	R Op 1	7.63	31.00	1	1233	264	969	HDU5-SDS	5645	0.17
C-1	R Op 1	7.63	31.00	1	1075	440	1515	Compression	10312	0.15
C-1	L Op 2	15.88	31.00	1	1075	240	835	HDU5-SDS	5645	0.15
C-1	L Op 2	15.88	31.00	1	1233	400	1633	Compression	10312	0.16
C-1	R Op 2	17.63	31.00	1	1078	240	838	HDU5-SDS	5645	0.15
C-1	R Op 2	17.63	31.00	1	1092	400	1492	Compression	10312	0.14
C-1	L Op 3	25.88	31.00	1	1092	492	600	HDU5-SDS	5645	0.11
C-1	L Op 3	25.88	31.00	1	1078	820	1898	Compression	10312	0.18
C-1	R Op 3	38.13	31.00	1	926	800	1725	Compression	10312	0.17
C-1	L Op 4	45.88	31.00	1	926	228	698	HDU5-SDS	5645	0.12
C-1	L Op 4	45.88	31.00	1	200	60	260	Compression	10312	0.03
C-1	R Op 4	47.63	31.00	1	117	117	0	Not required	5645	0.00
C-1	R Op 4	47.63	31.00	1	126	111	237	Compression	10312	0.02
C-1	L Op 5	52.88	31.00	1	126	126	0	Not required	5645	0.00
C-1	L Op 5	52.88	31.00	1	117	295	412	Compression	10312	0.04
C-1	R Op 5	57.13	31.00	1	265	265	0	Not required	5645	0.00
C-1	R Op 5	57.13	31.00	1	240	561	801	Compression	10312	0.08
C-1	R End	67.88	31.00	1	240	240	0	Not required	5645	0.00
C-1	R End	67.88	31.00	1	265	282	547	Compression	10312	0.05

Legend:

Line-Wall:

At wall or opening – Shearline and wall number

At vertical element – Shearline

Posit'n – Position of stud pack that hold-down is attached to or which is applying compression force:

V Elem – Vertical element: column or strengthened studs required where not at wall end or opening

L or R End – At left or right wall end

L or R Op n – At left or right side of opening n

t @ Op n – Uplift force t at opening n from offset opening in perforated wall above, from SDPWS 4.3.6.4.2.1

Location – Co-ordinates in Plan View

Load Case – Results are for critical load case:

ASCE 7 All Heights: Case 1 or 2 from Fig. 27.3-8

ASCE 7 Low-rise: Windward corner(s) and Case A or B from Fig. 28.3-1

ASCE 7 Minimum loads (27.1.5 / 28.3.4): "Min"

Tensile Hold-down or Compressive Stud Force – Upwards force on hold-down at one end of the wall or downward force on bottom plate under studs at the other end, for each force direction. Includes forces transferred from upper levels.

Shear – Overturning component = $V \times h / \text{beff}$ from SDPWS Eqn. 4.3-7; V = force on segment, ASD-factored by 0.60; h = wall height, beff = wall segment length – (tension stud pack width + hold-down anchor bolt offset) – (1/2 compression stud pack width). For perforated walls = $V \times h / \text{Co sum (bi)}$ from SDPWS Eqn. 4.3-8.

Dead – Dead load resisting component, factored for ASD by 0.60 for tension and 1.0 for compression

Uplift – Uplift wind load component, factored for ASD by 0.60

Cmb'd – Sum of ASD-factored overturning, dead and uplift forces. May also include the uplift force t from perforated walls from SDPWS 4.3.6.4.2.1 when openings are staggered.

Hold-down – Device model number from hold-down database; "Compression" for bearing of end stud pack on bottom plate

Cap – Hold-downs: Allowable ASD tension load from database; Compression: allowable ASD bearing force = $C_t CM C_b F_{cp} A$; A = cross sectional area of end studs. Refer to Framing materials table for details

Crit. Resp. – Critical Response = Combined ASD force / Allowable ASD tension load

Notes:

HDU5-SDS2.5 for studs with thickness $> 0'-3"$ and depth $> 0'-3.5"$: Uses 14 1/4" x 2.5" SDS heavy-duty screws; 5/8" anchor bolt.

Refer to the Shear Line Dimensions table for wall height h , effective segment length b_{eff} and perforated wall adjusted sum of b_i , to the Story Table for joist depth, and to the Shear Results table for perforated factor C_o .

Most severe of wind load cases is used for overturning calculation.

Designer is responsible for design of connection from wall to floor or foundation for shear force shown in Shear Results table. Refer to SDPWS

4.3.6.4.3 for foundation anchor bolt requirements.

*WARNING - Design capacity has been exceeded.

COLLECTOR FORCES (flexible wind design)

Level 1					Drag Strut Force [lbs]		Strap/Blocking Force [lbs]	
Line-Wall	Position on Wall or Opening	Location [ft]		Load Case	Force [lbs]		Force [lbs]	
		X	Y		--->	<---	--->	<---
Line 1								
1-1	Left Opening 1	0.00	11.00		1395	-3493		
1-1	Right Opening 1	0.00	16.00		-839			
1-1	Left Opening 2	0.00	20.00		-2519			
1-1	Right Opening 2	0.00	22.00		-3413	1422		
Line 2								
2-1	Left Opening 1	46.92	3.00		-221	636		
2-1	Right Opening 1	46.92	6.00		-897	1312		
2-1	Right Wall End	46.92	18.75		2759	-2759		
Line 3								
3-1	Right Opening 1	68.00	7.50		-2710	2710		
3-1	Left Opening 2	68.00	18.00		2700	-3342		
3-1	Right Opening 2	68.00	22.50		1074	-1716		
Line A								
A-1	Left Opening 1	6.00	0.00		-271	9		
A-1	Right Opening 1	14.00	0.00		-881	619		
A-1	Left Opening 2	21.00	0.00		-255	62		
A-1	Right Opening 2	26.00	0.00		-636	443		
A-1	Left Opening 3	32.00	0.00		197	275		
A-1	Right Opening 3	40.00	0.00		-413	885		
A-1	Left Opening 4	49.00	0.00		1371	-1449		
A-1	Right Opening 4	65.00	0.00		152			
Line B								
B-1	Left Wall End	46.92	18.67		-1810	1810		
B-1	Left Opening 1	49.92	18.67		-1771	1874		
B-1	Right Opening 1	52.92	18.67		-1886	1989		
Line C								
C-1	Left Opening 1	3.00	31.00			92		
C-1	Right Opening 1	6.00	31.00		-410	297		
C-1	Left Opening 2	10.00	31.00		-182	540		
C-1	Right Opening 2	13.00	31.00		-387			
C-1	Left Opening 3	24.00	31.00		76			
C-1	Right Opening 3	27.00	31.00		-129	1702		
C-1	Left Opening 4	35.00	31.00		472	-622		
C-1	Right Opening 4	42.00	31.00		-7	-143		
C-1	Left Opening 5	50.00	31.00		574	352		
C-1	Right Opening 5	53.00	31.00		369	557		

Level 2					Drag Strut Force [lbs]		Strap/Blocking Force [lbs]	
Line-Wall	Position on Wall or Opening	Location [ft]		Load Case	Force [lbs]		Force [lbs]	
		X	Y		--->	<---	--->	<---
Line 1								
1-1	Right Opening 1	0.00	10.00		-2914	2914		
1-1	Left Opening 2	0.00	21.00		2914	-2914		
Line 3								
3-1	Left Opening 1	68.00	5.50		-391	335		
3-1	Right Opening 1	68.00	10.50		-1849	1792		
3-1	Left Opening 2	68.00	15.00		-2633	2576		
3-1	Right Opening 2	68.00	20.00		-4090	4033		
Line A								
A-1	Left Opening 1	3.00	0.00		69	-686		
A-1	Right Opening 1	7.00	0.00		-143	-474		
A-1	Left Opening 2	11.00	0.00		-104	-1381		
A-1	Right Opening 2	17.00	0.00		-422	-1063		
A-1	Left Opening 3	23.00	0.00		54	-1050		
A-1	Right Opening 3	36.00	0.00		-635	-361		
A-1	Left Opening 4	41.00	0.00		-136	-303		
A-1	Right Opening 4	44.00	0.00		-295	-144		
A-1	Left Opening 5	49.00	0.00		132	-117		
A-1	Right Opening 5	53.00	0.00		-80	95		
Line C								
C-1	Left Opening 1	5.00	31.00		330	198		
C-1	Right Opening 1	7.50	31.00		198	330		
C-1	Left Opening 2	16.00	31.00		1019	-328		
C-1	Right Opening 2	17.50	31.00		939	-248		
C-1	Left Opening 3	26.00	31.00		1600	-924		
C-1	Right Opening 3	38.00	31.00		964	-288		
C-1	Left Opening 4	46.00	31.00		733	-760		
C-1	Right Opening 4	47.50	31.00		654	-681		
C-1	Left Opening 5	53.00	31.00		439	-472		

COLLECTOR FORCES (flexible wind design, continued)

C-1	Right Opening 5	57.00	31.00	227	-260	
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Legend:

Line-Wall - Shearline and wall number

Position...- Side of opening or wall end that drag strut is attached to

Location - Co-ordinates in Plan View

Load Case - Results are for critical load case:

ASCE 7 All heights Case 1 or 2

ASCE 7 Low-rise corner; Case A or B

Drag strut Force - Axial force in transfer element at openings, gaps, or changes in design shear along shearline. + : tension; - : compression.

Based on ASD-factored shearline force (v_{max} from 4.3.6.4.1.1 for perforated walls)

Strap/Blocking Force - For FTAO walls, force transferred from above and below opening to shearwall pier.

-> Due to shearline force in the west-to-east or south-to-north direction

<- Due to shearline force in the east-to-west or north-to-south direction

MWFRS DEFLECTION (flexible wind design)*These deflections are used to determine shearwall stiffness for force distribution*

Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 1														
Line 1														
1-1,1	2	S->N	Comb	573.7	11.00	9.00	16.5	.013	50.6	171	.025	.102	0.31	0.42
		N->S	Comb	764.4	11.00	9.00	16.5	.018	50.6	171	.025	.136	0.34	0.50
1-1,2		S->N	Comb	26.8	4.00	9.00	16.5	.002	50.6	171	.025	.005	0.64	0.65
		N->S	Comb	0.0	4.00	9.00	16.5	-	50.6	-	-	-	-	0.50
1-1,3		S->N	Comb	826.1	9.00	9.00	16.5	.023	50.6	171	.025	.147	0.29	0.46
		N->S	Comb	604.9	9.00	9.00	16.5	.017	50.6	171	.025	.108	0.37	0.50
Line 2														
2-1,1	3	S->N	1S	151.6	3.00	9.00	16.5	.013	25.3	171	.025	.054	0.92	0.99
		N->S	1S	13.2	3.00	9.00	16.5	.001	25.3	171	.025	.005	0.81	0.82
2-1,2		S->N	1S	512.0	12.75	9.00	16.5	.010	25.3	171	.025	.182	0.26	0.45
		N->S	1S	544.6	12.75	9.00	16.5	.011	25.3	171	.025	.194	0.26	0.47
Line 3														
3-1,1	2	S->N	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.51
		N->S	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.47
3-1,2		S->N	Comb	876.5	10.50	9.00	16.5	.021	50.6	171	.025	.156	0.33	0.51
		N->S	Comb	937.6	10.50	9.00	16.5	.023	50.6	171	.025	.167	0.29	0.47
3-1,3		S->N	Comb	234.9	8.50	9.00	16.5	.007	50.6	171	.025	.042	0.46	0.51
		N->S	Comb	159.4	8.50	9.00	16.5	.005	50.6	171	.025	.028	0.44	0.47
Line A														
A-1,1	1	W->E	ExtS	31.1	6.00	9.00	16.5	.001	25.3	171	.025	.011	0.42	0.43
		E->W	ExtS	74.7	6.00	9.00	16.5	.003	25.3	171	.025	.027	0.41	0.44
A-1,2		W->E	ExtS	165.6	7.00	9.00	16.5	.006	25.3	171	.025	.059	0.37	0.44
		E->W	ExtS	155.8	7.00	9.00	16.5	.006	25.3	171	.025	.055	0.37	0.44
A-1,3		W->E	ExtS	215.2	6.00	9.00	16.5	.009	25.3	171	.025	.077	0.41	0.50
		E->W	ExtS	104.4	6.00	9.00	16.5	.004	25.3	171	.025	.037	0.39	0.44
A-1,4		W->E	ExtS	274.5	9.00	9.00	16.5	.008	25.3	171	.025	.098	0.34	0.44
		E->W	ExtS	335.5	9.00	9.00	16.5	.009	25.3	171	.025	.119	0.31	0.44
A-1,5		W->E	ExtS	25.7	3.00	9.00	16.5	.002	25.3	171	.025	.009	0.83	0.85
		E->W	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.44
Line B														
B-1,1	1	W->E	1S	51.5	3.00	9.00	16.5	.004	25.3	171	.025	.018	0.85	0.87
		E->W	1S	17.2	3.00	9.00	16.5	.001	25.3	171	.025	.006	0.82	0.82
B-1,2		W->E	1S	163.6	15.08	9.00	16.5	.003	25.3	171	.025	.058	0.17	0.23
		E->W	1S	170.5	15.08	9.00	16.5	.003	25.3	171	.025	.061	0.17	0.23
Line C														
C-1,1	1	W->E	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.02
		E->W	ExtS	37.8	3.00	9.00	16.5	.003	25.3	171	.025	.013	0.83	0.85
C-1,2		W->E	ExtS	125.4	4.00	9.00	16.5	.008	25.3	171	.025	.045	0.01	0.06
		E->W	ExtS	7.6	4.00	9.00	16.5	.000	25.3	171	.025	.003	0.00	0.01
C-1,3		W->E	ExtS	110.4	11.00	9.00	16.5	.003	25.3	171	.025	.039	0.23	0.27
		E->W	ExtS	0.0	11.00	9.00	16.5	-	25.3	-	-	-	-	0.20
C-1,4		W->E	ExtS	143.5	8.00	9.00	16.5	.005	25.3	171	.025	.051	0.01	0.06
		E->W	ExtS	358.8	8.00	9.00	16.5	.011	25.3	171	.025	.128	0.34	0.48
C-1,5		W->E	ExtS	141.0	8.00	9.00	16.5	.004	25.3	171	.025	.050	0.32	0.37
		E->W	ExtS	6.4	8.00	9.00	16.5	.000	25.3	171	.025	.002	0.00	0.01
C-1,6		W->E	ExtS	43.7	15.00	9.00	16.5	.001	25.3	171	.025	.016	0.00	0.02
		E->W	ExtS	105.5	15.00	9.00	16.5	.002	25.3	171	.025	.038	0.16	0.20
Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 2														
Line 1														
1-1,2	2	S->N	Comb	821.3	11.00	8.00	16.5	.013	50.6	171	.025	.130	0.39	0.53
		N->S	Comb	821.3	11.00	8.00	16.5	.013	50.6	171	.025	.130	0.39	0.54
Line 3														
3-1,1	1	S->N	ExtS	220.3	5.50	8.00	16.5	.007	25.3	171	.025	.070	0.49	0.57
		N->S	ExtS	230.5	5.50	8.00	16.5	.007	25.3	171	.025	.073	0.49	0.57
3-1,2		S->N	ExtS	117.2	4.50	8.00	16.5	.005	25.3	171	.025	.037	0.53	0.57
		N->S	ExtS	117.4	4.50	8.00	16.5	.005	25.3	171	.025	.037	0.53	0.57
3-1,3		S->N	ExtS	663.3	11.00	8.00	16.5	.011	25.3	171	.025	.210	0.35	0.57
		N->S	ExtS	658.1	11.00	8.00	16.5	.011	25.3	171	.025	.208	0.35	0.57
Line A														
A-1,1	1	W->E	ExtS	76.0	3.00	8.00	16.5	.004	25.3	171	.025	.024	0.80	0.83
		E->W	ExtS	281.6	3.00	8.00	16.5	.017	25.3	171	.025	.089	1.01	1.12
A-1,2		W->E	ExtS	62.7	4.00	8.00	16.5	.003	25.3	171	.025	.020	0.56	0.59
		E->W	ExtS	280.0	4.00	8.00	16.5	.012	25.3	171	.025	.089	0.73	0.83
A-1,3		W->E	ExtS	132.4	6.00	8.00	16.5	.004	25.3	171	.025	.042	0.40	0.44

MWFRS DEFLECTION (flexible wind design, continued)

A-1, 4	E->W	ExtS	50.8	6.00	8.00	16.5	.002	25.3	171	.025	.016	0.00	0.02
	W->E	ExtS	152.8	5.00	8.00	16.5	.005	25.3	171	.025	.048	0.48	0.54
A-1, 5	E->W	ExtS	41.5	5.00	8.00	16.5	.001	25.3	171	.025	.013	0.43	0.45
	W->E	ExtS	138.4	5.00	8.00	16.5	.005	25.3	171	.025	.044	0.49	0.54
A-1, 6	E->W	ExtS	47.5	5.00	8.00	16.5	.002	25.3	171	.025	.015	0.43	0.45
	W->E	ExtS	58.3	15.00	8.00	16.5	.001	25.3	171	.025	.018	0.14	0.16
Line C	E->W	ExtS	59.4	15.00	8.00	16.5	.001	25.3	171	.025	.019	0.14	0.16
	W->E	ExtS											
C-1, 1	1 W->E	ExtS	119.1	5.00	8.00	16.5	.004	25.3	171	.025	.038	0.48	0.53
	E->W	ExtS	13.5	5.00	8.00	16.5	.000	25.3	171	.025	.004	0.00	0.01
C-1, 2	W->E	ExtS	149.6	8.50	8.00	16.5	.003	25.3	171	.025	.047	0.28	0.33
	E->W	ExtS	130.4	8.50	8.00	16.5	.003	25.3	171	.025	.041	0.28	0.32
C-1, 3	W->E	ExtS	130.8	8.50	8.00	16.5	.003	25.3	171	.025	.041	0.28	0.32
	E->W	ExtS	132.5	8.50	8.00	16.5	.003	25.3	171	.025	.042	0.27	0.31
C-1, 4	W->E	ExtS	24.2	8.00	8.00	16.5	.001	25.3	171	.025	.008	0.00	0.01
	E->W	ExtS	112.1	8.00	8.00	16.5	.002	25.3	171	.025	.035	0.29	0.33
C-1, 5	W->E	ExtS	13.9	5.50	8.00	16.5	.000	25.3	171	.025	.004	0.00	0.01
	E->W	ExtS	15.1	5.50	8.00	16.5	.000	25.3	171	.025	.005	0.00	0.01
C-1, 6	W->E	ExtS	32.4	11.00	8.00	16.5	.001	25.3	171	.025	.010	0.00	0.01
	E->W	ExtS	29.4	11.00	8.00	16.5	.000	25.3	171	.025	.009	0.00	0.01

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B.

W Gp – Wall design group, refer to Sheathing and Framing Materials tables.

Dir – Force direction.

Srf – Wall surface = Int(erior) or Ext(erior) for perimeter walls, 1 or 2 for interior partitions; Comb = Combined v and Ga for identical materials on each side; S = Ga from side with stronger shear resistance; W = 2 x Ga of weaker side.

v – ASD shear force per unit distance on wall segment.

Unblocked walls = v / C_{ub} as per SDPWS 4.3.4.3, C_{ub} = Unblocked factor from 4.3.5.3, shown in the Shear Results table.

Perforated walls = v_{max} from Eqn. 4.3-9, as per 4.3.4.2.

FTAO walls = Unit shear force in pier beside opening(s).

b – Wall or segment length.

Segmented wall or FTAO wall segments = Width of wall segment between openings.

Perforated wall = Sum of FHS segments, modified as in 4.3.3.4 per 4.3.4.2.

FTAO wall = Length of wall including openings.

h – Wall height.

FTAO piers = Distance from bottom of opening to top of wall; for end segments, results using that distance and the wall height are averaged.

Defl – Horizontal shear wall deflection due to given term:

Bending = $8vh^3 / EA_b$; A = Effective cross sectional area of segment end stud(s), E = stud mod. of elasticity in Framing Materials table

For i studs at one end and j at the other, $A = 2ij / (i + j) \times$ area of one stud, based on Ex. C4.3.4-3

Shear = $vh / 1000 G_a$; $G_a = vw / (vw / G_{vtv} + 0.75 en)$, from SDPWS Ex. C4.3.4-1.

vw = ASD sheathing capacity.

G_{vtv} = Shear stiffness from C4.3.4, shown in Sheathing Materials table.

en = Nail slip from Table C4.2.3D of form aVn^b for WSP, varies linearly to value at capacity for other materials.

Vn = Shear force per nail along panel edge at ASD capacity vw .

Hold – Anchorage system (hold-down) = $d_a \times h / beff$.

d_a = Vertical hold-down displacement; refer to Hold-down Displacement table for components.

$beff$ = Effective wall segment length = $b -$ (tension stud pack width + hold-down anchor bolt offset) - (1/2 compression stud pack width)

$beff$ is given in the Shear Wall Dimensions table.

For FTAO walls, hold-down device at end of wall is applied to all segments, as per APA T555.

Total Defl – Deflection from bending + shear + hold-down, as per Eqn. 4.3-2.

For FTAO walls, the average of the values for the segments, as per APA T555.

WARNING - On shearline(s) A, B, C, 1, 2 the program was unable to equalize deflections on the shearwall segments. Change design setting to capacity-based rigidity, or turn off the distribution to segments based on rigidity.

SERVICEABILITY DEFLECTION (flexible wind design)

These deflections are used to determine story drift

Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 1														
Line 1														
1-1,1	2	S->N	Comb	506.4	11.00	9.00	16.5	.012	51.5	169	.024	.088	0.36	0.46
		N->S	Comb	753.9	11.00	9.00	16.5	.017	51.5	169	.024	.132	0.34	0.49
1-1,2		S->N	Comb	0.0	4.00	9.00	16.5	-	51.5	-	-	-	-	0.46
		N->S	Comb	0.0	4.00	9.00	16.5	-	51.5	-	-	-	-	0.49
1-1,3		S->N	Comb	899.0	9.00	9.00	16.5	.025	51.5	169	.024	.157	0.28	0.46
		N->S	Comb	596.5	9.00	9.00	16.5	.017	51.5	169	.024	.104	0.37	0.49
Line 2														
2-1,1	3	S->N	1S	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.45
		N->S	1S	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.46
2-1,2		S->N	1S	540.1	12.75	9.00	16.5	.011	25.8	169	.024	.189	0.26	0.45
		N->S	1S	540.1	12.75	9.00	16.5	.011	25.8	169	.024	.189	0.26	0.46
Line 3														
3-1,1	2	S->N	Comb	0.0	3.00	9.00	16.5	-	51.5	-	-	-	-	0.50
		N->S	Comb	0.0	3.00	9.00	16.5	-	51.5	-	-	-	-	0.47
3-1,2		S->N	Comb	868.0	10.50	9.00	16.5	.021	51.5	169	.024	.152	0.33	0.50
		N->S	Comb	922.8	10.50	9.00	16.5	.022	51.5	169	.024	.161	0.28	0.47
3-1,3		S->N	Comb	227.2	8.50	9.00	16.5	.007	51.5	169	.024	.040	0.46	0.50
		N->S	Comb	159.6	8.50	9.00	16.5	.005	51.5	169	.024	.028	0.44	0.47
Line A														
A-1,1	1	W->E	ExtS	47.4	6.00	9.00	16.5	.002	25.8	169	.024	.017	0.45	0.47
		E->W	ExtS	70.8	6.00	9.00	16.5	.003	25.8	169	.024	.025	0.41	0.43
A-1,2		W->E	ExtS	196.1	7.00	9.00	16.5	.007	25.8	169	.024	.068	0.39	0.47
		E->W	ExtS	153.4	7.00	9.00	16.5	.006	25.8	169	.024	.054	0.37	0.43
A-1,3		W->E	ExtS	155.3	6.00	9.00	16.5	.007	25.8	169	.024	.054	0.41	0.47
		E->W	ExtS	101.4	6.00	9.00	16.5	.004	25.8	169	.024	.035	0.39	0.43
A-1,4		W->E	ExtS	280.3	9.00	9.00	16.5	.008	25.8	169	.024	.098	0.36	0.47
		E->W	ExtS	333.9	9.00	9.00	16.5	.009	25.8	169	.024	.117	0.31	0.43
A-1,5		W->E	ExtS	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.47
		E->W	ExtS	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.43
Line B														
B-1,1	1	Both	1S	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.23
B-1,2		Both	1S	171.5	15.08	9.00	16.5	.003	25.8	169	.024	.060	0.17	0.23
Line C														
C-1,1	1	W->E	ExtS	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.07
		E->W	ExtS	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.19
C-1,2		W->E	ExtS	147.0	4.00	9.00	16.5	.009	25.8	169	.024	.051	0.01	0.07
		E->W	ExtS	312.6	4.00	9.00	16.5	.020	25.8	169	.024	.109	0.06	0.19
C-1,3		W->E	ExtS	0.0	11.00	9.00	16.5	-	25.8	-	-	-	-	0.07
		E->W	ExtS	0.0	11.00	9.00	16.5	-	25.8	-	-	-	-	0.19
C-1,4		W->E	ExtS	169.9	8.00	9.00	16.5	.005	25.8	169	.024	.059	0.01	0.07
		E->W	ExtS	0.0	8.00	9.00	16.5	-	25.8	-	-	-	-	0.19
C-1,5		W->E	ExtS	0.0	8.00	9.00	16.5	-	25.8	-	-	-	-	0.07
		E->W	ExtS	251.2	8.00	9.00	16.5	.008	25.8	169	.024	.088	0.10	0.19
C-1,6		W->E	ExtS	175.7	15.00	9.00	16.5	.003	25.8	169	.024	.061	0.01	0.07
		E->W	ExtS	88.2	15.00	9.00	16.5	.001	25.8	169	.024	.031	0.16	0.19
Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 2														
Line 1														
1-1,2	2	Both	Comb	810.0	11.00	8.00	16.5	.013	51.5	169	.024	.126	0.39	0.53
Line 3														
3-1,1	1	S->N	ExtS	215.0	5.50	8.00	16.5	.007	25.8	169	.024	.067	0.49	0.57
		N->S	ExtS	224.8	5.50	8.00	16.5	.007	25.8	169	.024	.070	0.49	0.57
3-1,2		S->N	ExtS	109.8	4.50	8.00	16.5	.004	25.8	169	.024	.034	0.53	0.57
		N->S	ExtS	112.7	4.50	8.00	16.5	.004	25.8	169	.024	.035	0.53	0.57
3-1,3		S->N	ExtS	657.6	11.00	8.00	16.5	.011	25.8	169	.024	.204	0.35	0.57
		N->S	ExtS	651.5	11.00	8.00	16.5	.011	25.8	169	.024	.202	0.35	0.57
Line A														
A-1,1	1	W->E	ExtS	0.0	3.00	8.00	16.5	-	25.8	-	-	-	-	0.22
		E->W	ExtS	0.0	3.00	8.00	16.5	-	25.8	-	-	-	-	0.19
A-1,2		W->E	ExtS	0.0	4.00	8.00	16.5	-	25.8	-	-	-	-	0.22
		E->W	ExtS	0.0	4.00	8.00	16.5	-	25.8	-	-	-	-	0.19
A-1,3		W->E	ExtS	0.0	6.00	8.00	16.5	-	25.8	-	-	-	-	0.22
		E->W	ExtS	0.0	6.00	8.00	16.5	-	25.8	-	-	-	-	0.19
A-1,4		W->E	ExtS	12.3	5.00	8.00	16.5	.000	25.8	169	.024	.004	0.43	0.44
		E->W	ExtS	249.8	5.00	8.00	16.5	.009	25.8	169	.024	.078	0.72	0.81

SERVICEABILITY DEFLECTION (flexible wind design, continued)

A-1,5		W->E	ExtS	0.0	5.00	8.00	16.5	-	25.8	-	-	-	-	0.22
				3.9	5.00	8.00	16.5	.000	25.8	169	.024	.001	0.42	0.42
A-1,6		W->E	ExtS	232.8	15.00	8.00	16.5	.003	25.8	169	.024	.072	0.14	0.22
				152.4	15.00	8.00	16.5	.002	25.8	169	.024	.047	0.14	0.19
Line C														
C-1,1	1	W->E	ExtS	0.0	5.00	8.00	16.5	-	25.8	-	-	-	-	0.05
				156.2	5.00	8.00	16.5	.006	25.8	169	.024	.048	0.01	0.06
C-1,2		W->E	ExtS	0.0	8.50	8.00	16.5	-	25.8	-	-	-	-	0.05
				0.0	8.50	8.00	16.5	-	25.8	-	-	-	-	0.06
C-1,3		W->E	ExtS	0.0	8.50	8.00	16.5	-	25.8	-	-	-	-	0.05
				0.0	8.50	8.00	16.5	-	25.8	-	-	-	-	0.06
C-1,4		W->E	ExtS	151.6	8.00	8.00	16.5	.003	25.8	169	.024	.047	0.00	0.05
				0.0	8.00	8.00	16.5	-	25.8	-	-	-	-	0.06
C-1,5		W->E	ExtS	120.6	5.50	8.00	16.5	.004	25.8	169	.024	.037	0.01	0.05
				158.8	5.50	8.00	16.5	.005	25.8	169	.024	.049	0.01	0.06
C-1,6		W->E	ExtS	152.6	11.00	8.00	16.5	.002	25.8	169	.024	.047	0.01	0.05
				172.7	11.00	8.00	16.5	.003	25.8	169	.024	.054	0.01	0.06

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B.

W Gp – Wall design group, refer to Sheathing and Framing Materials tables.

Dir – Force direction.

Srf – Wall surface = Int(erior) or Ext(erior) for perimeter walls, 1 or 2 for interior partitions; Comb = Combined v and Ga for identical materials on each side; S = Ga from side with stronger shear resistance; W = 2 x Ga of weaker side.

v – Shear force per unit distance on wall segment using 1.0 Wa = wind load based on serviceability wind speeds from ASCE 7 CC.2.2, Figs. CC.2-1 - CC.2-4.

Unblocked walls = v / C_{ub} as per SDPWS 4.3.4.3, C_{ub} = Unblocked factor from 4.3.5.3, shown in the Shear Results table.

Perforated walls = v_{max} from Eqn. 4.3-9, as per 4.3.4.2.

FTAO walls = Unit shear force in pier beside opening(s).

b – Wall or segment length.

Segmented wall or FTAO wall segments = Width of wall segment between openings.

Perforated wall = Sum of FHS segments, modified as in 4.3.3.4 per 4.3.4.2.

FTAO wall = Length of wall including openings.

h – Wall height.

FTAO piers = Distance from bottom of opening to top of wall; for end segments, results using that distance and the wall height are averaged.

Defl – Horizontal shear wall deflection due to given term:

Bending = $8vh^3 / EAb$; A = Effective cross sectional area of segment end stud(s), E = stud mod. of elasticity in Framing Materials table

For i studs at one end and j at the other, $A = 2ij / (i + j) \times \text{area of one stud}$, based on Ex. C4.3.4-3

Shear = $vh / 1000 Ga$; Ga = Factor x $v_w / (\text{Factor} \times v_w / G_{vtv} + 0.75 en)$, adapted from SDPWS Ex. C4.3.4-1.

Factor = $P_s / P_m / 0.6$ for WSP, 1.0 for other materials.

v_w = ASD sheathing capacity.

G_{vtv} = Shear stiffness from C4.3.4, shown in Sheathing Materials table.

en = Nail slip from Table C4.2.3D of form aV_n^b for WSP, varies linearly to value at capacity for other materials.

P_s = Serviceability wind pressure; P_m = MWFRS wind pressure.

V_n = Serviceability force per nail along panel edge at ASD capacity = Factor x v_w .

Hold – Anchorage system (hold-down) = $d_a \times h / beff$.

d_a = Vertical hold-down displacement; refer to Hold-down Displacement table for components.

$beff$ = Effective wall segment length = $b - (\text{tension stud pack width} + \text{hold-down anchor bolt offset}) - (1/2 \text{ compression stud pack width})$ $beff$ is given in the Shear Wall Dimensions table.

For FTAO walls, hold-down device at end of wall is applied to all segments, as per APA T555.

Total Defl – Deflection from bending + shear + hold-down, as per Eqn. 4.3-2.

For FTAO walls, the average of the values for the segments, as per APA T555.

WARNING - On shearline(s) A the program was unable to equalize deflections on the shearwall segments. Change design setting to capacity-based rigidity, or turn off the distribution to segments based on rigidity.

MWFRS HOLD-DOWN DISPLACEMENT (flexible wind design)*These displacements are used to determine deflections for force distribution*

Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 1													
Line 1													
1-1,1	S->N	HDU5-SDS	4940	.101	.005	0.105	-	-	.248	6007	0.02	0.37	0.31
	N->S	HDU5-SDS	6606	.135	.006	0.141	-	-	.248	7611	0.02	0.41	0.34
1-1,2	S->N	HDU5-SDS	15	.000	.000	0.000	-	-	.248	7544	0.02	0.27	0.64
	N->S	HDU5-SDS	0	.000	.000	0.000	-	-	.000	405	0.00	0.00	-
1-1,3	S->N	HDU5-SDS	416	.008	.000	0.009	-	-	.248	8088	0.02	0.28	0.29
	N->S	HDU5-SDS	5335	.109	.005	0.114	-	-	.248	-277	0.00	0.36	0.37
Line 2													
2-1,1	S->N	HDU5-SDS	1440	.029	.001	0.031	-	-	.248	1650	0.00	0.28	0.92
	N->S	HDU5-SDS	33	.001	.000	0.001	-	-	.248	211	0.00	0.25	0.81
2-1,2	S->N	HDU5-SDS	4445	.091	.004	0.095	-	-	.248	5045	0.01	0.36	0.26
	N->S	HDU5-SDS	4793	.098	.005	0.102	-	-	.248	5424	0.01	0.36	0.26
Line 3													
3-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
3-1,2	S->N	HDU5-SDS	5696	.116	.005	0.121	-	-	.248	3664	0.01	0.38	0.33
	N->S	HDU5-SDS	2650	.054	.003	0.057	-	-	.248	7609	0.02	0.32	0.29
3-1,3	S->N	HDU5-SDS	7076	.144	.007	0.151	-	-	.248	8431	0.03	0.42	0.46
	N->S	HDU5-SDS	6371	.130	.006	0.136	-	-	.248	7752	0.02	0.40	0.44
Line A													
A-1,1	W->E	HDU5-SDS	721	.015	.001	0.015	-	-	.248	1353	0.00	0.27	0.42
	E->W	HDU5-SDS	226	.005	.000	0.005	-	-	.248	3278	0.01	0.26	0.41
A-1,2	W->E	HDU5-SDS	967	.020	.001	0.021	-	-	.248	3666	0.01	0.28	0.37
	E->W	HDU5-SDS	1243	.025	.001	0.026	-	-	.248	2438	0.01	0.28	0.37
A-1,3	W->E	HDU5-SDS	448	.009	.000	0.010	-	-	.248	1712	0.00	0.26	0.41
	E->W	HDU5-SDS	43	.001	.000	0.001	-	-	.248	1324	0.00	0.25	0.39
A-1,4	W->E	HDU5-SDS	3146	.064	.003	0.067	-	-	.248	5281	0.01	0.33	0.34
	E->W	HDU5-SDS	1793	.037	.002	0.038	-	-	.248	4591	0.01	0.30	0.31
A-1,5	W->E	HDU5-SDS	178	.004	.000	0.004	-	-	.248	1327	0.00	0.25	0.83
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
Line B													
B-1,1	W->E	HDU5-SDS	457	.009	.000	0.010	-	-	.248	668	0.00	0.26	0.85
	E->W	HDU5-SDS	72	.001	.000	0.002	-	-	.248	250	0.00	0.25	0.82
B-1,2	W->E	HDU5-SDS	1205	.025	.001	0.026	-	-	.248	1905	0.01	0.28	0.17
	E->W	HDU5-SDS	1316	.027	.001	0.028	-	-	.248	2048	0.01	0.28	0.17
Line C													
C-1,1	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
	E->W	HDU5-SDS	205	.004	.000	0.004	-	-	.248	775	0.00	0.25	0.83
C-1,2	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1519	0.00	0.00	0.01
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	286	0.00	0.00	0.00
C-1,3	W->E	HDU5-SDS	639	.013	.001	0.014	-	-	.248	3032	0.01	0.27	0.23
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	375	0.00	0.00	-
C-1,4	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	2168	0.01	0.01	0.01
	E->W	HDU5-SDS	1737	.035	.002	0.037	-	-	.248	3249	0.01	0.29	0.34
C-1,5	W->E	HDU5-SDS	689	.022	.001	0.023	-	-	.248	2126	0.00	0.27	0.32
	E->W	HDU5-SDS	44	.000	.000	0.000	-	-	.000	1145	0.00	0.00	0.00
C-1,6	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	965	0.00	0.00	0.00
	E->W	HDU5-SDS	531	.011	.001	0.011	-	-	.248	1972	0.01	0.26	0.16
Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 2													
Line 1													
1-1,2	S->N	HDU5-SDS	6244	.254	.002	0.256	-	-	.248	7244	0.02	0.52	0.39
	N->S	HDU5-SDS	6412	.261	.002	0.263	-	-	.248	7524	0.02	0.53	0.39
Line 3													
3-1,1	S->N	HDU5-SDS	1714	.070	.000	0.070	-	-	.248	2266	0.01	0.32	0.49
	N->S	HDU5-SDS	1680	.068	.000	0.069	-	-	.248	2152	0.01	0.32	0.49
3-1,2	S->N	HDU5-SDS	765	.031	.000	0.031	-	-	.248	1373	0.00	0.28	0.53
	N->S	HDU5-SDS	766	.031	.000	0.031	-	-	.248	1374	0.00	0.28	0.53
3-1,3	S->N	HDU5-SDS	5046	.206	.001	0.207	-	-	.248	5870	0.02	0.47	0.35
	N->S	HDU5-SDS	5123	.209	.001	0.210	-	-	.248	6027	0.02	0.47	0.35
Line A													
A-1,1	W->E	HDU5-SDS	591	.024	.000	0.024	-	-	.248	943	0.00	0.27	0.80
	E->W	HDU5-SDS	2289	.093	.001	0.094	-	-	.248	2577	0.01	0.35	1.01
A-1,2	W->E	HDU5-SDS	343	.014	.000	0.014	-	-	.248	935	0.00	0.26	0.56
	E->W	HDU5-SDS	2149	.088	.001	0.088	-	-	.248	2709	0.01	0.34	0.73
A-1,3	W->E	HDU5-SDS	817	.033	.000	0.034	-	-	.248	1865	0.00	0.29	0.40
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	851	0.00	0.00	0.00

MWFRS HOLD-DOWN DISPLACEMENT (flexible wind design, continued)

A-1, 4	W->E	HDU5-SDS	855	.035	.000	0.035	-	-	.248	1607	0.00	0.29	0.48
	E->W	HDU5-SDS	158	.006	.000	0.006	-	-	.248	1070	0.00	0.26	0.43
A-1, 5	W->E	HDU5-SDS	974	.040	.000	0.040	-	-	.248	1526	0.00	0.29	0.49
	E->W	HDU5-SDS	184	.007	.000	0.008	-	-	.248	720	0.00	0.26	0.43
A-1, 6	W->E	HDU5-SDS	19	.001	.000	0.001	-	-	.248	1075	0.00	0.25	0.14
	E->W	HDU5-SDS	123	.005	.000	0.005	-	-	.248	1243	0.00	0.26	0.14
Line C													
C-1, 1	W->E	HDU5-SDS	883	.036	.000	0.036	-	-	.248	1303	0.00	0.29	0.48
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	203	0.00	0.00	0.00
C-1, 2	W->E	HDU5-SDS	969	.039	.000	0.040	-	-	.248	1633	0.00	0.29	0.28
	E->W	HDU5-SDS	835	.034	.000	0.034	-	-	.248	1515	0.00	0.29	0.28
C-1, 3	W->E	HDU5-SDS	838	.034	.000	0.034	-	-	.248	1898	0.01	0.29	0.28
	E->W	HDU5-SDS	600	.024	.000	0.025	-	-	.248	1492	0.00	0.28	0.27
C-1, 4	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	260	0.00	0.00	0.00
	E->W	HDU5-SDS	698	.028	.000	0.029	-	-	.248	1726	0.00	0.28	0.29
C-1, 5	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	412	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	237	0.00	0.00	0.00
C-1, 6	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	547	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	801	0.00	0.00	0.00

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B

Dir – Force direction

Tens., Comp. – Accumulated ASD hold-down tension force T and end stud compression force C from overturning, dead and wind uplift loads.

da – Vertical displacements due to the following components:

Vert. Displacement – Elongation when slippage calculated separately; displacement when combined elongation/slippage used

Manuf – Using manufacturer's value for anchor bolt length, or no bolt contribution for connector-only elongation

Unless marked with * = (ASD tension force / ASD hold-down capacity) x max ASD elongation or displacement

* - Maximum strength-level elongation or displacement is used. May result in higher than actual displacements for lightly loaded hold-downs, causing the segment to draw less force due to lower than actual stiffness.

Add – Due to longer anchor bolt length than manufacturer's value, or entire bolt length for connector-only elongation = $TL / (Ab \times Es)$

Ab = bolt cross-sectional area

Es = steel modulus = 29000000 psi

L = Lb – Lh

Lb = Total bolt length shown in Storey Information table

Lh = Manufacturer's anchor bolt length for given displacement/elongation from hold-down database

Slippage – Due to vertical slippage of hold-down fasteners attached to stud(s) when not combined with elongation

Nails = en from SDPWS Table C4.2.3D using values for wood structural panels

Bolts = $V_f / (270,000 D^{1.5})$ (NDS 11.3.6); D = bolt diameter, V_f = Tension force T / number of fasteners

Shrink + Extra – Wood shrinkage plus extra displacement due to mis-cuts, gaps, etc.

Shrinkage = $0.002 \times (19\% \text{ fabrication} - 10\% \text{ in-service moisture contents}) \times L_s$

Ls = Length between anchor bolt fasteners subject to perp-to-grain shrinkage; see Story Information table

Crush – Deformation of bottom plate at compression end of wall segment

= $0.02'' \times [r / 0.73, r < 0.73; (1 + (r - 0.73) / 0.27), 0.73 < r < 1; 2r^3, r > 1]$

$r = f_{cp} / F_{cp}'$; $F_{cp}' = C_t CM F_{cp}$; $f_{cp} = C / A$, A = cross sectional area of end studs

Total da – Vert. Displacement + Slippage + Shrink + Crush + Extra

Horz Defl – Anchorage deflection term in SDPWS Eqn. C.4.3.4-1 = $h / beff \times da$

h = Wall height. For end segments in FTAO walls, h is the average of the wall height and the distance from the bottom of opening to top of wall

beff = Effective wall segment length = b - (tension stud pack width + hold-down anchor bolt offset) - (1/2 compression stud pack width)

h and b are shown in Deflection table, beff in the Shear Wall Dimensions table

SERVICEABILITY HOLD-DOWN DISPLACEMENT (flexible wind design)*These displacements are used to determine deflections for story drift*

Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 1													
Line 1													
1-1,1	S->N	HDU5-SDS	4940	.138	.006	0.144	-	-	.248	5638	0.04	0.43	0.36
	N->S	HDU5-SDS	6606	.135	.006	0.141	-	-	.248	7281	0.02	0.41	0.34
1-1,2	S->N	HDU5-SDS	15	.000	.000	0.000	-	-	.000	7218	0.00	0.00	-
	N->S	HDU5-SDS	0	.000	.000	0.000	-	-	.000	240	0.00	0.00	-
1-1,3	S->N	HDU5-SDS	416	.011	.001	0.012	-	-	.248	7802	0.01	0.27	0.28
	N->S	HDU5-SDS	5335	.109	.005	0.114	-	-	.248	-607	0.00	0.36	0.37
Line 2													
2-1,1	S->N	HDU5-SDS	1440	.000	.000	0.000	-	-	.000	1563	0.00	0.00	-
	N->S	HDU5-SDS	33	.000	.000	0.000	-	-	.000	176	0.00	0.00	-
2-1,2	S->N	HDU5-SDS	4445	.091	.004	0.095	-	-	.248	4839	0.01	0.35	0.26
	N->S	HDU5-SDS	4793	.099	.005	0.103	-	-	.248	5182	0.01	0.37	0.26
Line 3													
3-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
3-1,2	S->N	HDU5-SDS	5696	.117	.005	0.122	-	-	.248	3214	0.01	0.38	0.33
	N->S	HDU5-SDS	2650	.054	.003	0.057	-	-	.248	7151	0.02	0.32	0.28
3-1,3	S->N	HDU5-SDS	7076	.143	.007	0.150	-	-	.248	7990	0.02	0.42	0.46
	N->S	HDU5-SDS	6371	.130	.006	0.136	-	-	.248	7295	0.02	0.40	0.44
Line A													
A-1,1	W->E	HDU5-SDS	721	.030	.001	0.031	-	-	.248	916	0.01	0.29	0.45
	E->W	HDU5-SDS	226	.004	.000	0.004	-	-	.248	3214	0.01	0.26	0.41
A-1,2	W->E	HDU5-SDS	967	.030	.001	0.032	-	-	.248	3215	0.02	0.30	0.39
	E->W	HDU5-SDS	1243	.025	.001	0.027	-	-	.248	1999	0.01	0.28	0.37
A-1,3	W->E	HDU5-SDS	448	.014	.001	0.015	-	-	.248	1303	0.00	0.26	0.41
	E->W	HDU5-SDS	43	.001	.000	0.001	-	-	.248	1013	0.00	0.25	0.39
A-1,4	W->E	HDU5-SDS	3146	.083	.004	0.087	-	-	.248	4400	0.02	0.35	0.36
	E->W	HDU5-SDS	1793	.037	.002	0.038	-	-	.248	4080	0.01	0.30	0.31
A-1,5	W->E	HDU5-SDS	178	.000	.000	0.000	-	-	.000	1214	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
Line B													
B-1,1	W->E	HDU5-SDS	457	.000	.000	0.000	-	-	.000	595	0.00	0.00	-
	E->W	HDU5-SDS	72	.000	.000	0.000	-	-	.000	214	0.00	0.00	-
B-1,2	W->E	HDU5-SDS	1205	.025	.001	0.027	-	-	.248	1718	0.00	0.28	0.17
	E->W	HDU5-SDS	1316	.027	.001	0.028	-	-	.248	1827	0.00	0.28	0.17
Line C													
C-1,1	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
	E->W	HDU5-SDS	205	.000	.000	0.000	-	-	.000	655	0.00	0.00	-
C-1,2	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1374	0.00	0.00	0.01
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	243	0.03	0.03	0.06
C-1,3	W->E	HDU5-SDS	639	.000	.000	0.000	-	-	.000	2621	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	374	0.00	0.00	-
C-1,4	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1729	0.00	0.00	0.01
	E->W	HDU5-SDS	1737	.000	.000	0.000	-	-	.000	2807	0.00	0.00	-
C-1,5	W->E	HDU5-SDS	689	.000	.000	0.000	-	-	.000	1805	0.00	0.00	-
	E->W	HDU5-SDS	44	.000	.000	0.000	-	-	.000	1023	0.08	0.08	0.10
C-1,6	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	985	0.01	0.01	0.01
	E->W	HDU5-SDS	531	.010	.000	0.010	-	-	.248	1485	0.00	0.26	0.16
Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 2													
Line 1													
1-1,2	S->N	HDU5-SDS	6244	.254	.002	0.256	-	-	.248	6938	0.02	0.52	0.39
	N->S	HDU5-SDS	6412	.261	.002	0.263	-	-	.248	7104	0.02	0.53	0.39
Line 3													
3-1,1	S->N	HDU5-SDS	1714	.069	.000	0.070	-	-	.248	2069	0.01	0.32	0.49
	N->S	HDU5-SDS	1680	.068	.000	0.068	-	-	.248	2035	0.01	0.32	0.49
3-1,2	S->N	HDU5-SDS	765	.029	.000	0.029	-	-	.248	1204	0.00	0.28	0.53
	N->S	HDU5-SDS	766	.030	.000	0.030	-	-	.248	1205	0.00	0.28	0.53
3-1,3	S->N	HDU5-SDS	5046	.207	.001	0.208	-	-	.248	5615	0.02	0.47	0.35
	N->S	HDU5-SDS	5123	.210	.001	0.211	-	-	.248	5691	0.02	0.47	0.35
Line A													
A-1,1	W->E	HDU5-SDS	591	.000	.000	0.000	-	-	.000	819	0.00	0.00	-
	E->W	HDU5-SDS	2289	.000	.000	0.000	-	-	.000	2494	0.00	0.00	-
A-1,2	W->E	HDU5-SDS	343	.000	.000	0.000	-	-	.000	765	0.00	0.00	-
	E->W	HDU5-SDS	2149	.000	.000	0.000	-	-	.000	2545	0.00	0.00	-
A-1,3	W->E	HDU5-SDS	817	.000	.000	0.000	-	-	.000	1540	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	837	0.00	0.00	-

SERVICEABILITY HOLD-DOWN DISPLACEMENT (flexible wind design, continued)

A-1, 4	W->E	HDU5-SDS	855	.009	.000	0.009	-	-	.248	1459	0.00	0.26	0.43
	E->W	HDU5-SDS	158	.090	.001	0.091	-	-	.248	771	0.09	0.43	0.72
A-1, 5	W->E	HDU5-SDS	974	.000	.000	0.000	-	-	.000	1363	0.00	0.00	-
	E->W	HDU5-SDS	184	.001	.000	0.001	-	-	.248	584	0.00	0.25	0.42
A-1, 6	W->E	HDU5-SDS	19	.004	.000	0.004	-	-	.248	823	0.01	0.26	0.14
	E->W	HDU5-SDS	123	.012	.000	0.012	-	-	.248	926	0.01	0.27	0.14
Line C													
C-1, 1	W->E	HDU5-SDS	883	.000	.000	0.000	-	-	.000	1167	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	203	0.01	0.01	0.01
C-1, 2	W->E	HDU5-SDS	969	.000	.000	0.000	-	-	.000	1452	0.00	0.00	-
	E->W	HDU5-SDS	835	.000	.000	0.000	-	-	.000	1320	0.00	0.00	-
C-1, 3	W->E	HDU5-SDS	838	.000	.000	0.000	-	-	.000	1548	0.00	0.00	-
	E->W	HDU5-SDS	600	.000	.000	0.000	-	-	.000	1314	0.00	0.00	-
C-1, 4	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	247	0.00	0.00	0.00
	E->W	HDU5-SDS	698	.000	.000	0.000	-	-	.000	1386	0.00	0.00	-
C-1, 5	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	377	0.01	0.01	0.01
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	236	0.01	0.01	0.01
C-1, 6	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	535	0.01	0.01	0.01
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	739	0.01	0.01	0.01

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B

Dir – Force direction

Tens., Comp. – Accumulated ASD hold-down tension force T and end stud compression force C from overturning, dead and wind uplift loads.

Compression force uses load combination D + Wa from ASCE 7 CC.2.2.

Tens. – ASD-factored force, used for proportion of manufacturer's maximum elongation

Comp. – Uses D + Wa from ASCE 7 CC.2.2; Wa = wind load based on serviceability wind speeds from Figs. CC.2-1 - CC.2-4

da – Vertical displacements due to the following components:

Vert. Displacement – Elongation when slippage calculated separately; displacement when combined elongation/slippage used

Manuf – Using manufacturer's value for anchor bolt length, or no bolt contribution for connector-only elongation

Unless marked with * = (ASD tension force / ASD hold-down capacity) x max strength-level elongation or displacement

* - Maximum strength-level elongation or displacement is used. May result in higher than actual displacements for lightly loaded hold-downs, causing the segment to draw less force due to lower than actual stiffness.

Add – Due to longer anchor bolt length than manufacturer's value, or entire bolt length for connector-only elongation = $TL / (Ab \times Es)$

T = Tension force using D + Wa serviceability load combination (not shown however usually same as Comp. C)

Ab = bolt cross-sectional area

Es = steel modulus = 29000000 psi

L = Lb – Lh

Lb = Total bolt length shown in Storey Information table

Lh = Manufacturer's anchor bolt length for given displacement/elongation from hold-down database

Slippage – Due to vertical slippage of hold-down fasteners attached to stud(s) when not combined with elongation

Nails = en from SDPWS Table C4.2.3D using values for wood structural panels

Bolts = $Vf / (270,000 D^{1.5})$ (NDS 11.3.6); D = bolt diameter, Vf = Tension force T / number of fasteners

Shrink + Extra – Wood shrinkage plus extra displacement due to mis-cuts, gaps, etc.

Shrinkage = $0.002 \times (19\% \text{ fabrication} - 10\% \text{ in-service moisture contents}) \times Ls$

Ls = Length between anchor bolt fasteners subject to perp-to-grain shrinkage; see Story Information table

Crush – Deformation of bottom plate at compression end of wall segment

= $0.02'' \times [r / 0.73, r < 0.73; (1 + (r - 0.73) / 0.27), 0.73 < r < 1; 2r^3, r > 1]$

$r = fcp / Fcp'$; $Fcp' = Ct CM Fcp$; $fcp = C / A$, A = cross sectional area of end studs

Total da – Vert. Displacement + Slippage + Shrink + Crush + Extra

Horz Defl – Anchorage deflection term in SDPWS Eqn. C.4.3.4-1 = $h / beff \times da$

h = Wall height. For end segments in FTAO walls, h is the average of the wall height and the distance from the bottom of opening to top of wall

beff = Effective wall segment length = b - (tension stud pack width + hold-down anchor bolt offset) - (1/2 compression stud pack width)

h and b are shown in Deflection table, beff in the Shear Wall Dimensions table

STORY DRIFT (flexible wind design)

Level	Dir	Actual Story Drift (in)		Allowable Story Drift		
		Max defl	Line	hs ft	Drift in	Ratio
1	N<->S	0.49	1	9.83	0.24	2.09*
	E<->W	0.43	A		0.24	1.84*
2	N<->S	0.57	3	8.00	0.19	2.96*
	E<->W	0.81	A		0.19	4.22*

Legend:

Max defl – Largest deflection for any shearline on level in this direction; refer to Serviceability Deflections table

Line – Shearline with largest deflection on level in this direction

hs – Story height = Height of walls plus joist depth between this level and the one above.

Drift = Allowable story drift on this level = story height / 500

Ratio - Proportion of allowable story drift experienced, on this level in this direction.

Notes:

*FAILURE – Story drift on this level is greater than maximum allowed.

Rigid Diaphragm Wind Design
ASCE 7 Directional (All Heights) Loads

 SHEAR RESULTS

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]						Resp. Ratio
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line 1														
Level 2														
Ln1, Lev2	-	Both	-	-	9014	-	-	-	-	-	-	-	15070	-
Wall 1-1	2	Both	-	-	9014	1.0	1.0	685	685	-	A	-	15070	-
Seg. 1	-	Both	0.0	-	0	1.0	1.0	685	685	-	-	1370	-	-
Seg. 2	-	Both	819.4	-	9014	1.0	1.0	685	685	-	-	1370	15070	0.60
Seg. 3	-	Both	0.0	-	0	1.0	1.0	685	685	-	-	1370	-	-
Seg. 4	-	Both	0.0	-	0	1.0	1.0	685	685	-	-	1370	-	-
Level 1														
Ln1, Lev1	-	S->N	-	-	14228	-	-	-	-	-	-	-	32709	-
	-	N->S	-	-	13636	-	-	-	-	-	-	-	32709	-
Wall 1-1	2	S->N	-	-	14228	1.0	1.0	685	685	-	A	-	32709	-
	2	N->S	-	-	13636	1.0	1.0	685	685	-	A	-	32709	-
Seg. 1	-	S->N	627.1	-	6898	1.0	1.0	685	685	-	-	1370	15070	0.46
	-	N->S	747.5	-	8223	1.0	1.0	685	685	-	-	1370	15070	0.55
Seg. 2	-	S->N	49.7	-	199	.97	.97	664	664	-	-	1327	5309	0.04
	-	N->S	0.0	-	0	.97	.97	664	664	-	-	1327	5309	0.00
Seg. 3	-	S->N	792.4	-	7131	1.0	1.0	685	685	-	-	1370	12330	0.58
	-	N->S	601.5	-	5413	1.0	1.0	685	685	-	-	1370	12330	0.44
Line 2														
Level 2														
Ln2, Lev1	-	S->N	-	-	6863	-	-	-	-	-	-	-	12454	-
	-	N->S	-	-	7552	-	-	-	-	-	-	-	12454	-
Wall 2-1	3	S->N	-	-	6863	1.0	1.0	125	685	-	A	-	12454	-
	3^	N->S	-	-	7552	1.0	1.0	125	685	-	A	-	12454	-
Seg. 1	-	S->N	6.7	-	20	.88	.88	109	599	-	-	709	2126	0.01
	-	N->S	9.2	-	28	.88	.88	109	599	-	-	709	2126	0.01
Seg. 2	-	S->N	536.7	-	6843	1.0	1.0	125	685	-	-	810	10328	0.66
	-	N->S	590.1	-	7524	1.0	1.0	125	685	-	-	810	10328	0.73
Line 3														
Level 2														
Ln3, Lev2	-	Both	-	-	9056	-	-	-	-	-	-	-	14385	-
Wall 3-1	1^	Both	-	-	9056	-	1.0	-	685	-	-	-	14385	-
Seg. 1	-	Both	226.2	-	1244	-	1.0	-	685	-	-	685	3768	0.33
Seg. 2	-	Both	111.6	-	502	-	1.0	-	685	-	-	685	3083	0.16
Seg. 3	-	Both	664.5	-	7310	-	1.0	-	685	-	-	685	7535	0.97
Level 1														
Ln3, Lev1	-	S->N	-	-	10944	-	-	-	-	-	-	-	29626	-
	-	N->S	-	-	10848	-	-	-	-	-	-	-	29626	-
Wall 3-1	2	S->N	-	-	10944	1.0	1.0	685	685	-	A	-	29626	-
	2	N->S	-	-	10848	1.0	1.0	685	685	-	A	-	29626	-
Seg. 1	-	Both	0.0	-	0	.88	.88	599	599	-	-	1199	3596	0.00
Seg. 2	-	S->N	861.5	-	9046	1.0	1.0	685	685	-	-	1370	14385	0.63
	-	N->S	910.6	-	9561	1.0	1.0	685	685	-	-	1370	14385	0.66
Seg. 3	-	S->N	223.3	-	1898	1.0	1.0	685	685	-	-	1370	11645	0.16
	-	N->S	151.4	-	1287	1.0	1.0	685	685	-	-	1370	11645	0.11
E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]						Resp. Ratio
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line A														
Level 2														
LnA, Lev2	-	Both	-	-	2192	-	-	-	-	-	-	-	25859	-
Wall A-1	1	Both	-	-	2192	-	1.0	-	685	-	-	-	25859	-
Seg. 1	-	Both	5.0	-	15	-	.92	-	628	-	-	628	1884	0.01
Seg. 2	-	Both	115.3	-	461	-	1.0	-	685	-	-	685	2740	0.17
Seg. 3	-	Both	4.1	-	24	-	1.0	-	685	-	-	685	4110	0.01
Seg. 4	-	Both	101.1	-	505	-	1.0	-	685	-	-	685	3425	0.15
Seg. 5	-	Both	101.1	-	505	-	1.0	-	685	-	-	685	3425	0.15
Seg. 6	-	Both	45.4	-	681	-	1.0	-	685	-	-	685	10275	0.07
Level 1														
LnA, Lev1	-	W->E	-	-	3259	-	-	-	-	-	-	-	20978	-
	-	E->W	-	-	3264	-	-	-	-	-	-	-	20978	-
Wall A-1	1	W->E	-	-	3259	-	1.0	-	685	-	-	-	20978	-
	1	E->W	-	-	3264	-	1.0	-	685	-	-	-	20978	-
Seg. 1	-	W->E	35.3	-	212	-	1.0	-	685	-	-	685	4110	0.05
	-	E->W	9.0	-	54	-	1.0	-	685	-	-	685	4110	0.01
Seg. 2	-	W->E	118.4	-	829	-	1.0	-	685	-	-	685	4795	0.17
	-	E->W	39.9	-	280	-	1.0	-	685	-	-	685	4795	0.06

SHEAR RESULTS (rigid wind design, continued)

Seg. 3	-	W->E	39.5	-	237	-	1.0	-	685	-	685	4110	0.06
	-	E->W	360.5	-	2163	-	1.0	-	685	-	685	4110	0.53
Seg. 4	-	W->E	220.1	-	1981	-	1.0	-	685	-	685	6165	0.32
	-	E->W	83.1	-	748	-	1.0	-	685	-	685	6165	0.12
Seg. 5	-	W->E	0.0	-	0	-	.88	-	599	-	599	1798	0.00
	-	E->W	6.3	-	19	-	.88	-	599	-	599	1798	0.01
Line B													
LnB, Lev1	-	W->E	-	-	3224	-	-	-	-	-	-	12130	-
	-	E->W	-	-	3202	-	-	-	-	-	-	12130	-
Wall B-1	1	W->E	-	-	3224	-	1.0	-	685	-	-	12130	-
	1	E->W	-	-	3202	-	1.0	-	685	-	-	12130	-
Seg. 1	-	W->E	213.2	-	640	-	.88	-	599	-	599	1798	0.36
	-	E->W	16.3	-	49	-	.88	-	599	-	599	1798	0.03
Seg. 2	-	W->E	171.3	-	2584	-	1.0	-	685	-	685	10332	0.25
	-	E->W	209.1	-	3153	-	1.0	-	685	-	685	10332	0.31
Line C													
Level 2													
LnC, Lev2	-	Both	-	-	5017	-	-	-	-	-	-	31853	-
Wall C-1	1	Both	-	-	5017	-	1.0	-	685	-	-	31853	-
Seg. 1	-	Both	18.6	-	93	-	1.0	-	685	-	685	3425	0.03
Seg. 2	-	Both	99.0	-	841	-	1.0	-	685	-	685	5823	0.14
Seg. 3	-	Both	99.0	-	841	-	1.0	-	685	-	685	5823	0.14
Seg. 4	-	Both	68.6	-	549	-	1.0	-	685	-	685	5480	0.10
Seg. 5	-	Both	44.2	-	243	-	1.0	-	685	-	685	3768	0.06
Seg. 6	-	Both	222.8	-	2451	-	1.0	-	685	-	685	7535	0.33
Level 1													
LnC, Lev1	-	W->E	-	-	5972	-	-	-	-	-	-	33223	-
	-	E->W	-	-	5989	-	-	-	-	-	-	33223	-
Wall C-1	1	W->E	-	-	5972	-	1.0	-	685	-	-	33223	-
	1	E->W	-	-	5989	-	1.0	-	685	-	-	33223	-
Seg. 1	-	W->E	23.3	-	70	-	.88	-	599	-	599	1798	0.04
	-	E->W	0.0	-	0	-	.88	-	599	-	599	1798	0.00
Seg. 2	-	W->E	249.8	-	999	-	.97	-	664	-	664	2654	0.38
	-	E->W	9.0	-	36	-	.97	-	664	-	664	2654	0.01
Seg. 3	-	W->E	44.2	-	487	-	1.0	-	685	-	685	7535	0.06
	-	E->W	104.7	-	1152	-	1.0	-	685	-	685	7535	0.15
Seg. 4	-	W->E	325.8	-	2606	-	1.0	-	685	-	685	5480	0.48
	-	E->W	150.0	-	1200	-	1.0	-	685	-	685	5480	0.22
Seg. 5	-	Both	0.0	-	0	-	1.0	-	685	-	685	5480	0.00
Seg. 6	-	W->E	120.7	-	1810	-	1.0	-	685	-	685	10275	0.18
	-	E->W	240.1	-	3602	-	1.0	-	685	-	685	10275	0.35

Legend:

W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "-" means that this wall is critical for all walls in the Standard Wall group.

For Dir - Direction of wind force along shearline.

v - Design shear force on segment = ASD-factored shear force per unit length of full-height sheathing (FHS)

vmax/vft - Perforated walls: Collector and in-plane anchorage force as per SDPWS eqn. 4.3-9 = V/FHS/Co. FHS is factored for narrow segments as per 4.3.3.4

FTAO walls: Shear force in piers above and below either openings or piers beside opening(s). Aspect ratio factor does not apply to these piers.

V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment

Asp/Cub - Unblocked wood structural panel factor Cub from SDPWS 4.3.5.3 or Aspect Ratio factor from 4.3.3.2, which for perforated walls is sum bi / FHS from 4.3.5.6 with bi defined in 4.3.3.4. For multi-segment walls, wall row shows Cub and segment rows show Asp. For single-segment walls and perforated walls, value shown is Asp for blocked walls and Cub for unblocked walls.

Int, Ext - Nominal unit shear capacity of interior and exterior sheathing, factored by Table 4.3-1 Note 3 for framing specific gravity and Note 10 for presence of hold-downs. For wall segments, also include unblocked factor Cub and aspect ratio adjustments.

Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-6.

C - Sheathing combination rule, A = Add capacities, S = Strongest side or twice weakest, G = Stiffness-based using Eqns. 4.3-3,-4.

Cmb - Combined interior and exterior unit shear capacity including perforated wall factor Co.

V - Total factored shear capacity of shearline, wall or segment.

Crit Resp - Response ratio = v/Cmb = design shear force/unit shear capacity. "S" indicates that the seismic design criterion was critical in selecting wall.

Notes:

Refer to Elevation View diagrams for individual level for uplift anchorage force t for perforated walls given by SDPWS 4.3.6.4.2,1.

Hold-Down and Compression Design (rigid wind design)

Level 1					Tensile Hold-down or Compressive Stud Force [lbs]				Hold-down	Cap [lbs]	Crit Resp.
Line- Wall	Posit'n	Location [ft]		Load Case	Shear	Dead	Uplift	Cmb'd			
		X	Y								
Line 1											
1-1	L End	0.00	0.12	1	5775	343		5433	HDU5-SDS	5645	0.96
1-1	L End	0.00	0.12	1	6884	571		7455	Compression	10312	0.72
	V Elem	0.00	10.13	1	6708	264		6444	Refer to upper level		
	V Elem	0.00	10.13	1	6708	440		7148	Compression		
1-1	L Op 1	0.00	10.88	1	6884	299		6585	HDU5-SDS	5645	1.17*
1-1	L Op 1	0.00	10.88	1	5775	499		6274	Compression	10312	0.61
1-1	R Op 1	0.00	16.13	1	477	108		369	HDU5-SDS	5645	0.07
	V Elem	0.00	19.88	1	3773	257		3517	Refer to upper level		
1-1	L Op 2	0.00	19.88	1	4250	428		4677	Compression		
1-1	R Op 2	0.00	22.13	1	4400	433		3967	HDU5-SDS	5645	0.70
1-1	R Op 2	0.00	22.13	1	2633	722		3355	Compression	10312	0.33
1-1	R End	0.00	30.88	1	5568	264		5303	HDU5-SDS	5645	0.94
1-1	R End	0.00	30.88	1	7335	441		7775	Compression	10312	0.75
Line 2											
2-1	L End	46.92	0.12	1	66	49		17	HDU5-SDS	5645	0.00
2-1	L End	46.92	0.12	1	90	81		171	Compression	10312	0.02
2-1	L Op 1	46.92	2.88	1	90	49		42	HDU5-SDS	5645	0.01
2-1	L Op 1	46.92	2.88	1	66	81		147	Compression	10312	0.01
2-1	R Op 1	46.92	6.13	1	4927	207		4721	HDU5-SDS	5645	0.84
2-1	R Op 1	46.92	6.13	1	5417	344		5761	Compression	10312	0.56
2-1	R End	46.92	18.63	1	5417	207		5211	HDU5-SDS	5645	0.92
2-1	R End	46.92	18.63	1	4927	344		5271	Compression	10312	0.51
Line 3											
	V Elem	68.00	0.12	1	1896	213		1683	Refer to upper level		
	V Elem	68.00	0.12	1	1896	355		2251	Compression		
	V Elem	68.00	2.88	1	895	143		752	Refer to upper level		
	V Elem	68.00	2.88	1	895	239		1134	Compression		
3-1	R Op 1	68.00	7.63	1	6942	353		6589	HDU5-SDS	5645	1.17*
3-1	R Op 1	68.00	7.63	1	7395	589		7983	Compression	10312	0.77
	V Elem	68.00	10.63	1	945	108		837	Refer to upper level		
	V Elem	68.00	10.63	1	945	180		1125	Compression		
	V Elem	68.00	14.88	1	945	108		837	Refer to upper level		
	V Elem	68.00	14.88	1	945	180		1125	Compression		
3-1	L Op 2	68.00	17.87	1	5524	423		5101	HDU5-SDS	5645	0.90
3-1	L Op 2	68.00	17.87	1	5072	705		5776	Compression	10312	0.56
3-1	R Op 2	68.00	22.63	1	4640	354		4285	HDU5-SDS	5645	0.76
3-1	R Op 2	68.00	22.63	1	3973	590		4563	Compression	10312	0.44
3-1	R End	68.00	30.88	1	6844	494		6350	HDU5-SDS	5645	1.12*
3-1	R End	68.00	30.88	1	7511	823		8333	Compression	10312	0.81
Line A											
A-1	L End	0.12	0.00	1	375	248		127	HDU5-SDS	5645	0.02
A-1	L End	0.12	0.00	1	128	73		201	Compression	10312	0.02
	V Elem	2.88	0.00	1	44	44		0	Refer to upper level		
	V Elem	2.88	0.00	1	44	73		116	Compression		
A-1	L Op 1	5.88	0.00	1	376	120		496	Compression	10312	0.05
A-1	R Op 1	14.13	0.00	1	644	303		341	HDU5-SDS	5645	0.06
A-1	R Op 1	14.13	0.00	1	-88	303		214	Compression	10312	0.02
	V Elem	17.13	0.00	1	34	34		-0	Refer to upper level		
	V Elem	17.13	0.00	1	34	57		91	Compression		
A-1	L Op 2	20.88	0.00	1	394	315		79	HDU5-SDS	5645	0.01
A-1	L Op 2	20.88	0.00	1	1126	525		1651	Compression	10312	0.16
A-1	R Op 2	26.13	0.00	1	359	175		184	HDU5-SDS	5645	0.03
A-1	R Op 2	26.13	0.00	1	3373	291		3664	Compression	10312	0.36
A-1	L Op 3	31.88	0.00	1	2973	220		2753	HDU5-SDS	5645	0.49
A-1	L Op 3	31.88	0.00	1	-41	220		179	Compression	10312	0.02
A-1	R Op 3	40.12	0.00	1	2477	305		2172	HDU5-SDS	5645	0.38
A-1	R Op 3	40.12	0.00	1	1208	508		1716	Compression	10312	0.17
	V Elem	40.88	0.00	1	851	120		731	Refer to upper level		
	V Elem	40.88	0.00	1	851	200		1051	Compression		
	V Elem	44.13	0.00	1	851	120		731	Refer to upper level		
	V Elem	44.13	0.00	1	851	200		1051	Compression		
A-1	L Op 4	48.88	0.00	1	1347	630		716	HDU5-SDS	5645	0.13
A-1	L Op 4	48.88	0.00	1	2615	1050		3665	Compression	10312	0.36
	V Elem	65.13	0.00	1	95	95		0	Not required	5645	0.00
A-1	R Op 4	65.13	0.00	1	157	273		430	Compression	10312	0.04
A-1	R End	67.88	0.00	1	431	431		0	Not required	5645	0.00
	V Elem	67.88	0.00	1	369	604		973	Compression	5645	-
Line B											
B-1	L End	47.04	18.67	1	2093	49		2045	HDU5-SDS	5645	0.36
B-1	L End	47.04	18.67	1	160	81		241	Compression	10312	0.02
B-1	L Op 1	49.79	18.67	1	160	49		111	HDU5-SDS	5645	0.02

Hold-Down and Compression Design (rigid wind design, continued)

B-1	L Op 1	49.79	18.67	1	2093	81	2174	Compression	10312	0.21	
B-1	R Op 1	53.04	18.67	1	1568	244	1324	HDU5-SDS	5645	0.23	
B-1	R Op 1	53.04	18.67	1	1913	407	2320	Compression	10312	0.22	
B-1	R End	67.88	18.67	1	1913	244	1669	HDU5-SDS	5645	0.30	
B-1	R End	67.88	18.67	1	1568	407	1975	Compression	10312	0.19	
Line C	C-1	L End	0.12	31.00	1	385	201	184	Refer to upper level		
		V Elem	0.12	31.00	1	156	223	379	Compression		
		V Elem	2.88	31.00	1	59	59	0	Refer to upper level		
	C-1	L Op 1	2.88	31.00	1	288	210	497	Compression		
	C-1	R Op 1	6.13	31.00	1	2300	183	2117	HDU5-SDS	5645	0.38
C-1	R Op 1	6.13	31.00	1	-11	171	160	Compression	10312	0.02	
	V Elem	7.63	31.00	1	816	204	612	Refer to upper level			
	V Elem	7.63	31.00	1	816	340	1156	Compression			
C-1	L Op 2	9.87	31.00	1	86	86	0	Not required	5645	0.00	
C-1	L Op 2	9.87	31.00	1	2398	180	2578	Compression	10312	0.25	
C-1	R Op 2	13.13	31.00	1	407	297	110	HDU5-SDS	5645	0.02	
C-1	R Op 2	13.13	31.00	1	965	495	1459	Compression	10312	0.14	
	V Elem	15.88	31.00	1	816	204	612	Refer to upper level			
	V Elem	15.88	31.00	1	816	340	1156	Compression			
	V Elem	17.63	31.00	1	816	204	612	Refer to upper level			
	V Elem	17.63	31.00	1	816	340	1156	Compression			
C-1	L Op 3	23.88	31.00	1	1271	374	897	HDU5-SDS	5645	0.16	
C-1	L Op 3	23.88	31.00	1	713	623	1336	Compression	10312	0.13	
C-1	R Op 3	27.13	31.00	1	2517	344	2173	HDU5-SDS	5645	0.38	
C-1	R Op 3	27.13	31.00	1	883	573	1456	Compression	10312	0.14	
C-1	L Op 4	34.88	31.00	1	1080	322	757	HDU5-SDS	5645	0.13	
C-1	L Op 4	34.88	31.00	1	2713	537	3250	Compression	10312	0.32	
	V Elem	42.13	31.00	1	253	253	0	Refer to upper level			
	V Elem	42.13	31.00	1	253	159	412	Compression			
	V Elem	45.88	31.00	1	566	192	374	Refer to upper level			
	V Elem	45.88	31.00	1	566	320	886	Compression			
	V Elem	47.63	31.00	1	370	132	238	Refer to upper level			
	V Elem	47.63	31.00	1	370	220	590	Compression			
	V Elem	49.88	31.00	1	15	15	0	Refer to upper level			
	V Elem	49.88	31.00	1	15	288	303	Compression			
C-1	R Op 5	53.13	31.00	1	750	532	218	HDU5-SDS	5645	0.04	
C-1	R Op 5	53.13	31.00	1	1843	886	2729	Compression	10312	0.26	
	V Elem	57.13	31.00	1	1824	264	1560	Refer to upper level			
	V Elem	57.13	31.00	1	1824	440	2264	Compression			
C-1	R End	67.88	31.00	1	4021	669	3352	HDU5-SDS	5645	0.59	
C-1	R End	67.88	31.00	1	2928	1115	4043	Compression	10312	0.39	
Level 2					Tensile Hold-down						
Line-Wall	Posit'n	Location [ft]		Load Case	or Compressive Stud Force [lbs]					Cap	Crit
		X	Y		Shear	Dead	Uplift	Cmb'd	Hold-down	[lbs]	Resp.
Line 1											
1-1	R Op 1	0.00	10.13	1	6708	264		6444	HDU5-SDS	5645	1.14*
1-1	R Op 1	0.00	10.13	1	6708	440		7148	Compression	10312	0.69
1-1	L Op 2	0.00	20.88	1	6708	264		6444	HDU5-SDS	5645	1.14*
1-1	L Op 2	0.00	20.88	1	6708	440		7148	Compression	10312	0.69
Line 3											
3-1	L End	68.00	0.12	1	1896	132		1764	HDU5-SDS	5645	0.31
3-1	L End	68.00	0.12	1	1896	220		2116	Compression	10312	0.21
3-1	L Op 1	68.00	5.38	1	1896	132		1764	HDU5-SDS	5645	0.31
3-1	L Op 1	68.00	5.38	1	1896	220		2116	Compression	10312	0.21
3-1	R Op 1	68.00	10.63	1	945	108		837	HDU5-SDS	5645	0.15
3-1	R Op 1	68.00	10.63	1	945	180		1125	Compression	10312	0.11
3-1	L Op 2	68.00	14.88	1	945	108		837	HDU5-SDS	5645	0.15
3-1	L Op 2	68.00	14.88	1	945	180		1125	Compression	10312	0.11
3-1	R Op 2	68.00	20.13	1	5440	264		5176	HDU5-SDS	5645	0.92
3-1	R Op 2	68.00	20.13	1	5440	440		5880	Compression	10312	0.57
3-1	R End	68.00	30.88	1	5440	264		5176	HDU5-SDS	5645	0.92
3-1	R End	68.00	30.88	1	5440	440		5880	Compression	10312	0.57
Line A											
A-1	L End	0.12	0.00	1	44	44		0	Not required	5645	0.00
A-1	L End	0.12	0.00	1	44	73		116	Compression	10312	0.01
A-1	L Op 1	2.88	0.00	1	44	44		0	Not required	5645	0.00
A-1	L Op 1	2.88	0.00	1	44	73		116	Compression	10312	0.01
A-1	R Op 1	7.13	0.00	1	984	96		888	HDU5-SDS	5645	0.16
A-1	R Op 1	7.13	0.00	1	984	160		1144	Compression	10312	0.11
A-1	L Op 2	10.88	0.00	1	984	96		888	HDU5-SDS	5645	0.16
A-1	L Op 2	10.88	0.00	1	984	160		1144	Compression	10312	0.11
A-1	R Op 2	17.13	0.00	1	34	34		0	Not required	5645	0.00
A-1	R Op 2	17.13	0.00	1	34	57		91	Compression	10312	0.01

Hold-Down and Compression Design (rigid wind design, continued)

A-1	L Op 3	22.88	0.00	1	34	34	0	Not required	5645	0.00
A-1	L Op 3	22.88	0.00	1	34	57	91	Compression	10312	0.01
A-1	R Op 3	36.13	0.00	1	851	120	731	HDU5-SDS	5645	0.13
A-1	R Op 3	36.13	0.00	1	851	200	1051	Compression	10312	0.10
A-1	L Op 4	40.88	0.00	1	851	120	731	HDU5-SDS	5645	0.13
A-1	L Op 4	40.88	0.00	1	851	200	1051	Compression	10312	0.10
A-1	R Op 4	44.13	0.00	1	851	120	731	HDU5-SDS	5645	0.13
A-1	R Op 4	44.13	0.00	1	851	200	1051	Compression	10312	0.10
A-1	L Op 5	48.88	0.00	1	851	120	731	HDU5-SDS	5645	0.13
A-1	L Op 5	48.88	0.00	1	851	200	1051	Compression	10312	0.10
A-1	R Op 5	53.13	0.00	1	369	360	9	HDU5-SDS	5645	0.00
A-1	R Op 5	53.13	0.00	1	369	600	969	Compression	10312	0.09
A-1	R End	67.88	0.00	1	369	360	9	HDU5-SDS	5645	0.00
A-1	R End	67.88	0.00	1	369	600	969	Compression	10312	0.09
Line C										
C-1	L End	0.12	31.00	1	156	120	36	HDU5-SDS	5645	0.01
C-1	L End	0.12	31.00	1	156	200	356	Compression	10312	0.03
C-1	L Op 1	4.88	31.00	1	156	120	36	HDU5-SDS	5645	0.01
C-1	L Op 1	4.88	31.00	1	156	200	356	Compression	10312	0.03
C-1	R Op 1	7.63	31.00	1	816	204	612	HDU5-SDS	5645	0.11
C-1	R Op 1	7.63	31.00	1	816	340	1156	Compression	10312	0.11
C-1	L Op 2	15.88	31.00	1	816	204	612	HDU5-SDS	5645	0.11
C-1	L Op 2	15.88	31.00	1	816	340	1156	Compression	10312	0.11
C-1	R Op 2	17.63	31.00	1	816	204	612	HDU5-SDS	5645	0.11
C-1	R Op 2	17.63	31.00	1	816	340	1156	Compression	10312	0.11
C-1	L Op 3	25.88	31.00	1	816	204	612	HDU5-SDS	5645	0.11
C-1	L Op 3	25.88	31.00	1	816	340	1156	Compression	10312	0.11
C-1	R Op 3	38.13	31.00	1	566	192	374	HDU5-SDS	5645	0.07
C-1	R Op 3	38.13	31.00	1	566	320	886	Compression	10312	0.09
C-1	L Op 4	45.88	31.00	1	566	192	374	HDU5-SDS	5645	0.07
C-1	L Op 4	45.88	31.00	1	566	320	886	Compression	10312	0.09
C-1	R Op 4	47.63	31.00	1	370	132	238	HDU5-SDS	5645	0.04
C-1	R Op 4	47.63	31.00	1	370	220	590	Compression	10312	0.06
C-1	L Op 5	52.88	31.00	1	370	132	238	HDU5-SDS	5645	0.04
C-1	L Op 5	52.88	31.00	1	370	220	590	Compression	10312	0.06
C-1	R Op 5	57.13	31.00	1	1824	264	1560	HDU5-SDS	5645	0.28
C-1	R Op 5	57.13	31.00	1	1824	440	2264	Compression	10312	0.22
C-1	R End	67.88	31.00	1	1824	264	1560	HDU5-SDS	5645	0.28
C-1	R End	67.88	31.00	1	1824	440	2264	Compression	10312	0.22

Legend:

Line-Wall:

At wall or opening – Shearline and wall number

At vertical element – Shearline

Posit'n – Position of stud pack that hold-down is attached to or which is applying compression force:

V Elem – Vertical element: column or strengthened studs required where not at wall end or opening

L or R End – At left or right wall end

L or R Op n – At left or right side of opening n

t @ Op n – Uplift force t at opening n from offset opening in perforated wall above, from SDPWS 4.3.6.4.2.1

Location – Co-ordinates in Plan View

Load Case – Results are for critical load case:

ASCE 7 All Heights: Case 1 or 2 from Fig. 27.3-8

ASCE 7 Low-rise: Windward corner(s) and Case A or B from Fig. 28.3-1

ASCE 7 Minimum loads (27.1.5 / 28.3.4): "Min"

Tensile Hold-down or Compressive Stud Force – Upwards force on hold-down at one end of the wall or downward force on bottom plate under studs at the other end, for each force direction. Includes forces transferred from upper levels.

Shear – Overturning component = $V \times h / b_{eff}$ from SDPWS Eqn. 4.3-7; V = force on segment, ASD-factored by 0.60; h = wall height, b_{eff} = wall segment length – (tension stud pack width + hold-down anchor bolt offset) – ($1/2$ compression stud pack width). For perforated walls = $V \times h / Co$ sum (bi) from SDPWS Eqn. 4.3-8.

Dead – Dead load resisting component, factored for ASD by 0.60 for tension and 1.0 for compression

Uplift – Uplift wind load component, factored for ASD by 0.60

Cmb'd – Sum of ASD-factored overturning, dead and uplift forces. May also include the uplift force t from perforated walls from SDPWS 4.3.6.4.2.1 when openings are staggered.

Hold-down – Device model number from hold-down database; "Compression" for bearing of end stud pack on bottom plate

Cap – Hold-downs: Allowable ASD tension load from database; Compression: allowable ASD bearing force = $C_t CM C_b F_{cp} A$; A = cross sectional area of end studs. Refer to Framing materials table for details

Crit. Resp. – Critical Response = Combined ASD force / Allowable ASD tension load

Notes:

HDU5-SDS2.5 for studs with thickness > 0'-3" and depth > 0'-3.5" : Uses 14 1/4" x 2.5" SDS heavy-duty screws; 5/8" anchor bolt.

Refer to the Shear Line Dimensions table for wall height h , effective segment length b_{eff} and perforated wall adjusted sum of b_i , to the Story Table for joist depth, and to the Shear Results table for perforated factor Co .

Most severe of wind load cases is used for overturning calculation.

Designer is responsible for design of connection from wall to floor or foundation for shear force shown in Shear Results table. Refer to SDPWS 4.3.6.4.3 for foundation anchor bolt requirements.

*WARNING - Design capacity has been exceeded.

COLLECTOR FORCES (rigid wind design)

Level 1					Drag Strut Force [lbs]		Strap/Blocking Force [lbs]	
Line-Wall	Position on Wall or Opening	Location [ft]		Load Case	---	---	---	---
		X	Y		-->	<---	-->	<---
Line 1								
1-1	Left Opening 1	0.00	11.00		1850	-3384		
1-1	Right Opening 1	0.00	16.00		-445			
1-1	Left Opening 2	0.00	20.00		-2082			
1-1	Right Opening 2	0.00	22.00		-3000	1454		
Line 2								
2-1	Left Opening 1	46.92	3.00		-644	703		
2-1	Right Opening 1	46.92	6.00		-1308	1434		
2-1	Right Wall End	46.92	18.75		2712	-2984		
Line 3								
3-1	Right Opening 1	68.00	7.50		-2648	2625		
3-1	Left Opening 2	68.00	18.00		2691	-3262		
3-1	Right Opening 2	68.00	22.50		1103	-1688		
Line A								
A-1	Left Opening 1	6.00	0.00		-76	234		
A-1	Right Opening 1	14.00	0.00		-459	618		
A-1	Left Opening 2	21.00	0.00		34	674		
A-1	Right Opening 2	26.00	0.00		-206	914		
A-1	Left Opening 3	32.00	0.00		-256	-961		
A-1	Right Opening 3	40.00	0.00		-639	-577		
A-1	Left Opening 4	49.00	0.00		911	-893		
A-1	Right Opening 4	65.00	0.00			-125		
Line B								
B-1	Left Wall End	46.92	18.67		-2224	2209		
B-1	Left Opening 1	49.92	18.67		-1727	2302		
B-1	Right Opening 1	52.92	18.67		-1869	2443		
Line C								
C-1	Left Opening 1	3.00	31.00		-194			
C-1	Right Opening 1	6.00	31.00		-457	528		
C-1	Left Opening 2	10.00	31.00		191	845		
C-1	Right Opening 2	13.00	31.00		-73	1109		
C-1	Left Opening 3	24.00	31.00		-552	926		
C-1	Right Opening 3	27.00	31.00		-816	1190		
C-1	Left Opening 4	35.00	31.00		1088	695		
C-1	Right Opening 5	53.00	31.00		-493	2280		
Level 2					Drag Strut Force [lbs]		Strap/Blocking Force [lbs]	
Line-Wall	Position on Wall or Opening	Location [ft]		Load Case	---	---	---	---
		X	Y		-->	<---	-->	<---
Line 1								
1-1	Right Opening 1	0.00	10.00		-2908	2908		
1-1	Left Opening 2	0.00	21.00		2908	-2908		
Line 3								
3-1	Left Opening 1	68.00	5.50		-363	363		
3-1	Right Opening 1	68.00	10.50		-1823	1823		
3-1	Left Opening 2	68.00	15.00		-2636	2636		
3-1	Right Opening 2	68.00	20.00		-4097	4097		
Line A								
A-1	Left Opening 1	3.00	0.00		-82	82		
A-1	Right Opening 1	7.00	0.00		-211	211		
A-1	Left Opening 2	11.00	0.00		122	-122		
A-1	Right Opening 2	17.00	0.00		-72	72		
A-1	Left Opening 3	23.00	0.00		-241	241		
A-1	Right Opening 3	36.00	0.00		-660	660		
A-1	Left Opening 4	41.00	0.00		-316	316		
A-1	Right Opening 4	44.00	0.00		-413	413		
A-1	Left Opening 5	49.00	0.00		-68	68		
A-1	Right Opening 5	53.00	0.00		-197	197		
Line C								
C-1	Left Opening 1	5.00	31.00		-276	276		
C-1	Right Opening 1	7.50	31.00		-461	461		
C-1	Left Opening 2	16.00	31.00		-246	246		
C-1	Right Opening 2	17.50	31.00		-357	357		
C-1	Left Opening 3	26.00	31.00		-143	143		
C-1	Right Opening 3	38.00	31.00		-1028	1028		
C-1	Left Opening 4	46.00	31.00		-1070	1070		
C-1	Right Opening 4	47.50	31.00		-1181	1181		
C-1	Left Opening 5	53.00	31.00		-1344	1344		
C-1	Right Opening 5	57.00	31.00		-1639	1639		

Legend:

Line-Wall - Shearline and wall number

Position...- Side of opening or wall end that drag strut is attached to

Location - Co-ordinates in Plan View

Load Case - Results are for critical load case:

ASCE 7 All heights Case 1 or 2

ASCE 7 Low-rise corner; Case A or B

Drag strut Force - Axial force in transfer element at openings, gaps, or changes in design shear along shearline. + : tension; - : compression.

Based on ASD-factored shearline force (vmax from 4.3.6.4.1.1 for perforated walls)

Strap/Blocking Force – For FTAO walls, force transferred from above and below opening to shearwall pier.

-> Due to shearline force in the west-to-east or south-to-north direction

<- Due to shearline force in the east-to-west or north-to-south direction

MWFRS DEFLECTION (rigid wind design)*These deflections are used to determine shearwall stiffness for force distribution*

Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 1														
Line 1														
1-1,1	2	S->N	Comb	627.1	11.00	9.00	16.5	.014	50.6	171	.025	.112	0.32	0.44
		N->S	Comb	747.5	11.00	9.00	16.5	.017	50.6	171	.025	.133	0.34	0.49
1-1,2		S->N	Comb	49.7	4.00	9.00	16.5	.003	50.6	171	.025	.009	0.66	0.67
		N->S	Comb	0.0	4.00	9.00	16.5	-	50.6	-	-	-	-	0.49
1-1,3		S->N	Comb	792.4	9.00	9.00	16.5	.022	50.6	171	.025	.141	0.28	0.44
		N->S	Comb	601.5	9.00	9.00	16.5	.017	50.6	171	.025	.107	0.37	0.49
Line 2														
2-1,1	3	S->N	1S	6.7	3.00	9.00	16.5	.001	25.3	171	.025	.002	0.81	0.82
		N->S	1S	9.2	3.00	9.00	16.5	.001	25.3	171	.025	.003	0.81	0.82
2-1,2		S->N	1S	536.7	12.75	9.00	16.5	.011	25.3	171	.025	.191	0.26	0.46
		N->S	1S	590.1	12.75	9.00	16.5	.012	25.3	171	.025	.210	0.27	0.49
Line 3														
3-1,1	2	S->N	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.51
		N->S	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.47
3-1,2		S->N	Comb	861.5	10.50	9.00	16.5	.021	50.6	171	.025	.153	0.33	0.51
		N->S	Comb	910.6	10.50	9.00	16.5	.022	50.6	171	.025	.162	0.28	0.47
3-1,3		S->N	Comb	223.3	8.50	9.00	16.5	.007	50.6	171	.025	.040	0.46	0.51
		N->S	Comb	151.4	8.50	9.00	16.5	.004	50.6	171	.025	.027	0.44	0.47
Line A														
A-1,1	1	W->E	ExtS	35.3	6.00	9.00	16.5	.001	25.3	171	.025	.013	0.40	0.41
		E->W	ExtS	9.0	6.00	9.00	16.5	.000	25.3	171	.025	.003	0.00	0.00
A-1,2		W->E	ExtS	118.4	7.00	9.00	16.5	.004	25.3	171	.025	.042	0.36	0.41
		E->W	ExtS	39.9	7.00	9.00	16.5	.001	25.3	171	.025	.014	0.33	0.35
A-1,3		W->E	ExtS	39.5	6.00	9.00	16.5	.002	25.3	171	.025	.014	0.39	0.41
		E->W	ExtS	360.5	6.00	9.00	16.5	.015	25.3	171	.025	.128	0.48	0.62
A-1,4		W->E	ExtS	220.1	9.00	9.00	16.5	.006	25.3	171	.025	.078	0.32	0.41
		E->W	ExtS	83.1	9.00	9.00	16.5	.002	25.3	171	.025	.030	0.27	0.31
A-1,5		W->E	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.41
		E->W	ExtS	6.3	3.00	9.00	16.5	.001	25.3	171	.025	.002	0.01	0.01
Line B														
B-1,1	1	W->E	1S	213.2	3.00	9.00	16.5	.018	25.3	171	.025	.076	0.97	1.07
		E->W	1S	16.3	3.00	9.00	16.5	.001	25.3	171	.025	.006	0.82	0.83
B-1,2		W->E	1S	171.3	15.08	9.00	16.5	.003	25.3	171	.025	.061	0.17	0.23
		E->W	1S	209.1	15.08	9.00	16.5	.003	25.3	171	.025	.074	0.18	0.25
Line C														
C-1,1	1	W->E	ExtS	23.3	3.00	9.00	16.5	.002	25.3	171	.025	.008	0.83	0.84
		E->W	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.29
C-1,2		W->E	ExtS	249.8	4.00	9.00	16.5	.016	25.3	171	.025	.089	0.72	0.82
		E->W	ExtS	9.0	4.00	9.00	16.5	.001	25.3	171	.025	.003	0.00	0.01
C-1,3		W->E	ExtS	44.2	11.00	9.00	16.5	.001	25.3	171	.025	.016	0.21	0.23
		E->W	ExtS	104.7	11.00	9.00	16.5	.002	25.3	171	.025	.037	0.24	0.28
C-1,4		W->E	ExtS	325.8	8.00	9.00	16.5	.010	25.3	171	.025	.116	0.34	0.47
		E->W	ExtS	150.0	8.00	9.00	16.5	.005	25.3	171	.025	.053	0.30	0.36
C-1,5		W->E	ExtS	0.0	8.00	9.00	16.5	-	25.3	-	-	-	-	0.21
		E->W	ExtS	0.0	8.00	9.00	16.5	-	25.3	-	-	-	-	0.29
C-1,6		W->E	ExtS	120.7	15.00	9.00	16.5	.002	25.3	171	.025	.043	0.16	0.21
		E->W	ExtS	240.1	15.00	9.00	16.5	.004	25.3	171	.025	.085	0.20	0.29
Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 2														
Line 1														
1-1,2	2	Both	Comb	819.4	11.00	8.00	16.5	.013	50.6	171	.025	.130	0.40	0.54
Line 3														
3-1,1	1	Both	ExtS	226.2	5.50	8.00	16.5	.007	25.3	171	.025	.072	0.50	0.57
3-1,2		Both	ExtS	111.6	4.50	8.00	16.5	.004	25.3	171	.025	.035	0.54	0.57
3-1,3		Both	ExtS	664.5	11.00	8.00	16.5	.011	25.3	171	.025	.210	0.35	0.57
Line A														
A-1,1	1	Both	ExtS	5.0	3.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
A-1,2		Both	ExtS	115.3	4.00	8.00	16.5	.005	25.3	171	.025	.036	0.61	0.65
A-1,3		Both	ExtS	4.1	6.00	8.00	16.5	.000	25.3	171	.025	.001	0.00	0.00
A-1,4		Both	ExtS	101.1	5.00	8.00	16.5	.004	25.3	171	.025	.032	0.47	0.51
A-1,5		Both	ExtS	101.1	5.00	8.00	16.5	.004	25.3	171	.025	.032	0.47	0.51
A-1,6		Both	ExtS	45.4	15.00	8.00	16.5	.001	25.3	171	.025	.014	0.14	0.15
Line C														
C-1,1	1	Both	ExtS	18.6	5.00	8.00	16.5	.001	25.3	171	.025	.006	0.42	0.43
C-1,2		Both	ExtS	99.0	8.50	8.00	16.5	.002	25.3	171	.025	.031	0.27	0.30

MWFRS DEFLECTION (rigid wind design, continued)

C-1, 3	Both	ExtS	99.0	8.50	8.00	16.5	.002	25.3	171	.025	.031	0.27	0.30
C-1, 4	Both	ExtS	68.6	8.00	8.00	16.5	.002	25.3	171	.025	.022	0.27	0.30
C-1, 5	Both	ExtS	44.2	5.50	8.00	16.5	.001	25.3	171	.025	.014	0.39	0.41
C-1, 6	Both	ExtS	222.8	11.00	8.00	16.5	.004	25.3	171	.025	.071	0.24	0.31

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B.

W Gp – Wall design group, refer to Sheathing and Framing Materials tables.

Dir – Force direction.

Srf – Wall surface = Int(erior) or Ext(erior) for perimeter walls, 1 or 2 for interior partitions; Comb = Combined v and Ga for identical materials on each side; S = Ga from side with stronger shear resistance; W = 2 x Ga of weaker side.

v – ASD shear force per unit distance on wall segment.

Unblocked walls = v / C_{ub} as per SDPWS 4.3.4.3, C_{ub} = Unblocked factor from 4.3.5.3, shown in the Shear Results table.

Perforated walls = v_{max} from Eqn. 4.3-9, as per 4.3.4.2.

FTAO walls = Unit shear force in pier beside opening(s).

b – Wall or segment length.

Segmented wall or FTAO wall segments = Width of wall segment between openings.

Perforated wall = Sum of FHS segments, modified as in 4.3.3.4 per 4.3.4.2.

FTAO wall = Length of wall including openings.

h – Wall height.

FTAO piers = Distance from bottom of opening to top of wall; for end segments, results using that distance and the wall height are averaged.

Defl – Horizontal shear wall deflection due to given term:

Bending = $8vh^3 / EAb$; A = Effective cross sectional area of segment end stud(s), E = stud mod. of elasticity in Framing Materials table

For i studs at one end and j at the other, $A = 2ij / (i + j) \times \text{area of one stud}$, based on Ex. C4.3.4-3

Shear = $vh / 1000 G_a$; $G_a = vw / (vw / G_{vtv} + 0.75 en)$, from SDPWS Ex. C4.3.4-1.

vw = ASD sheathing capacity.

G_{vtv} = Shear stiffness from C4.3.4, shown in Sheathing Materials table.

en = Nail slip from Table C4.2.3D of form aVn^b for WSP, varies linearly to value at capacity for other materials.

Vn = Shear force per nail along panel edge at ASD capacity vw .

Hold – Anchorage system (hold-down) = $da \times h / beff$.

da = Vertical hold-down displacement; refer to Hold-down Displacement table for components.

$beff$ = Effective wall segment length = $b - (\text{tension stud pack width} + \text{hold-down anchor bolt offset}) - (1/2 \text{ compression stud pack width})$

$beff$ is given in the Shear Wall Dimensions table.

For FTAO walls, hold-down device at end of wall is applied to all segments, as per APA T555.

Total Defl – Deflection from bending + shear + hold-down, as per Eqn. 4.3-2.

For FTAO walls, the average of the values for the segments, as per APA T555.

WARNING - On shearline(s) A, B, C, 1, 2 the program was unable to equalize deflections on the shearwall segments. Change design setting to capacity-based rigidity, or turn off the distribution to segments based on rigidity.

SERVICEABILITY DEFLECTION (rigid wind design)*These deflections are used to determine story drift*

Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 1														
Line 1														
1-1,1	2	S->N	Comb	627.3	11.00	9.00	16.5	.014	51.5	169	.024	.110	0.32	0.45
		N->S	Comb	737.2	11.00	9.00	16.5	.017	51.5	169	.024	.129	0.34	0.49
1-1,2		S->N	Comb	0.0	4.00	9.00	16.5	-	51.5	-	-	-	-	0.45
		N->S	Comb	0.0	4.00	9.00	16.5	-	51.5	-	-	-	-	0.49
1-1,3		S->N	Comb	792.3	9.00	9.00	16.5	.022	51.5	169	.024	.138	0.29	0.45
		N->S	Comb	593.2	9.00	9.00	16.5	.017	51.5	169	.024	.104	0.37	0.49
Line 2														
2-1,1	3	S->N	1S	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.46
		N->S	1S	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.48
2-1,2		S->N	1S	530.8	12.75	9.00	16.5	.011	25.8	169	.024	.185	0.26	0.46
		N->S	1S	584.1	12.75	9.00	16.5	.012	25.8	169	.024	.204	0.27	0.48
Line 3														
3-1,1	2	S->N	Comb	0.0	3.00	9.00	16.5	-	51.5	-	-	-	-	0.50
		N->S	Comb	0.0	3.00	9.00	16.5	-	51.5	-	-	-	-	0.46
3-1,2		S->N	Comb	851.6	10.50	9.00	16.5	.020	51.5	169	.024	.149	0.33	0.50
		N->S	Comb	905.2	10.50	9.00	16.5	.022	51.5	169	.024	.158	0.28	0.46
3-1,3		S->N	Comb	217.8	8.50	9.00	16.5	.006	51.5	169	.024	.038	0.46	0.50
		N->S	Comb	140.5	8.50	9.00	16.5	.004	51.5	169	.024	.025	0.44	0.46
Line A														
A-1,1	1	W->E	ExtS	48.8	6.00	9.00	16.5	.002	25.8	169	.024	.017	0.39	0.41
		E->W	ExtS	422.5	6.00	9.00	16.5	.018	25.8	169	.024	.148	0.00	0.17
A-1,2		W->E	ExtS	112.3	7.00	9.00	16.5	.004	25.8	169	.024	.039	0.36	0.41
		E->W	ExtS	0.0	7.00	9.00	16.5	-	25.8	-	-	-	-	0.17
A-1,3		W->E	ExtS	49.9	6.00	9.00	16.5	.002	25.8	169	.024	.017	0.39	0.41
		E->W	ExtS	0.0	6.00	9.00	16.5	-	25.8	-	-	-	-	0.17
A-1,4		W->E	ExtS	203.9	9.00	9.00	16.5	.006	25.8	169	.024	.071	0.33	0.41
		E->W	ExtS	0.0	9.00	9.00	16.5	-	25.8	-	-	-	-	0.17
A-1,5		W->E	ExtS	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.41
		E->W	ExtS	227.4	3.00	9.00	16.5	.019	25.8	169	.024	.079	0.07	0.17
Line B														
B-1,1	1	W->E	1S	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.26
		E->W	1S	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.25
B-1,2		W->E	1S	210.8	15.08	9.00	16.5	.004	25.8	169	.024	.074	0.18	0.26
		E->W	1S	209.4	15.08	9.00	16.5	.004	25.8	169	.024	.073	0.18	0.25
Line C														
C-1,1	1	Both	ExtS	0.0	3.00	9.00	16.5	-	25.8	-	-	-	-	0.27
C-1,2		W->E	ExtS	0.0	4.00	9.00	16.5	-	25.8	-	-	-	-	0.27
		E->W	ExtS	658.7	4.00	9.00	16.5	.042	25.8	169	.024	.230	0.00	0.27
C-1,3		W->E	ExtS	124.3	11.00	9.00	16.5	.003	25.8	169	.024	.043	0.22	0.27
		E->W	ExtS	65.2	11.00	9.00	16.5	.001	25.8	169	.024	.023	0.25	0.27
C-1,4		W->E	ExtS	5.0	8.00	9.00	16.5	.000	25.8	169	.024	.002	0.29	0.29
		E->W	ExtS	0.0	8.00	9.00	16.5	-	25.8	-	-	-	-	0.27
C-1,5		Both	ExtS	0.0	8.00	9.00	16.5	-	25.8	-	-	-	-	0.27
C-1,6		W->E	ExtS	298.8	15.00	9.00	16.5	.005	25.8	169	.024	.104	0.16	0.27
		E->W	ExtS	170.3	15.00	9.00	16.5	.003	25.8	169	.024	.059	0.21	0.27
Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 2														
Line 1														
1-1,2	2	Both	Comb	808.1	11.00	8.00	16.5	.013	51.5	169	.024	.125	0.39	0.53
Line 3														
3-1,1	1	S->N	ExtS	31.0	5.50	8.00	16.5	.001	25.8	169	.024	.010	0.60	0.61
		N->S	ExtS	31.1	5.50	8.00	16.5	.001	25.8	169	.024	.010	0.60	0.61
3-1,2		Both	ExtS	1.3	4.50	8.00	16.5	.000	25.8	169	.024	.000	0.60	0.61
3-1,3		S->N	ExtS	795.9	11.00	8.00	16.5	.013	25.8	169	.024	.247	0.35	0.61
		N->S	ExtS	795.8	11.00	8.00	16.5	.013	25.8	169	.024	.247	0.35	0.61
Line A														
A-1,1	1	Both	ExtS	227.2	3.00	8.00	16.5	.013	25.8	169	.024	.071	0.00	0.08
A-1,2		Both	ExtS	0.0	4.00	8.00	16.5	-	25.8	-	-	-	-	0.08
A-1,3		Both	ExtS	246.6	6.00	8.00	16.5	.007	25.8	169	.024	.077	0.00	0.08
A-1,4		Both	ExtS	0.0	5.00	8.00	16.5	-	25.8	-	-	-	-	0.08
A-1,5		Both	ExtS	0.0	5.00	8.00	16.5	-	25.8	-	-	-	-	0.08
A-1,6		Both	ExtS	0.0	15.00	8.00	16.5	-	25.8	-	-	-	-	0.08
Line C														
C-1,1	1	Both	ExtS	0.0	5.00	8.00	16.5	-	25.8	-	-	-	-	0.35
C-1,2		Both	ExtS	76.9	8.50	8.00	16.5	.002	25.8	169	.024	.024	0.32	0.35

SERVICEABILITY DEFLECTION (rigid wind design, continued)

C-1, 3	Both	ExtS	76.9	8.50	8.00	16.5	.002	25.8	169	.024	.024	0.32	0.35
C-1, 4	Both	ExtS	175.3	8.00	8.00	16.5	.004	25.8	169	.024	.054	0.29	0.35
C-1, 5	Both	ExtS	0.0	5.50	8.00	16.5	-	25.8	-	-	-	-	0.35
C-1, 6	Both	ExtS	203.4	11.00	8.00	16.5	.003	25.8	169	.024	.063	0.28	0.35

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B.

W Gp – Wall design group, refer to Sheathing and Framing Materials tables.

Dir – Force direction.

Srf – Wall surface = Int(erior) or Ext(erior) for perimeter walls, 1 or 2 for interior partitions; Comb = Combined v and Ga for identical materials on each side; S = Ga from side with stronger shear resistance; W = 2 x Ga of weaker side.

v – Shear force per unit distance on wall segment using 1.0 Wa = wind load based on serviceability wind speeds from ASCE 7 CC.2.2, Figs. CC.2-1 - CC.2-4.

Unblocked walls = v / C_{ub} as per SDPWS 4.3.4.3, C_{ub} = Unblocked factor from 4.3.5.3, shown in the Shear Results table.

Perforated walls = v_{max} from Eqn. 4.3-9, as per 4.3.4.2.

FTAO walls = Unit shear force in pier beside opening(s).

b – Wall or segment length.

Segmented wall or FTAO wall segments = Width of wall segment between openings.

Perforated wall = Sum of FHS segments, modified as in 4.3.3.4 per 4.3.4.2.

FTAO wall = Length of wall including openings.

h – Wall height.

FTAO piers = Distance from bottom of opening to top of wall; for end segments, results using that distance and the wall height are averaged.

Defl – Horizontal shear wall deflection due to given term:

Bending = $8vh^3 / EAb$; A = Effective cross sectional area of segment end stud(s), E = stud mod. of elasticity in Framing Materials table

For i studs at one end and j at the other, $A = 2ij / (i + j) \times$ area of one stud, based on Ex. C4.3.4-3

Shear = $vh / 1000 G_a$; G_a = Factor x $v_w / (\text{Factor} \times v_w / G_{vtv} + 0.75 en)$, adapted from SDPWS Ex. C4.3.4-1.

Factor = $P_s / P_m / 0.6$ for WSP, 1.0 for other materials.

v_w = ASD sheathing capacity.

G_{vtv} = Shear stiffness from C4.3.4, shown in Sheathing Materials table.

en = Nail slip from Table C4.2.3D of form aVn^b for WSP, varies linearly to value at capacity for other materials.

P_s = Serviceability wind pressure; P_m = MWFRS wind pressure.

V_n = Serviceability force per nail along panel edge at ASD capacity = Factor x v_w .

Hold – Anchorage system (hold-down) = $d_a \times h / beff$.

d_a = Vertical hold-down displacement; refer to Hold-down Displacement table for components.

$beff$ = Effective wall segment length = $b - (\text{tension stud pack width} + \text{hold-down anchor bolt offset}) - (1/2 \text{ compression stud pack width})$

$beff$ is given in the Shear Wall Dimensions table.

For FTAO walls, hold-down device at end of wall is applied to all segments, as per APA T555.

Total Defl – Deflection from bending + shear + hold-down, as per Eqn. 4.3-2.

For FTAO walls, the average of the values for the segments, as per APA T555.

WARNING - On shearline(s) C the program was unable to equalize deflections on the shearwall segments. Change design setting to capacity-based rigidity, or turn off the distribution to segments based on rigidity.

MWFRS HOLD-DOWN DISPLACEMENT (rigid wind design)*These displacements are used to determine deflections for force distribution*

Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 1													
Line 1													
1-1,1	S->N	HDU5-SDS	5433	.111	.005	0.116	-	-	.248	6274	0.02	0.38	0.32
	N->S	HDU5-SDS	6585	.134	.006	0.140	-	-	.248	7456	0.02	0.41	0.34
1-1,2	S->N	HDU5-SDS	369	.008	.000	0.008	-	-	.248	7612	0.02	0.28	0.66
	N->S	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
1-1,3	S->N	HDU5-SDS	194	.004	.000	0.004	-	-	.248	7775	0.02	0.27	0.28
	N->S	HDU5-SDS	5303	.108	.005	0.113	-	-	.248	-418	0.00	0.36	0.37
Line 2													
2-1,1	S->N	HDU5-SDS	17	.000	.000	0.000	-	-	.248	147	0.00	0.25	0.81
	N->S	HDU5-SDS	42	.001	.000	0.001	-	-	.248	171	0.00	0.25	0.81
2-1,2	S->N	HDU5-SDS	4721	.096	.005	0.101	-	-	.248	5271	0.01	0.36	0.26
	N->S	HDU5-SDS	5211	.106	.005	0.111	-	-	.248	5762	0.02	0.37	0.27
Line 3													
3-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
3-1,2	S->N	HDU5-SDS	5694	.116	.005	0.121	-	-	.248	3208	0.01	0.38	0.33
	N->S	HDU5-SDS	2532	.052	.002	0.054	-	-	.248	7088	0.02	0.32	0.28
3-1,3	S->N	HDU5-SDS	7156	.146	.007	0.153	-	-	.248	8333	0.03	0.43	0.46
	N->S	HDU5-SDS	6350	.129	.006	0.135	-	-	.248	7434	0.02	0.40	0.44
Line A													
A-1,1	W->E	HDU5-SDS	127	.003	.000	0.003	-	-	.248	628	0.00	0.25	0.40
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	201	0.00	0.00	0.00
A-1,2	W->E	HDU5-SDS	802	.016	.001	0.017	-	-	.248	1664	0.00	0.27	0.36
	E->W	HDU5-SDS	92	.003	.000	0.003	-	-	.248	676	0.00	0.25	0.33
A-1,3	W->E	HDU5-SDS	163	.003	.000	0.003	-	-	.248	-259	0.00	0.25	0.39
	E->W	HDU5-SDS	2314	.047	.002	0.049	-	-	.248	3643	0.01	0.31	0.48
A-1,4	W->E	HDU5-SDS	2584	.053	.002	0.055	-	-	.248	3570	0.01	0.31	0.32
	E->W	HDU5-SDS	621	.013	.001	0.013	-	-	.248	2129	0.01	0.27	0.27
A-1,5	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	430	0.00	0.00	0.01
Line B													
B-1,1	W->E	HDU5-SDS	2045	.042	.002	0.044	-	-	.248	2174	0.01	0.30	0.97
	E->W	HDU5-SDS	111	.002	.000	0.002	-	-	.248	241	0.00	0.25	0.82
B-1,2	W->E	HDU5-SDS	1324	.027	.001	0.028	-	-	.248	1975	0.01	0.28	0.17
	E->W	HDU5-SDS	1669	.034	.002	0.036	-	-	.248	2321	0.01	0.29	0.18
Line C													
C-1,1	W->E	HDU5-SDS	184	.004	.000	0.004	-	-	.248	595	0.00	0.25	0.83
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
C-1,2	W->E	HDU5-SDS	2059	.042	.002	0.044	-	-	.248	2578	0.01	0.30	0.72
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	160	0.00	0.00	0.00
C-1,3	W->E	HDU5-SDS	110	.002	.000	0.002	-	-	.248	1846	0.00	0.25	0.21
	E->W	HDU5-SDS	1407	.029	.001	0.030	-	-	.248	1460	0.00	0.28	0.24
C-1,4	W->E	HDU5-SDS	1867	.038	.002	0.040	-	-	.248	2998	0.01	0.30	0.34
	E->W	HDU5-SDS	505	.010	.000	0.011	-	-	.248	1150	0.00	0.26	0.30
C-1,5	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
C-1,6	W->E	HDU5-SDS	203	.004	.000	0.004	-	-	.248	4043	0.01	0.26	0.16
	E->W	HDU5-SDS	3352	.068	.003	0.071	-	-	.248	2713	0.01	0.33	0.20
Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 2													
Line 1													
1-1,2	Both	HDU5-SDS	6444	.263	.002	0.264	-	-	.248	7148	0.02	0.53	0.40
Line 3													
3-1,1	Both	HDU5-SDS	1764	.072	.000	0.072	-	-	.248	2116	0.01	0.33	0.50
3-1,2	Both	HDU5-SDS	837	.034	.000	0.034	-	-	.248	1125	0.00	0.28	0.54
3-1,3	Both	HDU5-SDS	5176	.211	.001	0.212	-	-	.248	5880	0.02	0.48	0.35
Line A													
A-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	116	0.00	0.00	0.00
A-1,2	Both	HDU5-SDS	888	.036	.000	0.036	-	-	.248	1144	0.00	0.29	0.61
A-1,3	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	91	0.00	0.00	0.00
A-1,4	Both	HDU5-SDS	731	.030	.000	0.030	-	-	.248	1051	0.00	0.28	0.47
A-1,5	Both	HDU5-SDS	731	.030	.000	0.030	-	-	.248	1051	0.00	0.28	0.47
A-1,6	Both	HDU5-SDS	9	.006	.000	0.006	-	-	.248	969	0.00	0.26	0.14
Line C													
C-1,1	Both	HDU5-SDS	36	.001	.000	0.001	-	-	.248	356	0.00	0.25	0.42
C-1,2	Both	HDU5-SDS	612	.025	.000	0.025	-	-	.248	1156	0.00	0.28	0.27
C-1,3	Both	HDU5-SDS	612	.025	.000	0.025	-	-	.248	1156	0.00	0.28	0.27
C-1,4	Both	HDU5-SDS	374	.015	.000	0.015	-	-	.248	886	0.00	0.27	0.27

MWFRS HOLD-DOWN DISPLACEMENT (rigid wind design, continued)

C-1, 5	Both	HDU5-SDS	238	.010	.000	0.010	-	-	.248	590	0.00	0.26	0.39
C-1, 6	Both	HDU5-SDS	1560	.064	.000	0.064	-	-	.248	2264	0.01	0.32	0.24

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B

Dir – Force direction

Tens., Comp. – Accumulated ASD hold-down tension force *T* and end stud compression force *C* from overturning, dead and wind uplift loads.

da – Vertical displacements due to the following components:

Vert. Displacement – Elongation when slippage calculated separately; displacement when combined elongation/slippage used

Manuf – Using manufacturer's value for anchor bolt length, or no bolt contribution for connector-only elongation

Unless marked with * = (ASD tension force / ASD hold-down capacity) x max ASD elongation or displacement

* - Maximum strength-level elongation or displacement is used. May result in higher than actual displacements for lightly loaded hold-downs, causing the segment to draw less force due to lower than actual stiffness.

Add – Due to longer anchor bolt length than manufacturer's value, or entire bolt length for connector-only elongation = $TL / (Ab \times Es)$

Ab = bolt cross-sectional area

Es = steel modulus = 29000000 psi

L = Lb – Lh

Lb = Total bolt length shown in Storey Information table

Lh = Manufacturer's anchor bolt length for given displacement/elongation from hold-down database

Slippage – Due to vertical slippage of hold-down fasteners attached to stud(s) when not combined with elongation

Nails = en from SDPWS Table C4.2.3D using values for wood structural panels

Bolts = $V_f / (270,000 D^{1.5})$ (NDS 11.3.6); *D* = bolt diameter, *V_f* = Tension force *T* / number of fasteners

Shrink + Extra – Wood shrinkage plus extra displacement due to mis-cuts, gaps, etc.

Shrinkage = $0.002 \times (19\% \text{ fabrication} - 10\% \text{ in-service moisture contents}) \times L_s$

Ls = Length between anchor bolt fasteners subject to perp-to-grain shrinkage; see Story Information table

Crush – Deformation of bottom plate at compression end of wall segment

= $0.02'' \times [r / 0.73, r < 0.73; (1 + (r - 0.73) / 0.27), 0.73 < r < 1; 2r^3, r > 1]$

$r = f_{cp} / F_{cp}'$; $F_{cp}' = C_t CM F_{cp}$; $f_{cp} = C / A$, *A* = cross sectional area of end studs

Total da – Vert. Displacement + Slippage + Shrink + Crush + Extra

Horz Defl – Anchorage deflection term in SDPWS Eqn. C.4.3.4-1 = $h / beff \times da$

h = Wall height. For end segments in FTAO walls, *h* is the average of the wall height and the distance from the bottom of opening to top of wall

beff = Effective wall segment length = *b* - (tension stud pack width + hold-down anchor bolt offset) - (1/2 compression stud pack width)

h and *b* are shown in Deflection table, beff in the Shear Wall Dimensions table

SERVICEABILITY HOLD-DOWN DISPLACEMENT (rigid wind design)*These displacements are used to determine deflections for story drift*

Wall, segment	Dir	Hold-down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 1													
Line 1													
1-1,1	S->N	HDU5-SDS	5433	.116	.005	0.121	-	-	.248	5991	0.02	0.39	0.32
	N->S	HDU5-SDS	6585	.134	.006	0.140	-	-	.248	7127	0.02	0.41	0.34
1-1,2	S->N	HDU5-SDS	369	.000	.000	0.000	-	-	.000	7338	0.00	0.00	-
	N->S	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
1-1,3	S->N	HDU5-SDS	194	.004	.000	0.005	-	-	.248	7494	0.03	0.28	0.29
	N->S	HDU5-SDS	5303	.108	.005	0.113	-	-	.248	-697	0.00	0.36	0.37
Line 2													
2-1,1	S->N	HDU5-SDS	17	.000	.000	0.000	-	-	.000	113	0.00	0.00	-
	N->S	HDU5-SDS	42	.000	.000	0.000	-	-	.000	137	0.00	0.00	-
2-1,2	S->N	HDU5-SDS	4721	.098	.005	0.103	-	-	.248	5063	0.01	0.36	0.26
	N->S	HDU5-SDS	5211	.107	.005	0.112	-	-	.248	5546	0.01	0.37	0.27
Line 3													
3-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
3-1,2	S->N	HDU5-SDS	5694	.116	.005	0.122	-	-	.248	2885	0.01	0.38	0.33
	N->S	HDU5-SDS	2532	.053	.002	0.055	-	-	.248	6758	0.02	0.32	0.28
3-1,3	S->N	HDU5-SDS	7156	.145	.007	0.152	-	-	.248	7894	0.02	0.42	0.46
	N->S	HDU5-SDS	6350	.128	.006	0.134	-	-	.248	7099	0.02	0.40	0.44
Line A													
A-1,1	W->E	HDU5-SDS	127	.003	.000	0.004	-	-	.248	617	0.00	0.25	0.39
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	193	0.00	0.00	0.00
A-1,2	W->E	HDU5-SDS	802	.018	.001	0.019	-	-	.248	1432	0.00	0.27	0.36
	E->W	HDU5-SDS	92	.000	.000	0.000	-	-	.000	665	0.00	0.00	-
A-1,3	W->E	HDU5-SDS	163	.004	.000	0.004	-	-	.248	-256	0.00	0.25	0.39
	E->W	HDU5-SDS	2314	.000	.000	0.000	-	-	.000	3479	0.00	0.00	-
A-1,4	W->E	HDU5-SDS	2584	.059	.003	0.062	-	-	.248	3106	0.01	0.32	0.33
	E->W	HDU5-SDS	621	.000	.000	0.000	-	-	.000	1899	0.00	0.00	-
A-1,5	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	447	0.02	0.02	0.07
Line B													
B-1,1	W->E	HDU5-SDS	2045	.000	.000	0.000	-	-	.000	2113	0.00	0.00	-
	E->W	HDU5-SDS	111	.000	.000	0.000	-	-	.000	206	0.00	0.00	-
B-1,2	W->E	HDU5-SDS	1324	.036	.002	0.038	-	-	.248	1787	0.01	0.29	0.18
	E->W	HDU5-SDS	1669	.035	.002	0.036	-	-	.248	2128	0.01	0.29	0.18
Line C													
C-1,1	W->E	HDU5-SDS	184	.000	.000	0.000	-	-	.000	504	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
C-1,2	W->E	HDU5-SDS	2059	.000	.000	0.000	-	-	.000	2471	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	145	0.00	0.00	0.00
C-1,3	W->E	HDU5-SDS	110	.005	.000	0.005	-	-	.248	1575	0.01	0.26	0.22
	E->W	HDU5-SDS	1407	.040	.002	0.041	-	-	.248	1244	0.01	0.30	0.25
C-1,4	W->E	HDU5-SDS	1867	.000	.000	0.000	-	-	.248	2744	0.00	0.25	0.29
	E->W	HDU5-SDS	505	.000	.000	0.000	-	-	.000	908	0.00	0.00	-
C-1,5	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
C-1,6	W->E	HDU5-SDS	203	.002	.000	0.002	-	-	.248	3548	0.01	0.26	0.16
	E->W	HDU5-SDS	3352	.082	.004	0.085	-	-	.248	2327	0.01	0.34	0.21
Wall, segment	Dir	Hold-down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 2													
Line 1													
1-1,2	Both	HDU5-SDS	6444	.263	.002	0.264	-	-	.248	6875	0.02	0.53	0.39
Line 3													
3-1,1	Both	HDU5-SDS	1764	.130	.001	0.130	-	-	.248	2000	0.02	0.39	0.60
3-1,2	Both	HDU5-SDS	837	.066	.000	0.066	-	-	.248	1038	0.01	0.32	0.60
3-1,3	Both	HDU5-SDS	5176	.210	.001	0.211	-	-	.248	5625	0.01	0.47	0.35
Line A													
A-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	110	0.00	0.00	0.00
A-1,2	Both	HDU5-SDS	888	.000	.000	0.000	-	-	.000	1065	0.00	0.00	-
A-1,3	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	86	0.00	0.00	0.00
A-1,4	Both	HDU5-SDS	731	.000	.000	0.000	-	-	.000	958	0.00	0.00	-
A-1,5	Both	HDU5-SDS	731	.000	.000	0.000	-	-	.000	958	0.00	0.00	-
A-1,6	Both	HDU5-SDS	9	.000	.000	0.000	-	-	.000	719	0.00	0.00	-
Line C													
C-1,1	Both	HDU5-SDS	36	.000	.000	0.000	-	-	.000	273	0.00	0.00	-
C-1,2	Both	HDU5-SDS	612	.072	.000	0.072	-	-	.248	1006	0.01	0.33	0.32
C-1,3	Both	HDU5-SDS	612	.072	.000	0.072	-	-	.248	1006	0.01	0.33	0.32
C-1,4	Both	HDU5-SDS	374	.031	.000	0.031	-	-	.248	748	0.00	0.28	0.29

SERVICEABILITY HOLD-DOWN DISPLACEMENT (rigid wind design, continued)

C-1, 5	Both	HDU5-SDS	238	.000	.000	0.000	-	-	.000	495	0.00	0.00	-
C-1, 6	Both	HDU5-SDS	1560	.114	.001	0.115	-	-	.248	2059	0.01	0.38	0.28

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B

Dir – Force direction

Tens., Comp. – Accumulated ASD hold-down tension force *T* and end stud compression force *C* from overturning, dead and wind uplift loads.

Compression force uses load combination *D + Wa* from ASCE 7 CC.2.2.

Tens. – ASD-factored force, used for proportion of manufacturer's maximum elongation

Comp. – Uses *D + Wa* from ASCE 7 CC.2.2; *Wa* = wind load based on serviceability wind speeds from Figs. CC.2-1 - CC.2-4

da – Vertical displacements due to the following components:

Vert. Displacement – Elongation when slippage calculated separately; displacement when combined elongation/slippage used

Manuf – Using manufacturer's value for anchor bolt length, or no bolt contribution for connector-only elongation

Unless marked with * = (ASD tension force / ASD hold-down capacity) x max strength-level elongation or displacement

* - Maximum strength-level elongation or displacement is used. May result in higher than actual displacements for lightly loaded hold-downs, causing the segment to draw less force due to lower than actual stiffness.

Add – Due to longer anchor bolt length than manufacturer's value, or entire bolt length for connector-only elongation = $TL / (Ab \times Es)$

T = Tension force using *D + Wa* serviceability load combination (not shown however usually same as Comp. *C*)

Ab = bolt cross-sectional area

Es = steel modulus = 29000000 psi

L = *Lb* – *Lh*

Lb = Total bolt length shown in Storey Information table

Lh = Manufacturer's anchor bolt length for given displacement/elongation from hold-down database

Slippage – Due to vertical slippage of hold-down fasteners attached to stud(s) when not combined with elongation

Nails = en from SDPWS Table C4.2.3D using values for wood structural panels

Bolts = $V_f / (270,000 D^{1.5})$ (NDS 11.3.6); *D* = bolt diameter, *V_f* = Tension force *T* / number of fasteners

Shrink + Extra – Wood shrinkage plus extra displacement due to mis-cuts, gaps, etc.

Shrinkage = $0.002 \times (19\% \text{ fabrication} - 10\% \text{ in-service moisture contents}) \times L_s$

L_s = Length between anchor bolt fasteners subject to perp-to-grain shrinkage; see Story Information table

Crush – Deformation of bottom plate at compression end of wall segment

= $0.02'' \times [r / 0.73, r < 0.73; (1 + (r - 0.73) / 0.27), 0.73 < r < 1; 2 r^3, r > 1]$

$r = f_{cp} / F_{cp}'$; $F_{cp}' = C_t CM F_{cp}$; $f_{cp} = C / A$, *A* = cross sectional area of end studs

Total da – Vert. Displacement + Slippage + Shrink + Crush + Extra

Horz Defl – Anchorage deflection term in SDPWS Eqn. C.4.3.4-1 = $h / beff \times da$

h = Wall height. For end segments in FTAO walls, *h* is the average of the wall height and the distance from the bottom of opening to top of wall

beff = Effective wall segment length = *b* - (tension stud pack width + hold-down anchor bolt offset) - (1/2 compression stud pack width)

h and *b* are shown in Deflection table, *beff* in the Shear Wall Dimensions table

STORY DRIFT (rigid wind design)

Level	Dir	Actual Story Drift (in)		Allowable Story Drift		
		Max defl	Line	hs ft	Drift in	Ratio
1	N<->S	0.49	1	9.83	0.24	2.08*
	E<->W	0.27	C		0.24	1.15*
2	N<->S	0.61	3	8.00	0.19	3.18*
	E<->W	0.35	C		0.19	1.80*

Legend:

Max defl – Largest deflection for any shearline on level in this direction; refer to Serviceability Deflections table

Line – Shearline with largest deflection on level in this direction

hs – Story height = Height of walls plus joist depth between this level and the one above.

Drift = Allowable story drift on this level = story height / 500

Ratio - Proportion of allowable story drift experienced, on this level in this direction.

Notes:

*FAILURE – Story drift on this level is greater than maximum allowed.

Out-of-plane Wind Design

COMPONENTS AND CLADDING by SHEARLINE

North-South Shearlines			Sheathing [psf]			Fastener Withdrawal [lbs]					Service Cond Factors	
Line	Lev	Grp	Force	Cap	Force/Cap	Force	Cap	Force/Cap	Force	Cap	Temp	Moist
1	1	2	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00
	2	2	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00
3	1	2	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00
	2	1	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00
East-West Shearlines			Sheathing [psf]			Fastener Withdrawal [lbs]					Service Cond Factors	
Line	Lev	Grp	Force	Cap	Force/Cap	Force	Cap	Force/Cap	Force	Cap	Temp	Moist
A	1	1	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00
	2	1	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00
C	1	1	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00
	2	1	34.4	228.1	0.15	22.9	18.6	105.5	0.22	0.18	1.00	1.00

Legend:

Grp - Wall Design Group (results for all design groups for rigid, flexible design listed for each wall)

Sheathing:

Force - C&C end zone exterior pressures using negative (suction) coefficient in ASCE 7 Figure 30.3-1 added to interior pressure using coefficients from Table 26.13-1

Cap - Out-of-plane capacity of exterior sheathing from SDPWS Tables 3.2.1A/B, divided by 1.6 for short-term ASD loads as per 3.2.1. Assumes continuous over 2 spans (table note 3).

Fastener Withdrawal:

Force - Force tributary to each nail in end zone and interior zone

Cap - Factored withdrawal capacity of individual nail according to NDS 12.2-3

Flexible Diaphragm Seismic Design

SEISMIC INFORMATION

Level	Mass [lbs]	Area [sq.ft]	Story Shear Fx [lbs]		Shear Resistance [lbs]		Diaphragm Force [lbs]			
			E-W	N-S	E-W	N-S	E-W		N-S	
							Fpx	Design	Fpx	Design
2	31020	2108.0	2672	8684	41222	21039	2672	2672	5211	8684
1	38986	2108.0	1852	6018	47379	52048	3275	3275	6550	6550
All	70006	-	4523	14701	-	-	-	-	-	-

Legend:

Mass – Sum of all generated and input building masses on level = w_x in ASCE 7 Eqn. 12.8-12.

Story Shear – Total ASD-factored shear force induced at level x from Eqn. 12.8-11.

Shear Resistance – Lateral design strength of all shear-resisting elements on story, for use in weak story evaluation (4.1.8).

Diaphragm Force – used by Shearwalls only for drag strut forces, as per Exception to 12.10.2.1.

Fpx - Minimum ASD-factored force for diaphragm design from Eqns. 12.10-1, -2, and -3.

Design = The greater of the story shear and Fpx + transfer forces from discontinuous shearlines, factored by overstrength (ω) as per 12.10.1.1. $\omega = 2.5$ as per 12.2-1.

Redundancy Factor ρ (rho):

E-W 1.00, N-S 1.00

Automatically calculated according to ASCE 7 12.3.4.2.

Vertical Earthquake Load E_v

$E_v = 0.2 S_{ds} D$; $S_{ds} = 0.60$; $E_v = 0.120 D$ unfactored; $0.084 D$ factored; total dead load factor: $0.6 - 0.084 = 0.516$ tension, $1.0 + 0.084 = 1.084$ compression.

Weak Story (SDPWS 4.1.8)

The lateral resistance of each story is greater than or equal to that of the story above. This vertical distribution of SFRS is permitted.

SHEAR RESULTS (flexible seismic design)

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]						Resp. Ratio
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line 1														
Level 2														
Ln1, Lev2	-	Both	-	-	4342	-	-	-	-	-	-	-	10764	-
Wall 1-1	2	Both	-	-	4342	1.0	1.0	489	489	-	A	-	10764	-
Seg. 1	-	Both	0.0	-	0	1.0	1.0	489	489	-	-	979	-	-
Seg. 2	-	Both	394.7	-	4342	1.0	1.0	489	489	-	-	979	10764	0.40
Seg. 3	-	Both	0.0	-	0	1.0	1.0	489	489	-	-	979	-	-
Seg. 4	-	Both	0.0	-	0	1.0	1.0	489	489	-	-	979	-	-
Level 1														
Ln1, Lev1	-	Both	-	-	6487	-	-	-	-	-	-	-	23363	-
Wall 1-1	2	Both	-	-	6487	1.0	1.0	489	489	-	A	-	23363	-
Seg. 1	-	S->N	202.0	-	2222	1.0	1.0	489	489	-	-	979	10764	0.21
	-	N->S	371.3	-	4084	1.0	1.0	489	489	-	-	979	10764	0.38
Seg. 2	-	S->N	17.6	-	71	.97	.97	474	474	-	-	948	3792	0.02
	-	N->S	0.0	-	0	.97	.97	474	474	-	-	948	3792	0.00
Seg. 3	-	S->N	466.0	-	4194	1.0	1.0	489	489	-	-	979	8807	0.48
	-	N->S	266.9	-	2402	1.0	1.0	489	489	-	-	979	8807	0.27
Line 2														
Ln2, Lev1	-	Both	-	-	2641	-	-	-	-	-	-	-	7523	-
Wall 2-1	3	Both	-	-	2641	1.0	1.0	89	489	-	S	-	7523	-
Seg. 1	-	S->N	59.5	-	178	.88	.88	78	428	-	-	428	1284	0.14
	-	N->S	26.5	-	79	.88	.88	78	428	-	-	428	1284	0.06
Seg. 2	-	S->N	193.2	-	2463	1.0	1.0	89	489	-	-	489	6238	0.39
	-	N->S	200.9	-	2562	1.0	1.0	89	489	-	-	489	6238	0.41
Line 3														
Level 2														
Ln3, Lev2	-	Both	-	-	4342	-	-	-	-	-	-	-	10275	-
Wall 3-1	1	Both	-	-	4342	-	1.0	-	489	-	-	-	10275	-
Seg. 1	-	S->N	71.2	-	392	-	1.0	-	489	-	-	489	2691	0.15
	-	N->S	80.5	-	443	-	1.0	-	489	-	-	489	2691	0.16
Seg. 2	-	S->N	28.0	-	126	-	1.0	-	489	-	-	489	2202	0.06
	-	N->S	28.4	-	128	-	1.0	-	489	-	-	489	2202	0.06
Seg. 3	-	S->N	347.7	-	3824	-	1.0	-	489	-	-	489	5382	0.71
	-	N->S	342.8	-	3771	-	1.0	-	489	-	-	489	5382	0.70
Level 1														
Ln3, Lev1	-	Both	-	-	5573	-	-	-	-	-	-	-	21162	-
Wall 3-1	2	Both	-	-	5573	1.0	1.0	489	489	-	A	-	21162	-
Seg. 1	-	Both	0.0	-	0	.88	.88	428	428	-	-	856	2569	0.00
Seg. 2	-	S->N	438.7	-	4607	1.0	1.0	489	489	-	-	979	10275	0.45
	-	N->S	477.9	-	5018	1.0	1.0	489	489	-	-	979	10275	0.49
Seg. 3	-	S->N	113.7	-	967	1.0	1.0	489	489	-	-	979	8318	0.12
	-	N->S	65.4	-	556	1.0	1.0	489	489	-	-	979	8318	0.07
E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]						Resp. Ratio
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line A														
Level 2														
LnA, Lev2	-	Both	-	-	1336	-	-	-	-	-	-	-	18471	-
Wall A-1	1	Both	-	-	1336	-	1.0	-	489	-	-	-	18471	-
Seg. 1	-	W->E	1.3	-	4	-	.92	-	449	-	-	449	1346	0.00
	-	E->W	3.7	-	11	-	.92	-	449	-	-	449	1346	0.01
Seg. 2	-	W->E	2.7	-	11	-	1.0	-	489	-	-	489	1957	0.01
	-	E->W	3.3	-	13	-	1.0	-	489	-	-	489	1957	0.01
Seg. 3	-	W->E	4.8	-	29	-	1.0	-	489	-	-	489	2936	0.01
	-	E->W	8.3	-	50	-	1.0	-	489	-	-	489	2936	0.02
Seg. 4	-	W->E	4.9	-	24	-	1.0	-	489	-	-	489	2446	0.01
	-	E->W	1.3	-	7	-	1.0	-	489	-	-	489	2446	0.00
Seg. 5	-	Both	5.7	-	29	-	1.0	-	489	-	-	489	2446	0.01
Seg. 6	-	W->E	82.6	-	1239	-	1.0	-	489	-	-	489	7339	0.17
	-	E->W	81.8	-	1226	-	1.0	-	489	-	-	489	7339	0.17
Level 1														
LnA, Lev1	-	Both	-	-	1999	-	-	-	-	-	-	-	14984	-
Wall A-1	1	Both	-	-	1999	-	1.0	-	489	-	-	-	14984	-
Seg. 1	-	W->E	19.5	-	117	-	1.0	-	489	-	-	489	2936	0.04
	-	E->W	21.1	-	127	-	1.0	-	489	-	-	489	2936	0.04
Seg. 2	-	W->E	101.4	-	710	-	1.0	-	489	-	-	489	3425	0.21
	-	E->W	19.7	-	138	-	1.0	-	489	-	-	489	3425	0.04
Seg. 3	-	W->E	22.4	-	134	-	1.0	-	489	-	-	489	2936	0.05
	-	E->W	17.0	-	102	-	1.0	-	489	-	-	489	2936	0.03
Seg. 4	-	W->E	115.4	-	1038	-	1.0	-	489	-	-	489	4404	0.24
	-	E->W	181.4	-	1633	-	1.0	-	489	-	-	489	4404	0.37

SHEAR RESULTS (flexible seismic design, continued)

Seg. 5	-	Both	0.0	-	0	-	.88	-	428	-	428	1284	0.00
Line B													
LnB, Lev1	-	Both	-	-	665	-	-	-	-	-	-	8664	-
Wall B-1	1	Both	-	-	665	-	1.0	-	489	-	-	8664	-
Seg. 1	-	W->E	12.0	-	36	-	.88	-	428	-	428	1284	0.03
	-	E->W	6.7	-	20	-	.88	-	428	-	428	1284	0.02
Seg. 2	-	W->E	41.7	-	629	-	1.0	-	489	-	489	7380	0.09
	-	E->W	42.7	-	645	-	1.0	-	489	-	489	7380	0.09
Line C													
Level 2													
LnC, Lev2	-	Both	-	-	1336	-	-	-	-	-	-	22752	-
Wall C-1	1	Both	-	-	1336	-	1.0	-	489	-	-	22752	-
Seg. 1	-	W->E	3.6	-	18	-	1.0	-	489	-	489	2446	0.01
	-	E->W	5.3	-	27	-	1.0	-	489	-	489	2446	0.01
Seg. 2	-	W->E	7.1	-	60	-	1.0	-	489	-	489	4159	0.01
	-	E->W	8.7	-	74	-	1.0	-	489	-	489	4159	0.02
Seg. 3	-	W->E	6.1	-	52	-	1.0	-	489	-	489	4159	0.01
	-	E->W	74.7	-	635	-	1.0	-	489	-	489	4159	0.15
Seg. 4	-	W->E	58.4	-	467	-	1.0	-	489	-	489	3914	0.12
	-	E->W	56.5	-	452	-	1.0	-	489	-	489	3914	0.12
Seg. 5	-	W->E	4.1	-	22	-	1.0	-	489	-	489	2691	0.01
	-	E->W	5.4	-	30	-	1.0	-	489	-	489	2691	0.01
Seg. 6	-	W->E	65.1	-	716	-	1.0	-	489	-	489	5382	0.13
	-	E->W	10.8	-	119	-	1.0	-	489	-	489	5382	0.02
Level 1													
LnC, Lev1	-	Both	-	-	1859	-	-	-	-	-	-	23730	-
Wall C-1	1	Both	-	-	1859	-	1.0	-	489	-	-	23730	-
Seg. 1	-	W->E	23.9	-	72	-	.88	-	428	-	428	1284	0.06
	-	E->W	5.1	-	15	-	.88	-	428	-	428	1284	0.01
Seg. 2	-	W->E	5.2	-	21	-	.97	-	474	-	474	1896	0.01
	-	E->W	43.6	-	174	-	.97	-	474	-	474	1896	0.09
Seg. 3	-	W->E	24.0	-	264	-	1.0	-	489	-	489	5382	0.05
	-	E->W	0.0	-	0	-	1.0	-	489	-	489	5382	0.00
Seg. 4	-	W->E	118.4	-	947	-	1.0	-	489	-	489	3914	0.24
	-	E->W	19.7	-	157	-	1.0	-	489	-	489	3914	0.04
Seg. 5	-	W->E	0.0	-	0	-	1.0	-	489	-	489	3914	0.00
	-	E->W	10.8	-	86	-	1.0	-	489	-	489	3914	0.02
Seg. 6	-	W->E	37.1	-	556	-	1.0	-	489	-	489	7339	0.08
	-	E->W	95.1	-	1426	-	1.0	-	489	-	489	7339	0.19

Legend:

W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "A" means that this wall is critical for all walls in the Standard Wall group.

For Dir - Direction of seismic force along shearline.

v - Design shear force on segment = ASD-factored shear force per unit length of full-height sheathing (FHS)

vmax/vft - Perforated walls: Collector and in-plane anchorage force as per SDPWS eqn. 4.3-9 = V/FHS/Co. FHS is factored for narrow segments as per 4.3.3.4

FTAO walls: Shear force in piers above and below either openings or piers beside opening(s). Aspect ratio factor does not apply to these piers.

V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment

Asp/Cub - Unblocked wood structural panel factor Cub from SDPWS 4.3.5.3 or Aspect Ratio factor from 4.3.3.2, which for perforated walls is sum bi / FHS from 4.3.5.6 with bi defined in 4.3.3.4. For multi-segment walls, wall row shows Cub and segment rows show Asp. For single-segment walls and perforated walls, value shown is Asp for blocked walls and Cub for unblocked walls.

Int, Ext - Nominal unit shear capacity of interior and exterior sheathing, factored by Table 4.3-1 Note 3 for framing specific gravity and Note 10 for presence of hold-downs. For wall segments, also include unblocked factor Cub and aspect ratio adjustments.

Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-6.

C - Sheathing combination rule, A = Add capacities, S = Strongest side or twice weakest, G = Stiffness-based using Eqns. 4.3-3,-4.

Cmb - Combined interior and exterior unit shear capacity including perforated wall factor Co.

V - Total factored shear capacity of shearline, wall or segment.

Crit Resp - Response ratio = v/Cmb = design shear force/unit shear capacity. "W" indicates that the wind design criterion was critical in selecting wall.

Notes:

Refer to Elevation View diagrams for individual level for uplift anchorage force t for perforated walls given by SDPWS 4.3.6.4.2.1.

Hold-Down and Compression Design (flexible seismic design)

Level 1				Tensile Hold-down				Hold-down	Cap [lbs]	Crit Resp.
Line-Wall	Posit'n	Location [ft]		or Compressive Stud Force [lbs]						
		X	Y	Shear	Dead	Ev	Cmb'd			
Line 1										
1-1	L End	0.00	0.12	1860	343	48	1565	HDU5-SDS	5645	0.28
1-1	L End	0.00	0.12	3419	571	48	4039	Compression	10312	0.39
	V Elem	0.00	0.88	0	360	30	390	Compression		
	V Elem	0.00	10.13	3231	480	67	2818	Refer to upper level		
	V Elem	0.00	10.13	3231	800	67	4098	Compression		
1-1	L Op 1	0.00	10.88	3419	434	61	3046	HDU5-SDS	5645	0.54
1-1	L Op 1	0.00	10.88	1860	724	61	2644	Compression	10312	0.26
1-1	R Op 1	0.00	16.13	169	197	28	0	Not required	5645	0.00
1-1	R Op 1	0.00	16.13	0	405	34	439	Compression	10312	0.04
	V Elem	0.00	19.88	1817	338	47	1527	HDU5-SDS	5645	0.27
1-1	L Op 2	0.00	19.88	1987	530	45	2562	Compression	10312	0.25
1-1	R Op 2	0.00	22.13	2900	508	71	2463	HDU5-SDS	5645	0.44
1-1	R Op 2	0.00	22.13	1057	847	71	1975	Compression	10312	0.19
	V Elem	0.00	23.13	0	80	7	87	Compression		
	V Elem	0.00	24.88	0	240	20	260	Compression		
1-1	R End	0.00	30.88	2471	264	37	2244	HDU5-SDS	5645	0.40
1-1	R End	0.00	30.88	4314	441	37	4791	Compression	10312	0.46
	V Elem	0.00	31.13	0	240	20	260	Compression		
Line 2										
2-1	L End	46.92	0.12	584	49	7	542	HDU5-SDS	5645	0.10
2-1	L End	46.92	0.12	260	81	7	348	Compression	10312	0.03
2-1	L Op 1	46.92	2.88	260	97	14	177	HDU5-SDS	5645	0.03
2-1	L Op 1	46.92	2.88	584	162	14	760	Compression	10312	0.07
2-1	R Op 1	46.92	6.13	1773	255	36	1554	HDU5-SDS	5645	0.28
2-1	R Op 1	46.92	6.13	1844	425	36	2305	Compression	10312	0.22
2-1	R End	46.92	18.63	1844	207	29	1667	HDU5-SDS	5645	0.30
2-1	R End	46.92	18.63	1773	344	29	2146	Compression	10312	0.21
Line 3										
	V Elem	68.00	0.12	597	213	30	413	Refer to upper level		
	V Elem	68.00	0.12	675	355	30	1060	Compression		
	V Elem	68.00	2.88	319	322	45	42	Refer to upper level		
	V Elem	68.00	2.88	282	536	45	863	Compression		
3-1	R Op 1	68.00	7.63	3730	538	75	3267	HDU5-SDS	5645	0.58
3-1	R Op 1	68.00	7.63	4050	897	75	5022	Compression	10312	0.49
	V Elem	68.00	10.63	237	228	32	41	Refer to upper level		
	V Elem	68.00	10.63	240	380	32	652	Compression		
	V Elem	68.00	14.88	240	228	32	44	Refer to upper level		
	V Elem	68.00	14.88	237	380	32	649	Compression		
3-1	L Op 2	68.00	17.87	2925	608	85	2402	HDU5-SDS	5645	0.43
3-1	L Op 2	68.00	17.87	2543	1013	85	3641	Compression	10312	0.35
3-1	R Op 2	68.00	22.63	2399	532	75	1941	HDU5-SDS	5645	0.34
3-1	R Op 2	68.00	22.63	1931	887	75	2893	Compression	10312	0.28
3-1	R End	68.00	30.88	3413	494	69	2988	HDU5-SDS	5645	0.53
3-1	R End	68.00	30.88	3901	823	69	4792	Compression	10312	0.46
Line A										
A-1	L End	0.12	0.00	194	225	32	0	Not required	5645	0.00
A-1	L End	0.12	0.00	231		32	230	Compression	10312	0.02
	V Elem	2.88	0.00	11	198	17	225	Compression		
A-1	L Op 1	5.88	0.00	172	1192	100	1463	Compression	10312	0.14
A-1	R Op 1	14.13	0.00	935	644	90	381	HDU5-SDS	5645	0.07
A-1	R Op 1	14.13	0.00	170	738	62	970	Compression	10312	0.09
	V Elem	17.13	0.00	69	262	22	353	Compression		
A-1	L Op 2	20.88	0.00	971	1249	105	2325	Compression	10312	0.23
A-1	R Op 2	26.13	0.00	134	531	45	709	Compression	10312	0.07
A-1	L Op 3	31.88	0.00	191	803	67	1061	Compression	10312	0.10
A-1	R Op 3	40.12	0.00	1089	901	126	315	HDU5-SDS	5645	0.06
A-1	R Op 3	40.12	0.00	1685	1482	124	3292	Compression	10312	0.32
	V Elem	40.88	0.00	41	131	11	183	Compression		
	V Elem	44.13	0.00	48	131	11	190	Compression		
A-1	L Op 4	48.88	0.00	1234	1301	182	115	HDU5-SDS	5645	0.02
A-1	L Op 4	48.88	0.00	618	2157	181	2956	Compression	10312	0.29
	V Elem	65.13	0.00	171	1051	88	1311	Compression		
	V Elem	67.88	0.00	665	441	62	286	Refer to upper level		
	V Elem	67.88	0.00	672	655	55	1382	Compression		
Line B										
B-1	L End	47.04	18.67	118	49	7	76	HDU5-SDS	5645	0.01
B-1	L End	47.04	18.67	66	51	4	122	Compression	10312	0.01
B-1	L Op 1	49.79	18.67	66	77	11	0	Not required	5645	0.00
B-1	L Op 1	49.79	18.67	118	162	14	294	Compression	10312	0.03
B-1	R Op 1	53.04	18.67	381	293	41	130	HDU5-SDS	5645	0.02
B-1	R Op 1	53.04	18.67	391	488	41	920	Compression	10312	0.09

Hold-Down and Compression Design (flexible seismic design, continued)

B-1	R End	67.88	18.67	391	244	34	181	HDU5-SDS	5645	0.03
B-1	R End	67.88	18.67	381	407	34	823	Compression	10312	0.08
Line C										
C-1	L End	0.12	31.00	265	167	23	121	HDU5-SDS	5645	0.02
C-1	L End	0.12	31.00	95		23	95	Compression	10312	0.01
C-1	L Op 1	2.88	31.00	246	493	41	780	Compression	10312	0.08
C-1	R Op 1	6.13	31.00	390	491	41	923	Compression	10312	0.09
	V Elem	7.63	31.00	72	196	16	285	Compression		
C-1	L Op 2	9.87	31.00	419	307	43	154	HDU5-SDS	5645	0.03
C-1	L Op 2	9.87	31.00	50	278	23	352	Compression	10312	0.03
C-1	R Op 2	13.13	31.00	221	257	36	0	Not required	5645	0.00
C-1	R Op 2	13.13	31.00	0	248	21	268	Compression	10312	0.03
	V Elem	15.88	31.00	72	84	12	-0	Refer to upper level		
	V Elem	15.88	31.00	58	66	6	129	Compression		
	V Elem	17.63	31.00	50	59	8	0	Refer to upper level		
	V Elem	17.63	31.00	616	400	34	1049	Compression		
C-1	L Op 3	23.88	31.00	240	673	56	969	Compression	10312	0.09
C-1	R Op 3	27.13	31.00	1068	539	75	605	HDU5-SDS	5645	0.11
C-1	R Op 3	27.13	31.00	-202	753	105	656	Compression	10312	0.06
C-1	L Op 4	34.88	31.00	833	1118	94	2044	Compression	10312	0.20
C-1	R Op 4	42.13	31.00	308	734	62	1104	Compression		
	V Elem	45.88	31.00	466	228	32	270	Refer to upper level		
	V Elem	45.88	31.00	482	380	32	894	Compression		
	V Elem	47.63	31.00	45	66	6	116	Compression		
	V Elem	49.88	31.00	1	286	24	312	Compression		
C-1	R Op 5	53.13	31.00	307	357	50	0	Not required	5645	0.00
C-1	R Op 5	53.13	31.00	827	1305	110	2242	Compression	10312	0.22
	V Elem	57.13	31.00	533	360	50	223	Refer to upper level		
	V Elem	57.13	31.00	88	362	30	480	Compression		
C-1	R End	67.88	31.00	959	712	100	346	HDU5-SDS	5645	0.06
C-1	R End	67.88	31.00	872	668	56	1596	Compression	10312	0.15
Level 2				Tensile Hold-down or Compressive Stud Force [lbs]						
Line-Wall	Posit'n	Location [ft]		Shear	Dead	Ev	Cmb'd	Hold-down	Cap [lbs]	Crit Resp.
Line 1										
	V Elem	0.00	0.88	0	360	30	390	Compression		
1-1	R Op 1	0.00	10.13	3231	480	67	2818	HDU5-SDS	5645	0.50
1-1	R Op 1	0.00	10.13	3231	800	67	4098	Compression	10312	0.40
1-1	L Op 2	0.00	20.88	3231	312	44	2963	HDU5-SDS	5645	0.52
1-1	L Op 2	0.00	20.88	3231	520	44	3795	Compression	10312	0.37
	V Elem	0.00	23.13	0	80	7	87	Compression		
	V Elem	0.00	24.88	0	240	20	260	Compression		
	V Elem	0.00	31.13	0	240	20	260	Compression		
Line 3										
3-1	L End	68.00	0.12	597	132	18	483	HDU5-SDS	5645	0.09
3-1	L End	68.00	0.12	675	220	18	913	Compression	10312	0.09
3-1	L Op 1	68.00	5.38	675	252	35	458	HDU5-SDS	5645	0.08
3-1	L Op 1	68.00	5.38	597	420	35	1052	Compression	10312	0.10
3-1	R Op 1	68.00	10.63	237	228	32	41	HDU5-SDS	5645	0.01
3-1	R Op 1	68.00	10.63	240	380	32	652	Compression	10312	0.06
3-1	L Op 2	68.00	14.88	240	228	32	44	HDU5-SDS	5645	0.01
3-1	L Op 2	68.00	14.88	237	380	32	649	Compression	10312	0.06
3-1	R Op 2	68.00	20.13	2846	384	54	2516	HDU5-SDS	5645	0.45
3-1	R Op 2	68.00	20.13	2806	640	54	3500	Compression	10312	0.34
3-1	R End	68.00	30.88	2806	264	37	2579	HDU5-SDS	5645	0.46
3-1	R End	68.00	30.88	2846	440	37	3323	Compression	10312	0.32
Line A										
A-1	L End	0.12	0.00	11	13	2	0	Not required	5645	0.00
A-1	L End	0.12	0.00	32		2	32	Compression	10312	0.00
A-1	L Op 1	2.88	0.00	11	198	17	225	Compression	10312	0.02
A-1	R Op 1	7.13	0.00	28	175	15	218	Compression	10312	0.02
A-1	L Op 2	10.88	0.00	23	262	22	307	Compression	10312	0.03
A-1	R Op 2	17.13	0.00	69	262	22	353	Compression	10312	0.03
A-1	L Op 3	22.88	0.00	40	568	48	655	Compression	10312	0.06
A-1	R Op 3	36.13	0.00	11	568	48	626	Compression	10312	0.06
A-1	L Op 4	40.88	0.00	41	131	11	183	Compression	10312	0.02
A-1	R Op 4	44.13	0.00	48	131	11	190	Compression	10312	0.02
A-1	L Op 5	48.88	0.00	49	175	15	238	Compression	10312	0.02
A-1	R Op 5	53.13	0.00	672	456	64	280	HDU5-SDS	5645	0.05
A-1	R Op 5	53.13	0.00	665	760	64	1489	Compression	10312	0.14
A-1	R End	67.88	0.00	665	360	50	356	HDU5-SDS	5645	0.06
A-1	R End	67.88	0.00	672	600	50	1322	Compression	10312	0.13
Line C										
C-1	L End	0.12	31.00	31	36	5	0	Not required	5645	0.00

Hold-Down and Compression Design (flexible seismic design, continued)

C-1	L End	0.12	31.00	45		5	45	Compression	10312	0.00
C-1	L Op 1	4.88	31.00	31	174	15	219	Compression	10312	0.02
C-1	R Op 1	7.63	31.00	72	196	16	285	Compression	10312	0.03
C-1	L Op 2	15.88	31.00	72	84	12	0	Not required	5645	0.00
C-1	L Op 2	15.88	31.00	58	66	6	129	Compression	10312	0.01
C-1	R Op 2	17.63	31.00	50	59	8	0	Not required	5645	0.00
C-1	R Op 2	17.63	31.00	616	400	34	1049	Compression	10312	0.10
C-1	L Op 3	25.88	31.00	616	492	69	192	HDU5-SDS	5645	0.03
C-1	L Op 3	25.88	31.00	50	565	47	663	Compression	10312	0.06
C-1	R Op 3	38.13	31.00	482	480	67	70	HDU5-SDS	5645	0.01
C-1	R Op 3	38.13	31.00	466	800	67	1333	Compression	10312	0.13
C-1	L Op 4	45.88	31.00	466	228	32	270	HDU5-SDS	5645	0.05
C-1	L Op 4	45.88	31.00	482	380	32	894	Compression	10312	0.09
C-1	R Op 4	47.63	31.00	45	66	6	116	Compression	10312	0.01
C-1	L Op 5	52.88	31.00	34	175	15	223	Compression	10312	0.02
C-1	R Op 5	57.13	31.00	533	360	50	223	HDU5-SDS	5645	0.04
C-1	R Op 5	57.13	31.00	88	362	30	480	Compression	10312	0.05
C-1	R End	67.88	31.00	88	103	14	0	Not required	5645	0.00
C-1	R End	67.88	31.00	533	440	37	1010	Compression	10312	0.10

Legend:**Line-Wall:**

At wall or opening – Shearline and wall number

At vertical element – Shearline

Posit'n – Position of stud pack that hold-down is attached to:

V Elem – Vertical element: column or strengthened studs required where not at wall end or opening

L or R End – At left or right wall end

L or R Op n – At left or right side of opening n

t @ Op n – Uplift force t at opening n from offset opening in perforated wall above, from SDPWS 4.3.6.4.2.1

Location – Co-ordinates in Plan View**Tensile Hold-down or Compressive Stud Force** – Upwards force on hold-down at one end of the wall or downward force on bottom plate under studs at the other end, for each force direction. Includes forces transferred from upper levels.**Shear** – Overturning component = $V \times h / beff$ from SDPWS Eqn. 4.3-7; V = force on segment, ASD-factored by 0.70; h = wall height, beff = wall segment length – (tension stud pack width + hold-down anchor bolt offset) – (1/2 compression stud pack width). For perforated walls = $V \times h / Co$ sum (bi) from SDPWS Eqn. 4.3-8.**Dead** – Dead load resisting component, factored for ASD by 0.60 for tension and 1.0 for compression**Ev** – Vertical seismic load effect from ASCE 7 12.4.2.2 = $-0.2 Sds \times ASD \text{ factor} \times \text{unfactored } D = 0.14 SDS \times \text{factored } D$. Refer to Seismic Information table for more details.**Cmb'd** – Sum of ASD-factored overturning, dead and vertical seismic forces. May also include the uplift force t from perforated walls from SDPWS 4.3.6.4.2.1 when openings are staggered.**Hold-down** – Device model number from hold-down database; "Compression" for bearing of end stud pack on bottom plate**Cap** – Hold-downs: Allowable ASD tension load from database; Compression: Allowable ASD bearing force = $Ct CM Cb Fcp A$; A = cross sectional area of end studs. Refer to Framing materials table for details.**Crit. Resp.** – Critical Response = Combined ASD force/Allowable ASD tension load**Notes:**

HDU5-SDS2.5 for studs with thickness > 0'-3" and depth > 0'-3.5" : Uses 14 1/4" x 2.5" SDS heavy-duty screws; 5/8" anchor bolt.

Combined force from ASCE 7 2.4.1 load combination 10 = $-(0.6D - 0.7Ev + 0.7Eh)$; Eh (from 12.4.2.1) = - shear overturning force

Refer to the Shear Line Dimensions table for wall height h, effective segment length beff and perforated wall adjusted sum of bi, to the Story Table for joist depth, and to the Shear Results table for perforated factor Co.

Designer is responsible for design of connection from wall to floor or foundation for shear force shown in Shear Results table. Refer to SDPWS 4.3.6.4.3 for foundation anchor bolt requirements.

COLLECTOR FORCES (flexible seismic design)

Level 1				Drag Strut		Strap/Blocking	
Line-Wall	Position on Wall or Opening	Location [ft]		Force [lbs]		Force [lbs]	
		X	Y	--->	<---	--->	<---
Line 1							
	Shearline force			6676	6676		
1-1	Left Opening 1	0.00	11.00	-82	-1835		
1-1	Right Opening 1	0.00	16.00	-1159			
1-1	Left Opening 2	0.00	20.00	-1948			
1-1	Right Opening 2	0.00	22.00	-2378	534		
Line 2							
	Shearline force			2875	2875		
2-1	Left Opening 1	46.92	3.00	-84	192		
2-1	Right Opening 1	46.92	6.00	-362	470		
2-1	Right Wall End	46.92	18.75	1136	-1136		
Line 3							
	Shearline force			5682	5682		
3-1	Right Opening 1	68.00	7.50	-1375	1375		
3-1	Left Opening 2	68.00	18.00	1397	-1816		
3-1	Right Opening 2	68.00	22.50	572	-992		
Line A							
	Shearline force			2509	2509		
A-1	Left Opening 1	6.00	0.00	-75	63		
A-1	Right Opening 1	14.00	0.00	-370	358		
A-1	Left Opening 2	21.00	0.00	262	443		
A-1	Right Opening 2	26.00	0.00	78	628		
A-1	Left Opening 3	32.00	0.00	25	721		
A-1	Right Opening 3	40.00	0.00	-270	1016		
A-1	Left Opening 4	49.00	0.00	701	-701		
Line B							
	Shearline force			1176	1176		
B-1	Left Wall End	46.92	18.67	-811	811		
B-1	Left Opening 1	49.92	18.67	-799	827		
B-1	Right Opening 1	52.92	18.67	-851	879		
Line C							
	Shearline force			2262	2262		
C-1	Left Opening 1	3.00	31.00	-13	81		
C-1	Right Opening 1	6.00	31.00	-112	181		
C-1	Left Opening 2	10.00	31.00	-220	102		
C-1	Right Opening 2	13.00	31.00	-320			
C-1	Left Opening 3	24.00	31.00	-365			
C-1	Right Opening 3	27.00	31.00	-465	667		
C-1	Left Opening 4	35.00	31.00	421	742		
C-1	Right Opening 4	42.00	31.00		975		
C-1	Left Opening 5	50.00	31.00		1136		
C-1	Right Opening 5	53.00	31.00	-178	1236		
Level 2				Drag Strut		Strap/Blocking	
Line-Wall	Position on Wall or Opening	Location [ft]		Force [lbs]		Force [lbs]	
		X	Y	--->	<---	--->	<---
Line 1							
	Shearline force			4342	4342		
1-1	Right Opening 1	0.00	10.00	-1401	1401		
1-1	Left Opening 2	0.00	21.00	1401	-1401		
Line 3							
	Shearline force			4342	4342		
3-1	Left Opening 1	68.00	5.50	-379	327		
3-1	Right Opening 1	68.00	10.50	-1079	1028		
3-1	Left Opening 2	68.00	15.00	-1583	1530		
3-1	Right Opening 2	68.00	20.00	-2284	2231		
Line A							
	Shearline force			1336	1336		
A-1	Left Opening 1	3.00	0.00	-55	48		
A-1	Right Opening 1	7.00	0.00	-134	126		
A-1	Left Opening 2	11.00	0.00	-201	192		
A-1	Right Opening 2	17.00	0.00	-319	310		
A-1	Left Opening 3	23.00	0.00	-408	378		
A-1	Right Opening 3	36.00	0.00	-664	633		
A-1	Left Opening 4	41.00	0.00	-738	725		
A-1	Right Opening 4	44.00	0.00	-797	784		
A-1	Left Opening 5	49.00	0.00	-866	853		
A-1	Right Opening 5	53.00	0.00	-945	932		
Line C							
	Shearline force			1336	1336		

COLLECTOR FORCES (flexible seismic design, continued)

C-1	Left Opening 1	5.00	31.00	-80	72
C-1	Right Opening 1	7.50	31.00	-129	121
C-1	Left Opening 2	16.00	31.00	-236	213
C-1	Right Opening 2	17.50	31.00	-265	243
C-1	Left Opening 3	26.00	31.00	-380	-225
C-1	Right Opening 3	38.00	31.00	-616	11
C-1	Left Opening 4	46.00	31.00	-306	-284
C-1	Right Opening 4	47.50	31.00	-336	-254
C-1	Left Opening 5	53.00	31.00	-421	-176
C-1	Right Opening 5	57.00	31.00	-500	-97

Legend:*Line-Wall - Shearline and wall number**Position...- Side of opening or wall end that drag strut is attached to**Location - Co-ordinates in Plan View**Drag strut Force - Axial force in transfer element at openings, gaps, or changes in design shear along shearline. + : tension; - : compression.**Based on ASD-factored shearline force shown. For SDC C-F, it is the greater of the design shearline force and the diaphragm force F_{px} , added to shearline force from story above and to forces transferred from discontinuous shearlines factored by overstrength (ω) as per 12.10.1.1.**Refer to Seismic Information table for diaphragm forces and omega factor.**For SDC D-F, if horizontal torsional irregularities 2, 3, or 4 are input, or vertical irregularity 4 detected or input, 25% increase from 12.3.3.4 applied.**For perforated walls, this force is converted to v_{max} using 4.3.6.4.1.1.**Strap/Blocking Force – For FTAO walls, force transferred from above and below opening to shearwall pier.**-> Due to shearline force in the west-to-east or south-to-north direction**<- Due to shearline force in the east-to-west or north-to-south direction*

DEFLECTION (flexible seismic design)

Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 1														
Line 1														
1-1,1	2	S->N	Comb	288.6	11.00	9.00	16.5	.007	50.6	171	.025	.051	0.25	0.31
		N->S	Comb	530.4	11.00	9.00	16.5	.012	50.6	171	.025	.094	0.29	0.40
1-1,2		S->N	Comb	25.2	4.00	9.00	16.5	.002	50.6	171	.025	.004	0.04	0.04
		N->S	Comb	0.0	4.00	9.00	16.5	-	50.6	-	-	-	-	0.40
1-1,3		S->N	Comb	665.7	9.00	9.00	16.5	.019	50.6	171	.025	.119	0.29	0.43
		N->S	Comb	381.3	9.00	9.00	16.5	.011	50.6	171	.025	.068	0.32	0.40
Line 2														
2-1,1	3	S->N	1S	85.0	3.00	9.00	16.5	.007	25.3	171	.025	.030	0.87	0.91
		N->S	1S	37.9	3.00	9.00	16.5	.003	25.3	171	.025	.013	0.83	0.85
2-1,2		S->N	1S	275.9	12.75	9.00	16.5	.005	25.3	171	.025	.098	0.22	0.32
		N->S	1S	287.0	12.75	9.00	16.5	.006	25.3	171	.025	.102	0.22	0.33
Line 3														
3-1,1	2	S->N	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.43
		N->S	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.40
3-1,2		S->N	Comb	626.8	10.50	9.00	16.5	.015	50.6	171	.025	.112	0.30	0.43
		N->S	Comb	682.7	10.50	9.00	16.5	.016	50.6	171	.025	.122	0.26	0.40
3-1,3		S->N	Comb	162.5	8.50	9.00	16.5	.005	50.6	171	.025	.029	0.40	0.43
		N->S	Comb	93.4	8.50	9.00	16.5	.003	50.6	171	.025	.017	0.38	0.40
Line A														
A-1,1	1	W->E	ExtS	27.8	6.00	9.00	16.5	.001	25.3	171	.025	.010	0.01	0.02
		E->W	ExtS	30.1	6.00	9.00	16.5	.001	25.3	171	.025	.011	0.00	0.01
A-1,2		W->E	ExtS	144.8	7.00	9.00	16.5	.005	25.3	171	.025	.052	0.36	0.41
		E->W	ExtS	28.1	7.00	9.00	16.5	.001	25.3	171	.025	.010	0.00	0.02
A-1,3		W->E	ExtS	32.0	6.00	9.00	16.5	.001	25.3	171	.025	.011	0.01	0.02
		E->W	ExtS	24.3	6.00	9.00	16.5	.001	25.3	171	.025	.009	0.00	0.01
A-1,4		W->E	ExtS	164.8	9.00	9.00	16.5	.005	25.3	171	.025	.059	0.28	0.34
		E->W	ExtS	259.2	9.00	9.00	16.5	.007	25.3	171	.025	.092	0.01	0.11
A-1,5		W->E	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.34
		E->W	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.11
Line B														
B-1,1	1	W->E	1S	17.2	3.00	9.00	16.5	.001	25.3	171	.025	.006	0.82	0.83
		E->W	1S	9.6	3.00	9.00	16.5	.001	25.3	171	.025	.003	0.00	0.01
B-1,2		W->E	1S	59.5	15.08	9.00	16.5	.001	25.3	171	.025	.021	0.15	0.18
		E->W	1S	61.1	15.08	9.00	16.5	.001	25.3	171	.025	.022	0.16	0.18
Line C														
C-1,1	1	W->E	ExtS	34.1	3.00	9.00	16.5	.003	25.3	171	.025	.012	0.83	0.84
		E->W	ExtS	7.3	3.00	9.00	16.5	.001	25.3	171	.025	.003	0.00	0.00
C-1,2		W->E	ExtS	7.5	4.00	9.00	16.5	.000	25.3	171	.025	.003	0.00	0.01
		E->W	ExtS	62.3	4.00	9.00	16.5	.004	25.3	171	.025	.022	0.61	0.64
C-1,3		W->E	ExtS	34.3	11.00	9.00	16.5	.001	25.3	171	.025	.012	0.21	0.22
		E->W	ExtS	0.0	11.00	9.00	16.5	-	25.3	-	-	-	-	0.21
C-1,4		W->E	ExtS	169.1	8.00	9.00	16.5	.005	25.3	171	.025	.060	0.32	0.38
		E->W	ExtS	28.1	8.00	9.00	16.5	.001	25.3	171	.025	.010	0.00	0.01
C-1,5		W->E	ExtS	0.0	8.00	9.00	16.5	-	25.3	-	-	-	-	0.02
		E->W	ExtS	15.4	8.00	9.00	16.5	.000	25.3	171	.025	.005	0.00	0.01
C-1,6		W->E	ExtS	53.0	15.00	9.00	16.5	.001	25.3	171	.025	.019	0.00	0.02
		E->W	ExtS	135.8	15.00	9.00	16.5	.002	25.3	171	.025	.048	0.16	0.21
Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/ in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 2														
Line 1														
1-1,2	2	S->N	Comb	563.9	11.00	8.00	16.5	.009	50.6	171	.025	.089	0.31	0.41
		N->S	Comb	563.9	11.00	8.00	16.5	.009	50.6	171	.025	.089	0.32	0.42
Line 3														
3-1,1	1	S->N	ExtS	101.7	5.50	8.00	16.5	.003	25.3	171	.025	.032	0.42	0.46
		N->S	ExtS	115.0	5.50	8.00	16.5	.004	25.3	171	.025	.036	0.42	0.46
3-1,2		S->N	ExtS	40.0	4.50	8.00	16.5	.002	25.3	171	.025	.013	0.47	0.49
		N->S	ExtS	40.5	4.50	8.00	16.5	.002	25.3	171	.025	.013	0.48	0.49
3-1,3		S->N	ExtS	496.7	11.00	8.00	16.5	.008	25.3	171	.025	.157	0.30	0.46
		N->S	ExtS	489.8	11.00	8.00	16.5	.008	25.3	171	.025	.155	0.30	0.46
Line A														
A-1,1	1	W->E	ExtS	1.8	3.00	8.00	16.5	.000	25.3	171	.025	.001	0.00	0.00
		E->W	ExtS	5.3	3.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
A-1,2		W->E	ExtS	3.9	4.00	8.00	16.5	.000	25.3	171	.025	.001	0.00	0.00
		E->W	ExtS	4.7	4.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
A-1,3		W->E	ExtS	6.8	6.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.01
		E->W	ExtS	11.8	6.00	8.00	16.5	.000	25.3	171	.025	.004	0.00	0.01

DEFLECTION (flexible seismic design, continued)

A-1, 4		W->E	ExtS	6.9	5.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
		E->W	ExtS	1.9	5.00	8.00	16.5	.000	25.3	171	.025	.001	0.00	0.00
A-1, 5		W->E	ExtS	8.3	5.00	8.00	16.5	.000	25.3	171	.025	.003	0.00	0.00
		E->W	ExtS	8.2	5.00	8.00	16.5	.000	25.3	171	.025	.003	0.00	0.00
A-1, 6		W->E	ExtS	118.0	15.00	8.00	16.5	.001	25.3	171	.025	.037	0.15	0.18
		E->W	ExtS	116.8	15.00	8.00	16.5	.001	25.3	171	.025	.037	0.15	0.19
Line C														
C-1, 1	1	W->E	ExtS	5.2	5.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
		E->W	ExtS	7.6	5.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
C-1, 2		W->E	ExtS	10.1	8.50	8.00	16.5	.000	25.3	171	.025	.003	0.00	0.00
		E->W	ExtS	12.5	8.50	8.00	16.5	.000	25.3	171	.025	.004	0.00	0.01
C-1, 3		W->E	ExtS	8.7	8.50	8.00	16.5	.000	25.3	171	.025	.003	0.00	0.01
		E->W	ExtS	106.7	8.50	8.00	16.5	.002	25.3	171	.025	.034	0.25	0.29
C-1, 4		W->E	ExtS	83.4	8.00	8.00	16.5	.002	25.3	171	.025	.026	0.26	0.29
		E->W	ExtS	80.7	8.00	8.00	16.5	.002	25.3	171	.025	.026	0.27	0.30
C-1, 5		W->E	ExtS	5.8	5.50	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
		E->W	ExtS	7.7	5.50	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
C-1, 6		W->E	ExtS	93.0	11.00	8.00	16.5	.001	25.3	171	.025	.029	0.20	0.23
		E->W	ExtS	15.4	11.00	8.00	16.5	.000	25.3	171	.025	.005	0.00	0.01

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B.

W Gp – Wall design group, refer to Sheathing and Framing Materials tables.

Dir – Force direction.

Srf – Wall surface = Int(erior) or Ext(erior) for perimeter walls, 1 or 2 for interior partitions; Comb = Combined v and Ga for identical materials on each side; S = Ga from side with stronger shear resistance; W = 2 x Ga of weaker side.

v – Unfactored (strength-level) shear force per unit distance on wall segment = ASD force / 0.70, as per ASCE 7 12.8.6.

Unblocked walls = v / Cub as per SDPWS 4.3.4.3, Cub = Unblocked factor from 4.3.5.3, shown in the Shear Results table.

Perforated walls = vmax from Eqn. 4.3-9, as per 4.3.4.2.

FTAO walls = Unit shear force in pier beside opening(s).

b – Wall or segment length.

Segmented wall or FTAO wall segments = Width of wall segment between openings.

Perforated wall = Sum of FHS segments, modified as in 4.3.3.4 per 4.3.4.2.

FTAO wall = Length of wall including openings.

h – Wall height.

FTAO piers = Distance from bottom of opening to top of wall; for end segments, results using that distance and the wall height are averaged.

Defl – Horizontal shear wall deflection due to given term:

Bending = $8vh^3 / EAb$; A = Effective cross sectional area of segment end stud(s), E = stud mod. of elasticity in Framing Materials table

For i studs at one end and j at the other, $A = 2ij / (i + j) \times \text{area of one stud}$, based on Ex. C4.3.4-3

Shear = $vh / 1000 Ga$; $Ga = 1.4 vs / (1.4 vs / Gvtv + 0.75 en)$ from SDPWS Eqn. C4.2.3-3.

vs = ASD sheathing capacity.

Gvtv = Shear stiffness from C4.3.4, shown in Sheathing Materials table.

en = Nail slip from Table C4.2.3D, of form aVn^b for WSP, varies linearly to value at capacity for other materials.

Vn = Strength-level shear force per nail along panel edge at ASD capacity = 1.4 vs.

Hold – Anchorage system (hold-down) = $da \times h / beff$.

da = Vertical hold-down displacement; refer to Hold-down Displacement table for components.

beff = Effective wall segment length = $b - (\text{tension stud pack width} + \text{hold-down anchor bolt offset}) - (1/2 \text{ compression stud pack width})$

beff is given in the Shear Wall Dimensions table.

For FTAO walls, hold-down device at end of wall is applied to all segments, as per APA T555.

Total Defl – Deflection from bending + shear + hold-down, as per Eqn. 4.3-2.

For FTAO walls, the average of the values for the segments, as per APA T555.

WARNING - On shearline(s) A, B, C, 1, 2, 3 the program was unable to equalize deflections on the shearwall segments. Change design setting to capacity-based rigidity, or turn off the distribution to segments based on rigidity.

HOLD-DOWN DISPLACEMENT (flexible seismic design)

Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 1													
Line 1													
1-1,1	S->N	HDU5-SDS	1565	.044	.001	0.045	-	-	.248	3757	0.01	0.30	0.25
	N->S	HDU5-SDS	3046	.085	.003	0.088	-	-	.248	5753	0.02	0.35	0.29
1-1,2	S->N	HDU5-SDS	0	.000	.000	0.000	-	-	.000	3598	0.02	0.02	0.04
	N->S	HDU5-SDS	0	.000	.000	0.000	-	-	.000	616	0.00	0.00	-
1-1,3	S->N	HDU5-SDS	646	.018	.001	0.019	-	-	.248	6832	0.02	0.28	0.29
	N->S	HDU5-SDS	2244	.063	.002	0.065	-	-	.248	202	0.00	0.31	0.32
Line 2													
2-1,1	S->N	HDU5-SDS	542	.015	.001	0.016	-	-	.248	1081	0.00	0.27	0.87
	N->S	HDU5-SDS	177	.005	.000	0.005	-	-	.248	495	0.00	0.25	0.83
2-1,2	S->N	HDU5-SDS	1554	.043	.001	0.045	-	-	.248	3056	0.01	0.30	0.22
	N->S	HDU5-SDS	1667	.047	.002	0.048	-	-	.248	3281	0.01	0.30	0.22
Line 3													
3-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
3-1,2	S->N	HDU5-SDS	2986	.084	.003	0.086	-	-	.248	3252	0.01	0.34	0.30
	N->S	HDU5-SDS	1077	.030	.001	0.031	-	-	.248	6693	0.02	0.30	0.26
3-1,3	S->N	HDU5-SDS	3443	.096	.003	0.100	-	-	.248	6823	0.02	0.37	0.40
	N->S	HDU5-SDS	2988	.084	.003	0.086	-	-	.248	6224	0.02	0.35	0.38
Line A													
A-1,1	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1992	0.01	0.01	0.01
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	329	0.00	0.00	0.00
A-1,2	W->E	HDU5-SDS	392	.011	.000	0.011	-	-	.248	3308	0.01	0.27	0.36
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1339	0.00	0.00	0.00
A-1,3	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1463	0.00	0.00	0.01
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	978	0.00	0.00	0.00
A-1,4	W->E	HDU5-SDS	334	.009	.000	0.010	-	-	.248	3915	0.01	0.27	0.28
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	4669	0.01	0.01	0.01
A-1,5	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
Line B													
B-1,1	W->E	HDU5-SDS	76	.002	.000	0.002	-	-	.248	415	0.00	0.25	0.82
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	159	0.00	0.00	0.00
B-1,2	W->E	HDU5-SDS	130	.004	.000	0.004	-	-	.248	1164	0.00	0.25	0.15
	E->W	HDU5-SDS	181	.005	.000	0.005	-	-	.248	1301	0.00	0.26	0.16
Line C													
C-1,1	W->E	HDU5-SDS	121	.003	.000	0.003	-	-	.248	1132	0.00	0.25	0.83
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	136	0.00	0.00	0.00
C-1,2	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	486	0.00	0.00	0.00
	E->W	HDU5-SDS	154	.004	.000	0.004	-	-	.248	1281	0.00	0.26	0.61
C-1,3	W->E	HDU5-SDS	0	.002	.000	0.002	-	-	.248	1306	0.00	0.25	0.21
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	373	0.00	0.00	-
C-1,4	W->E	HDU5-SDS	586	.017	.001	0.017	-	-	.248	2581	0.01	0.27	0.32
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	857	0.00	0.00	0.00
C-1,5	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1533	0.00	0.00	0.00
C-1,6	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	2187	0.01	0.01	0.00
	E->W	HDU5-SDS	346	.010	.000	0.010	-	-	.248	3171	0.01	0.27	0.16
Wall, segment	Dir	Hold- down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 2													
Line 1													
1-1,2	S->N	HDU5-SDS	2818	.158	.001	0.159	-	-	.248	5406	0.01	0.42	0.31
	N->S	HDU5-SDS	2963	.166	.001	0.167	-	-	.248	5832	0.02	0.43	0.32
Line 3													
3-1,1	S->N	HDU5-SDS	483	.027	.000	0.027	-	-	.248	1491	0.00	0.28	0.42
	N->S	HDU5-SDS	458	.026	.000	0.026	-	-	.248	1299	0.00	0.28	0.42
3-1,2	S->N	HDU5-SDS	41	.002	.000	0.002	-	-	.248	916	0.00	0.25	0.47
	N->S	HDU5-SDS	44	.002	.000	0.002	-	-	.248	921	0.00	0.25	0.48
3-1,3	S->N	HDU5-SDS	2516	.141	.001	0.142	-	-	.248	4734	0.01	0.40	0.30
	N->S	HDU5-SDS	2579	.144	.001	0.145	-	-	.248	4982	0.01	0.41	0.30
Line A													
A-1,1	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	308	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	46	0.00	0.00	0.00
A-1,2	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	423	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	300	0.00	0.00	0.00
A-1,3	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	902	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	489	0.00	0.00	0.00
A-1,4	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	253	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	861	0.00	0.00	0.00

HOLD-DOWN DISPLACEMENT (flexible seismic design, continued)

A-1, 5	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	330	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	264	0.00	0.00	0.00
A-1, 6	W->E	HDU5-SDS	280	.016	.000	0.016	-	-	.248	1872	0.00	0.27	0.15
	E->W	HDU5-SDS	356	.020	.000	0.020	-	-	.248	2105	0.01	0.27	0.15
Line C													
C-1, 1	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	298	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	64	0.00	0.00	0.00
C-1, 2	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	181	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	382	0.00	0.00	0.00
C-1, 3	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	905	0.00	0.00	0.00
	E->W	HDU5-SDS	192	.011	.000	0.011	-	-	.248	1487	0.00	0.26	0.25
C-1, 4	W->E	HDU5-SDS	70	.004	.000	0.004	-	-	.248	1267	0.00	0.25	0.26
	E->W	HDU5-SDS	270	.014	.000	0.014	-	-	.248	1882	0.00	0.27	0.27
C-1, 5	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	309	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	162	0.00	0.00	0.00
C-1, 6	W->E	HDU5-SDS	223	.012	.000	0.013	-	-	.248	1430	0.00	0.26	0.20
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	649	0.00	0.00	0.00

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B

Dir – Force direction

Tens., Comp. – Accumulated ASD hold-down tension force *T* and strength-level end compression force *C* from overturning, dead and vertical earthquake loads.

Tens. – ASD-factored force, used for proportion of manufacturer's maximum elongation

Comp. – Strength level force as per ASCE 12.8.6

da – Vertical displacements due to the following components:

Vert. Displacement – Elongation when slippage calculated separately; displacement when combined elongation/slippage used

Manuf – Using manufacturer's value for anchor bolt length, or no bolt contribution for connector-only elongation

Unless marked with * = (ASD tension force / ASD hold-down capacity) x max strength-level elongation or displacement

* - Maximum strength-level elongation or displacement is used. May result in higher than actual displacements for lightly loaded hold-downs, causing the segment to draw less force due to lower than actual stiffness.

Add – Due to longer anchor bolt length than manufacturer's value, or entire bolt length for connector-only elongation = $TL / (Ab \times Es)$

T = Strength level tension force (not shown)

Ab = bolt cross-sectional area

Es = steel modulus = 29000000 psi

L = *Lb* – *Lh*

Lb = Total bolt length shown in Storey Information table

Lh = Manufacturer's anchor bolt length for given displacement/elongation from hold-down database

Slippage – Due to vertical slippage of hold-down fasteners attached to stud(s) when not combined with elongation

Nails = *en* from SDPWS Table C4.2.3D using values for wood structural panels

Bolts = $V_f / (270,000 D^{1.5})$ (NDS 11.3.6); *D* = bolt diameter, *V_f* = Tension force *T* / number of fasteners

Shrink + Extra – Wood shrinkage plus extra displacement due to mis-cuts, gaps, etc.

Shrinkage = $0.002 \times (19\% \text{ fabrication} - 10\% \text{ in-service moisture contents}) \times L_s$

L_s = Length between anchor bolt fasteners subject to perp-to-grain shrinkage; see Storey Information table

Crush – Deformation of bottom plate at compression end of wall segment

= $0.02'' \times [r / 0.73, r < 0.73; (1 + (r - 0.73) / 0.27), 0.73 < r < 1; 2r^3, r > 1]$

r = f_{cp} / F_{cp} ; F_{cp} = $C_t CM F_{cp}$; f_{cp} = C / A , *A* = cross sectional area of end studs

Total da – Vert. Displacement + Slippage + Shrink + Crush + Extra

Horz Defl – Anchorage deflection term in SDPWS Eqn. C.4.3.4-1 = $h / beff \times da$

h = Wall height. For end segments in FTAO walls, *h* is the average of the wall height and the distance from the bottom of opening to top of wall

beff = Effective wall segment length = *b* - (tension stud pack width + hold-down anchor bolt offset) - (1/2 compression stud pack width)

h and *b* are shown in Deflection table, *beff* in the Shear Wall Dimensions table

STORY DRIFT (flexible seismic design)

Level	Dir	Actual Story Drift (in)							Allowable Story Drift			
		Const defl	Max dxe	Line	Max dx	Center of Mass	C of M dxe	C of M dx	hsx ft	Delta a in	Ratio Max	C of M
1	N<->S	0.74	0.85	2	0.95	34.51	0.73	0.86	9.83	2.95	0.32	0.29
	E<->W	0.56	0.64	C	0.89	15.47	0.17	0.30			0.30	0.10
2	N<->S	0.18	0.46	3	0.75	34.00	0.44	0.70	8.00	2.40	0.31	0.29
	E<->W	0.23	0.29	C	0.46	15.50	0.24	0.41			0.19	0.17

ASCE 7 Eqn. 12.8-15: $dx = dxc + (dxe - dxc) Cd / Ie$ Deflection amplification factor Cd from Table 12.2-1 = 4.0 (E-W), 2.0 (N-S)Importance factor $Ie = 1.00$

Legend:

Const defl (dxc) – Deflection due to shrinkage, gaps, bolt hole, etc. (constant with respect to force)*Max dxe* – Largest deflection for any shearline on level in this direction; refer to Deflections table*Line* – Shearline with largest deflection on level in this direction*hsx* – Story height in ASCE Table 12.12-1 = Height of walls plus joist depth between this level and the one above.*Max dx* – Largest amplified deflection on level in this direction using ASCE 7 Eq'n 12.8-15*C of M dxe* - Deflection at the center of mass of this level; from interpolating deflections at adjacent shearlines.*C of M dx* - Amplified deflection at center of mass using Eq'n 12.8-15. Does not include differences between top and bottom diaphragm deflection.*Delta a* = Allowable story drift on this level from ASCE 7 Table 12.12-1*Ratio* - Proportion of allowable story drift experienced, on this level in this direction.

Rigid Diaphragm Seismic Design

SEISMIC INFORMATION

Level	Mass [lbs]	Area [sq.ft]	Story Shear Fx [lbs]		Shear Resistance [lbs]		Diaphragm Force [lbs]			
			E-W	N-S	E-W	N-S	E-W		N-S	
							Fpx	Design	Fpx	Design
2	31020	2108.0	2672	8684	41222	21039	2672	2672	5211	8684
1	38986	2108.0	1852	6018	47379	52048	3275	3275	6550	6550
All	70006	-	4523	14701	-	-	-	-	-	-

Legend:

Mass – Sum of all generated and input building masses on level = w_x in ASCE 7 Eqn. 12.8-12.

Story Shear – Total ASD-factored shear force induced at level x from Eqn. 12.8-11.

Shear Resistance – Lateral design strength of all shear-resisting elements on story, for use in weak story evaluation (4.1.8).

Diaphragm Force – used by Shearwalls only for drag strut forces, as per Exception to 12.10.2.1.

Fpx - Minimum ASD-factored force for diaphragm design from Eqns. 12.10-1, -2, and -3.

Design = The greater of the story shear and Fpx + transfer forces from discontinuous shearlines, factored by overstrength (ω) as per 12.10.1.1. $\omega = 3.0$ as per 12.2-1.

On at least one level and force direction, a torsional irregularity was detected and torsional amplification factor A_x applied according to 12.8.4.3. Refer to the Torsional Analysis section of the Log File output for the values of A_x .

Redundancy Factor ρ (rho):

E-W 1.00, N-S 1.00

Automatically calculated according to ASCE 7 12.3.4.2.

Vertical Earthquake Load E_v

$E_v = 0.2 S_d S_d$; $S_d = 0.60$; $E_v = 0.120 D$ unfactored; $0.084 D$ factored; total dead load factor: $0.6 - 0.084 = 0.516$ tension, $1.0 + 0.084 = 1.084$ compression.

Weak Story (SDPWS 4.1.8)

The lateral resistance of each story is greater than or equal to that of the story above. This vertical distribution of SFRS is permitted.

SHEAR RESULTS (rigid seismic design)

N-S Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]						Resp. Ratio
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line 1														
Level 2														
Ln1, Lev2	-	Both	-	-	4651	-	-	-	-	-	-	-	10764	-
Wall 1-1	2	Both	-	-	4651	1.0	1.0	489	489	-	A	-	10764	-
Seg. 1	-	Both	0.0	-	0	1.0	1.0	489	489	-	-	979	-	-
Seg. 2	-	Both	422.8	-	4651	1.0	1.0	489	489	-	-	979	10764	0.43
Seg. 3	-	Both	0.0	-	0	1.0	1.0	489	489	-	-	979	-	-
Seg. 4	-	Both	0.0	-	0	1.0	1.0	489	489	-	-	979	-	-
Level 1														
Ln1, Lev1	-	S->N	-	-	6498	-	-	-	-	-	-	-	23363	-
	-	N->S	-	-	6556	-	-	-	-	-	-	-	23363	-
Wall 1-1	2	S->N	-	-	6498	1.0	1.0	489	489	-	A	-	23363	-
	2	N->S	-	-	6556	1.0	1.0	489	489	-	A	-	23363	-
Seg. 1	-	S->N	263.2	-	2895	1.0	1.0	489	489	-	-	979	10764	0.27
	-	N->S	372.1	-	4094	1.0	1.0	489	489	-	-	979	10764	0.38
Seg. 2	-	S->N	56.5	-	226	.97	.97	474	474	-	-	948	3792	0.06
	-	N->S	0.0	-	0	.97	.97	474	474	-	-	948	3792	0.00
Seg. 3	-	S->N	375.2	-	3377	1.0	1.0	489	489	-	-	979	8807	0.38
	-	N->S	273.6	-	2463	1.0	1.0	489	489	-	-	979	8807	0.28
Line 2														
Level 2														
Ln2, Lev1	-	S->N	-	-	4544	-	-	-	-	-	-	-	7523	-
	-	N->S	-	-	4389	-	-	-	-	-	-	-	7523	-
Wall 2-1	3	S->N	-	-	4544	1.0	1.0	89	489	-	S	-	7523	-
	3	N->S	-	-	4389	1.0	1.0	89	489	-	S	-	7523	-
Seg. 1	-	S->N	49.7	-	149	.88	.88	78	428	-	-	428	1284	0.12
	-	N->S	46.7	-	140	.88	.88	78	428	-	-	428	1284	0.11
Seg. 2	-	S->N	344.7	-	4395	1.0	1.0	89	489	-	-	489	6238	0.70
	-	N->S	333.3	-	4249	1.0	1.0	89	489	-	-	489	6238	0.68
Line 3														
Level 2														
Ln3, Lev2	-	Both	-	-	4645	-	-	-	-	-	-	-	10275	-
Wall 3-1	1	Both	-	-	4645	-	1.0	-	489	-	-	-	10275	-
Seg. 1	-	Both	91.9	-	505	-	1.0	-	489	-	-	489	2691	0.19
Seg. 2	-	Both	21.4	-	96	-	1.0	-	489	-	-	489	2202	0.04
Seg. 3	-	Both	367.6	-	4044	-	1.0	-	489	-	-	489	5382	0.75
Level 1														
Ln3, Lev1	-	S->N	-	-	4866	-	-	-	-	-	-	-	21162	-
	-	N->S	-	-	5030	-	-	-	-	-	-	-	21162	-
Wall 3-1	2	S->N	-	-	4866	1.0	1.0	489	489	-	A	-	21162	-
	2	N->S	-	-	5030	1.0	1.0	489	489	-	A	-	21162	-
Seg. 1	-	Both	0.0	-	0	.88	.88	428	428	-	-	856	2569	0.00
Seg. 2	-	S->N	407.6	-	4280	1.0	1.0	489	489	-	-	979	10275	0.42
	-	N->S	455.5	-	4783	1.0	1.0	489	489	-	-	979	10275	0.47
Seg. 3	-	S->N	69.0	-	586	1.0	1.0	489	489	-	-	979	8318	0.07
	-	N->S	29.1	-	247	1.0	1.0	489	489	-	-	979	8318	0.03
E-W Shearlines	W Gp	For Dir	ASD Shear Force [plf]			Asp-Cub		Allowable Shear [plf]						Resp. Ratio
			v	vmax/vft	V [lbs]	Int	Ext	Int	Ext	Co	C	Cmb	V [lbs]	
Line A														
Level 2														
LnA, Lev2	-	Both	-	-	1600	-	-	-	-	-	-	-	18471	-
Wall A-1	1	Both	-	-	1600	-	1.0	-	489	-	-	-	18471	-
Seg. 1	-	Both	2.5	-	8	-	.92	-	449	-	-	449	1346	0.01
Seg. 2	-	Both	4.4	-	17	-	1.0	-	489	-	-	489	1957	0.01
Seg. 3	-	Both	59.8	-	359	-	1.0	-	489	-	-	489	2936	0.12
Seg. 4	-	Both	6.2	-	31	-	1.0	-	489	-	-	489	2446	0.01
Seg. 5	-	Both	6.2	-	31	-	1.0	-	489	-	-	489	2446	0.01
Seg. 6	-	Both	77.0	-	1155	-	1.0	-	489	-	-	489	7339	0.16
Level 1														
LnA, Lev1	-	W->E	-	-	1551	-	-	-	-	-	-	-	14984	-
	-	E->W	-	-	1743	-	-	-	-	-	-	-	14984	-
Wall A-1	1	W->E	-	-	1551	-	1.0	-	489	-	-	-	14984	-
	1	E->W	-	-	1743	-	1.0	-	489	-	-	-	14984	-
Seg. 1	-	W->E	12.2	-	73	-	1.0	-	489	-	-	489	2936	0.02
	-	E->W	60.2	-	361	-	1.0	-	489	-	-	489	2936	0.12
Seg. 2	-	W->E	14.5	-	101	-	1.0	-	489	-	-	489	3425	0.03
	-	E->W	12.1	-	84	-	1.0	-	489	-	-	489	3425	0.02
Seg. 3	-	W->E	13.4	-	80	-	1.0	-	489	-	-	489	2936	0.03
	-	E->W	70.8	-	425	-	1.0	-	489	-	-	489	2936	0.14
Seg. 4	-	W->E	144.1	-	1297	-	1.0	-	489	-	-	489	4404	0.29
	-	E->W	96.9	-	872	-	1.0	-	489	-	-	489	4404	0.20
Seg. 5	-	Both	0.0	-	0	-	.88	-	428	-	-	428	1284	0.00

SHEAR RESULTS (rigid seismic design, continued)

Line B												
LnB, Lev1	-	W->E	-	-	283	-	-	-	-	-	8664	-
	-	E->W	-	-	526	-	-	-	-	-	8664	-
Wall B-1	1	W->E	-	-	283	-	1.0	-	489	-	8664	-
	1	E->W	-	-	526	-	1.0	-	489	-	8664	-
Seg. 1	-	W->E	12.2	-	36	-	.88	-	428	-	428	0.03
	-	E->W	86.6	-	260	-	.88	-	428	-	428	0.20
Seg. 2	-	W->E	16.4	-	247	-	1.0	-	489	-	489	0.03
	-	E->W	17.6	-	266	-	1.0	-	489	-	489	0.04
Line C												
Level 2												
LnC, Lev2	-	Both	-	-	1172	-	-	-	-	-	22752	-
Wall C-1	1	Both	-	-	1172	-	1.0	-	489	-	22752	-
Seg. 1	-	Both	23.0	-	115	-	1.0	-	489	-	489	0.05
Seg. 2	-	Both	33.5	-	284	-	1.0	-	489	-	489	0.07
Seg. 3	-	Both	33.5	-	284	-	1.0	-	489	-	489	0.07
Seg. 4	-	Both	32.5	-	260	-	1.0	-	489	-	489	0.07
Seg. 5	-	Both	25.2	-	139	-	1.0	-	489	-	489	0.05
Seg. 6	-	Both	8.2	-	90	-	1.0	-	489	-	489	0.02
Level 1												
LnC, Lev1	-	W->E	-	-	2843	-	-	-	-	-	23730	-
	-	E->W	-	-	2380	-	-	-	-	-	23730	-
Wall C-1	1	W->E	-	-	2843	-	1.0	-	489	-	23730	-
	1	E->W	-	-	2380	-	1.0	-	489	-	23730	-
Seg. 1	-	Both	0.0	-	0	-	.88	-	428	-	428	0.00
Seg. 2	-	W->E	7.9	-	31	-	.97	-	474	-	474	0.02
	-	E->W	9.4	-	38	-	.97	-	474	-	474	0.02
Seg. 3	-	W->E	94.0	-	1034	-	1.0	-	489	-	489	0.19
	-	E->W	103.5	-	1138	-	1.0	-	489	-	489	0.21
Seg. 4	-	W->E	87.3	-	699	-	1.0	-	489	-	489	0.18
	-	E->W	89.3	-	714	-	1.0	-	489	-	489	0.18
Seg. 5	-	W->E	68.5	-	548	-	1.0	-	489	-	489	0.14
	-	E->W	0.0	-	0	-	1.0	-	489	-	489	0.00
Seg. 6	-	W->E	35.4	-	530	-	1.0	-	489	-	489	0.07
	-	E->W	32.6	-	490	-	1.0	-	489	-	489	0.07

Legend:

W Gp - Wall design group defined in Sheathing and Framing Materials tables, where it shows associated Standard Wall. "A" means that this wall is critical for all walls in the Standard Wall group.

For Dir - Direction of seismic force along shearline.

v - Design shear force on segment = ASD-factored shear force per unit length of full-height sheathing (FHS)

v_{max}/v_f - Perforated walls: Collector and in-plane anchorage force as per SDPWS eqn. 4.3-9 = V/FHS/Co. FHS is factored for narrow segments as per 4.3.3.4

FTAO walls: Shear force in piers above and below either openings or piers beside opening(s). Aspect ratio factor does not apply to these piers.

V - ASD factored shear force. For shearline: total shearline force. For wall: total of all segments on wall. For segment: force on segment

Asp/Cub - Unblocked wood structural panel factor Cub from SDPWS 4.3.5.3 or Aspect Ratio factor from 4.3.3.2, which for perforated walls is sum bi / FHS from 4.3.5.6 with bi defined in 4.3.3.4. For multi-segment walls, wall row shows Cub and segment rows show Asp. For single-segment walls and perforated walls, value shown is Asp for blocked walls and Cub for unblocked walls.

Int, Ext - Nominal unit shear capacity of interior and exterior sheathing, factored by Table 4.3-1 Note 3 for framing specific gravity and Note 10 for presence of hold-downs. For wall segments, also include unblocked factor Cub and aspect ratio adjustments.

Co - Adjustment factor for perforated walls from SDPWS Equation 4.3-6.

C - Sheathing combination rule, A = Add capacities, S = Strongest side or twice weakest, G = Stiffness-based using Eqns. 4.3-3,-4.

Cmb - Combined interior and exterior unit shear capacity including perforated wall factor Co.

V - Total factored shear capacity of shearline, wall or segment.

Crit Resp - Response ratio = v/Cmb = design shear force/unit shear capacity. "W" indicates that the wind design criterion was critical in selecting wall.

Notes:

Refer to Elevation View diagrams for individual level for uplift anchorage force t for perforated walls given by SDPWS 4.3.6.4.2,1.

Hold-Down and Compression Design (rigid seismic design)

Level 1	Location [ft]			Tensile Hold-down or Compressive Stud Force [lbs]				Hold-down	Cap [lbs]	Crit Resp.
Line-Wall	Posit'n	X	Y	Shear	Dead	Ev	Cmb'd			
Line 1										
1-1	L End	0.00	0.12	2424	343	48	2129	HDU5-SDS	5645	0.38
1-1	L End	0.00	0.12	3427	571	48	4046	Compression	10312	0.39
	V Elem	0.00	10.13	3461	264	37	3234	Refer to upper level		
	V Elem	0.00	10.13	3461	440	37	3938	Compression		
1-1	L Op 1	0.00	10.88	3427	299	42	3170	HDU5-SDS	5645	0.56
1-1	L Op 1	0.00	10.88	2424	499	42	2964	Compression	10312	0.29
1-1	R Op 1	0.00	16.13	542	108	15	449	HDU5-SDS	5645	0.08
1-1	R Op 1	0.00	16.13	0	180	15	195	Compression	10312	0.02
	V Elem	0.00	19.88	1947	257	36	1726	HDU5-SDS	5645	0.31
1-1	L Op 2	0.00	19.88	2489	428	36	2952	Compression	10312	0.29
1-1	R Op 2	0.00	22.13	1959	433	61	1586	HDU5-SDS	5645	0.28
1-1	R Op 2	0.00	22.13	1019	722	61	1801	Compression	10312	0.17
1-1	R End	0.00	30.88	2533	264	37	2306	HDU5-SDS	5645	0.41
1-1	R End	0.00	30.88	3473	441	37	3951	Compression	10312	0.38
Line 2										
2-1	L End	46.92	0.12	488	49	7	446	HDU5-SDS	5645	0.08
2-1	L End	46.92	0.12	459	81	7	546	Compression	10312	0.05
2-1	L Op 1	46.92	2.88	459	49	7	417	HDU5-SDS	5645	0.07
2-1	L Op 1	46.92	2.88	488	81	7	576	Compression	10312	0.06
2-1	R Op 1	46.92	6.13	3164	207	29	2987	HDU5-SDS	5645	0.53
2-1	R Op 1	46.92	6.13	3059	344	29	3432	Compression	10312	0.33
2-1	R End	46.92	18.63	3059	207	29	2882	HDU5-SDS	5645	0.51
2-1	R End	46.92	18.63	3164	344	29	3537	Compression	10312	0.34
Line 3										
	V Elem	68.00	0.12	770	213	30	587	Refer to upper level		
	V Elem	68.00	0.12	770	355	30	1155	Compression		
	V Elem	68.00	2.88	364	143	20	240	Refer to upper level		
	V Elem	68.00	2.88	364	239	20	623	Compression		
3-1	R Op 1	68.00	7.63	3351	353	49	3048	HDU5-SDS	5645	0.54
3-1	R Op 1	68.00	7.63	3793	589	49	4431	Compression	10312	0.43
	V Elem	68.00	10.63	181	108	15	88	Refer to upper level		
	V Elem	68.00	10.63	181	180	15	376	Compression		
	V Elem	68.00	14.88	181	108	15	88	Refer to upper level		
	V Elem	68.00	14.88	181	180	15	376	Compression		
3-1	L Op 2	68.00	17.87	2611	423	59	2248	HDU5-SDS	5645	0.40
3-1	L Op 2	68.00	17.87	2170	705	59	2933	Compression	10312	0.28
3-1	R Op 2	68.00	22.63	2061	354	50	1756	HDU5-SDS	5645	0.31
3-1	R Op 2	68.00	22.63	1691	590	50	2330	Compression	10312	0.23
3-1	R End	68.00	30.88	3279	494	69	2854	HDU5-SDS	5645	0.51
3-1	R End	68.00	30.88	3649	823	69	4540	Compression	10312	0.44
Line A										
A-1	L End	0.12	0.00	143	166	23	0	Not required		0.00
A-1	L End	0.12	0.00	594	432	36	1063	Compression	10312	0.10
	V Elem	2.88	0.00	28	26	4	6	Refer to upper level		
	V Elem	2.88	0.00	28	47	4	79	Compression		
A-1	L Op 1	5.88	0.00	546	243	34	338	HDU5-SDS	5645	0.06
A-1	L Op 1	5.88	0.00	95	305	26	426	Compression	10312	0.04
A-1	R Op 1	14.13	0.00	116	135	19	0	Not required		0.00
A-1	R Op 1	14.13	0.00	93	224	19	336	Compression	10312	0.03
	V Elem	17.13	0.00	68	240	20	328	Compression		
A-1	L Op 2	20.88	0.00	155	180	25	0	Not required		0.00
A-1	L Op 2	20.88	0.00	177	345	29	551	Compression	10312	0.05
A-1	R Op 2	26.13	0.00	100	116	16	0	Not required		0.00
A-1	R Op 2	26.13	0.00	640	360	30	1030	Compression	10312	0.10
A-1	L Op 3	31.88	0.00	639	194	27	472	HDU5-SDS	5645	0.08
A-1	L Op 3	31.88	0.00	99	167	14	280	Compression	10312	0.03
A-1	R Op 3	40.12	0.00	1362	330	46	1078	HDU5-SDS	5645	0.19
A-1	R Op 3	40.12	0.00	925	220	18	1164	Compression	10312	0.11
	V Elem	40.88	0.00	54	60	8	2	Refer to upper level		
	V Elem	40.88	0.00	54	110	9	173	Compression		
	V Elem	44.13	0.00	54	60	8	2	Refer to upper level		
	V Elem	44.13	0.00	54	110	9	173	Compression		
A-1	L Op 4	48.88	0.00	365	424	59	0	Not required		0.00
A-1	L Op 4	48.88	0.00	801	1106	93	2000	Compression	10312	0.19
	V Elem	65.13	0.00	204	174	24	54	Refer to upper level		
	V Elem	65.13	0.00	204	290	24	518	Compression		
	V Elem	67.88	0.00	791	441	62	412	Refer to upper level		
	V Elem	67.88	0.00	791	735	62	1587	Compression		
Line B										
B-1	L End	47.04	18.67	119	49	7	78	HDU5-SDS	5645	0.01
B-1	L End	47.04	18.67	850	81	7	938	Compression	10312	0.09

Hold-Down and Compression Design (rigid seismic design, continued)

B-1	L Op 1	49.79	18.67	850	49	7	809	HDU5-SDS	5645	0.14
B-1	L Op 1	49.79	18.67	119	81	7	207	Compression	10312	0.02
B-1	R Op 1	53.04	18.67	150	174	24	0	Not required	5645	0.00
B-1	R Op 1	53.04	18.67	161	341	29	531	Compression	10312	0.05
B-1	R End	67.88	18.67	161	188	26	0	Not required	5645	0.00
B-1	R End	67.88	18.67	150	317	27	493	Compression	10312	0.05
Line C										
	V Elem	0.12	31.00	611	201	28	438	Refer to upper level		
	V Elem	0.12	31.00	611	335	28	974	Compression		
	V Elem	2.88	31.00	229	126	18	121	Refer to upper level		
	V Elem	2.88	31.00	229	210	18	457	Compression		
C-1	R Op 1	6.13	31.00	292	211	30	51	HDU5-SDS	5645	0.01
C-1	R Op 1	6.13	31.00	306	82	7	381	Compression	10312	0.04
	V Elem	7.63	31.00	78	340	29	447	Compression		
C-1	L Op 2	9.87	31.00	90	105	15	0	Not required	5645	0.00
C-1	L Op 2	9.87	31.00	76		15	75	Compression	10312	0.01
C-1	R Op 2	13.13	31.00	866	297	42	610	HDU5-SDS	5645	0.11
C-1	R Op 2	13.13	31.00	953	495	42	1490	Compression	10312	0.14
	V Elem	15.88	31.00	78	340	29	447	Compression		
	V Elem	17.63	31.00	78	340	29	447	Compression		
C-1	L Op 3	23.88	31.00	982	374	52	661	HDU5-SDS	5645	0.12
C-1	L Op 3	23.88	31.00	895	623	52	1570	Compression	10312	0.15
C-1	R Op 3	27.13	31.00	762	344	48	467	HDU5-SDS	5645	0.08
C-1	R Op 3	27.13	31.00	780	573	48	1401	Compression	10312	0.14
C-1	L Op 4	34.88	31.00	789	322	45	512	HDU5-SDS	5645	0.09
C-1	L Op 4	34.88	31.00	771	537	45	1353	Compression	10312	0.13
C-1	R Op 4	42.13	31.00	669	302	42	409	Refer to upper level		
	V Elem	42.13	31.00	33	205	17	254	Compression		
	V Elem	45.88	31.00	73	320	27	420	Compression		
	V Elem	47.63	31.00	665	132	18	552	Refer to upper level		
	V Elem	47.63	31.00	665	220	18	904	Compression		
	V Elem	49.88	31.00	28	32	5	0	Not required	5645	0.00
C-1	L Op 5	49.88	31.00	664	369	31	1064	Compression	10312	0.10
C-1	R Op 5	53.13	31.00	314	138	12	440	Compression	10312	0.04
	V Elem	57.13	31.00	105	78	11	38	Refer to upper level		
	V Elem	57.13	31.00	105	142	12	259	Compression		
C-1	R End	67.88	31.00	404	470	66	0	Not required	5645	0.00
C-1	R End	67.88	31.00	429	155	13	597	Compression	10312	0.06
Level 2										
Line-Wall				Tensile Hold-down or Compressive Stud Force [lbs]						
	Posit'n	Location [ft]								
		X	Y	Shear	Dead	Ev	Cmb'd	Hold-down	Cap [lbs]	Crit Resp.
Line 1										
1-1	R Op 1	0.00	10.13	3461	264	37	3234	HDU5-SDS	5645	0.57
1-1	R Op 1	0.00	10.13	3461	440	37	3938	Compression	10312	0.38
1-1	L Op 2	0.00	20.88	3461	264	37	3234	HDU5-SDS	5645	0.57
1-1	L Op 2	0.00	20.88	3461	440	37	3938	Compression	10312	0.38
Line 3										
3-1	L End	68.00	0.12	770	132	18	657	HDU5-SDS	5645	0.12
3-1	L End	68.00	0.12	770	220	18	1008	Compression	10312	0.10
3-1	L Op 1	68.00	5.38	770	132	18	657	HDU5-SDS	5645	0.12
3-1	L Op 1	68.00	5.38	770	220	18	1008	Compression	10312	0.10
3-1	R Op 1	68.00	10.63	181	108	15	88	HDU5-SDS	5645	0.02
3-1	R Op 1	68.00	10.63	181	180	15	376	Compression	10312	0.04
3-1	L Op 2	68.00	14.88	181	108	15	88	HDU5-SDS	5645	0.02
3-1	L Op 2	68.00	14.88	181	180	15	376	Compression	10312	0.04
3-1	R Op 2	68.00	20.13	3009	264	37	2782	HDU5-SDS	5645	0.49
3-1	R Op 2	68.00	20.13	3009	440	37	3486	Compression	10312	0.34
3-1	R End	68.00	30.88	3009	264	37	2782	HDU5-SDS	5645	0.49
3-1	R End	68.00	30.88	3009	440	37	3486	Compression	10312	0.34
Line A										
A-1	L End	0.12	0.00	22	26	4	0	Not required	5645	0.00
A-1	L End	0.12	0.00	22	47	4	73	Compression	10312	0.01
A-1	L Op 1	2.88	0.00	22	26	4	0	Not required	5645	0.00
A-1	L Op 1	2.88	0.00	22	47	4	73	Compression	10312	0.01
A-1	R Op 1	7.13	0.00	37	43	6	0	Not required	5645	0.00
A-1	R Op 1	7.13	0.00	37	79	7	122	Compression	10312	0.01
A-1	L Op 2	10.88	0.00	37	43	6	0	Not required	5645	0.00
A-1	L Op 2	10.88	0.00	37	79	7	122	Compression	10312	0.01
A-1	R Op 2	17.13	0.00	499	144	20	375	HDU5-SDS	5645	0.07
A-1	R Op 2	17.13	0.00	499	240	20	759	Compression	10312	0.07
A-1	L Op 3	22.88	0.00	499	144	20	375	HDU5-SDS	5645	0.07
A-1	L Op 3	22.88	0.00	499	240	20	759	Compression	10312	0.07
A-1	R Op 3	36.13	0.00	52	60	8	0	Not required	5645	0.00
A-1	R Op 3	36.13	0.00	52	110	9	171	Compression	10312	0.02

Hold-Down and Compression Design (rigid seismic design, continued)

A-1	L Op 4	40.88	0.00	52	60	8	0	Not required	5645	0.00
A-1	L Op 4	40.88	0.00	52	110	9	171	Compression	10312	0.02
A-1	R Op 4	44.13	0.00	52	60	8	0	Not required	5645	0.00
A-1	R Op 4	44.13	0.00	52	110	9	171	Compression	10312	0.02
A-1	L Op 5	48.88	0.00	52	60	8	0	Not required	5645	0.00
A-1	L Op 5	48.88	0.00	52	110	9	171	Compression	10312	0.02
A-1	R Op 5	53.13	0.00	626	360	50	317	HDU5-SDS	5645	0.06
A-1	R Op 5	53.13	0.00	626	600	50	1277	Compression	10312	0.12
A-1	R End	67.88	0.00	626	360	50	317	HDU5-SDS	5645	0.06
A-1	R End	67.88	0.00	626	600	50	1277	Compression	10312	0.12
Line C										
C-1	L End	0.12	31.00	193	120	17	90	HDU5-SDS	5645	0.02
C-1	L End	0.12	31.00	193	200	17	410	Compression	10312	0.04
C-1	L Op 1	4.88	31.00	193	120	17	90	HDU5-SDS	5645	0.02
C-1	L Op 1	4.88	31.00	193	200	17	410	Compression	10312	0.04
C-1	R Op 1	7.63	31.00	276	204	29	100	HDU5-SDS	5645	0.02
C-1	R Op 1	7.63	31.00	276	340	29	644	Compression	10312	0.06
C-1	L Op 2	15.88	31.00	276	204	29	100	HDU5-SDS	5645	0.02
C-1	L Op 2	15.88	31.00	276	340	29	644	Compression	10312	0.06
C-1	R Op 2	17.63	31.00	276	204	29	100	HDU5-SDS	5645	0.02
C-1	R Op 2	17.63	31.00	276	340	29	644	Compression	10312	0.06
C-1	L Op 3	25.88	31.00	276	204	29	100	HDU5-SDS	5645	0.02
C-1	L Op 3	25.88	31.00	276	340	29	644	Compression	10312	0.06
C-1	R Op 3	38.13	31.00	268	192	27	103	HDU5-SDS	5645	0.02
C-1	R Op 3	38.13	31.00	268	320	27	615	Compression	10312	0.06
C-1	L Op 4	45.88	31.00	268	192	27	103	HDU5-SDS	5645	0.02
C-1	L Op 4	45.88	31.00	268	320	27	615	Compression	10312	0.06
C-1	R Op 4	47.63	31.00	211	132	18	98	HDU5-SDS	5645	0.02
C-1	R Op 4	47.63	31.00	211	220	18	449	Compression	10312	0.04
C-1	L Op 5	52.88	31.00	211	132	18	98	HDU5-SDS	5645	0.02
C-1	L Op 5	52.88	31.00	211	220	18	449	Compression	10312	0.04
C-1	R Op 5	57.13	31.00	67	78	11	0	Not required	5645	0.00
C-1	R Op 5	57.13	31.00	67	142	12	221	Compression	10312	0.02
C-1	R End	67.88	31.00	67	78	11	0	Not required	5645	0.00
C-1	R End	67.88	31.00	67	142	12	221	Compression	10312	0.02

Legend:**Line-Wall:**

At wall or opening – Shearline and wall number

At vertical element – Shearline

Posit'n – Position of stud pack that hold-down is attached to:

V Elem – Vertical element: column or strengthened studs required where not at wall end or opening

L or R End – At left or right wall end

L or R Op n – At left or right side of opening n

t @ Op n – Uplift force t at opening n from offset opening in perforated wall above, from SDPWS 4.3.6.4.2.1

Location – Co-ordinates in Plan View**Tensile Hold-down or Compressive Stud Force – Upwards force on hold-down at one end of the wall or downward force on bottom plate under studs at the other end, for each force direction. Includes forces transferred from upper levels.****Shear – Overturning component = $V \times h / \text{beff}$ from SDPWS Eqn. 4.3-7; V = force on segment, ASD-factored by 0.70; h = wall height, beff = wall segment length – (tension stud pack width + hold-down anchor bolt offset) – (1/2 compression stud pack width). For perforated walls = $V \times h / \text{Co sum (bi)}$ from SDPWS Eqn. 4.3-8.****Dead – Dead load resisting component, factored for ASD by 0.60 for tension and 1.0 for compression****Ev – Vertical seismic load effect from ASCE 7 12.4.2.2 = $-0.2 S_{ds} \times \text{ASD factor} \times \text{unfactored } D = 0.14 \text{ SDS} \times \text{factored } D$. Refer to Seismic Information table for more details.****Cmb'd – Sum of ASD-factored overturning, dead and vertical seismic forces. May also include the uplift force t from perforated walls from SDPWS 4.3.6.4.2.1 when openings are staggered.****Hold-down – Device model number from hold-down database; "Compression" for bearing of end stud pack on bottom plate****Cap – Hold-downs: Allowable ASD tension load from database; Compression: Allowable ASD bearing force = $C_t \text{ CM } C_b \text{ Fcp } A$; A = cross sectional area of end studs. Refer to Framing materials table for details.****Crit. Resp. – Critical Response = Combined ASD force/Allowable ASD tension load****Notes:**

HDU5-SDS2.5 for studs with thickness > 0'-3" and depth > 0'-3.5" : Uses 14 1/4" x 2.5" SDS heavy-duty screws; 5/8" anchor bolt.

Combined force from ASCE 7 2.4.1 load combination 10 = $-(0.6D - 0.7E_v + 0.7E_h)$; E_h (from 12.4.2.1) = - shear overturning force

Refer to the Shear Line Dimensions table for wall height h, effective segment length beff and perforated wall adjusted sum of bi, to the Story Table for joist depth, and to the Shear Results table for perforated factor Co.

Designer is responsible for design of connection from wall to floor or foundation for shear force shown in Shear Results table. Refer to SDPWS 4.3.6.4.3 for foundation anchor bolt requirements.

COLLECTOR FORCES (rigid seismic design)

Level 1				Drag Strut Force [lbs]		Strap/Blocking Force [lbs]	
Line-Wall	Position on Wall or Opening	Location [ft]		---	---	---	---
		X	Y	---	---	---	---
Line 1							
	Shearline force			6752	6752		
1-1	Left Opening 1	0.00	11.00	-801	-1814		
1-1	Right Opening 1	0.00	16.00	-1890			
1-1	Left Opening 2	0.00	20.00	-2694			
1-1	Right Opening 2	0.00	22.00	-3130	594		
Line 2							
	Shearline force			4716	4716		
2-1	Left Opening 1	46.92	3.00	-302	294		
2-1	Right Opening 1	46.92	6.00	-758	733		
2-1	Right Wall End	46.92	18.75	1863	-1793		
Line 3							
	Shearline force			5051	5051		
3-1	Right Opening 1	68.00	7.50	-1222	1258		
3-1	Left Opening 2	68.00	18.00	1507	-1925		
3-1	Right Opening 2	68.00	22.50	774	-1170		
Line A							
	Shearline force			2105	2105		
A-1	Left Opening 1	6.00	0.00	-138	-344		
A-1	Right Opening 1	14.00	0.00	-385	-65		
A-1	Left Opening 2	21.00	0.00	-533	-497		
A-1	Right Opening 2	26.00	0.00	-688	-323		
A-1	Left Opening 3	32.00	0.00	585	-195		
A-1	Right Opening 3	40.00	0.00	337	84		
A-1	Left Opening 4	49.00	0.00	588	-661		
Line B							
	Shearline force			375	375		
B-1	Left Wall End	46.92	18.67	-259	482		
B-1	Left Opening 1	49.92	18.67	-227	167		
B-1	Right Opening 1	52.92	18.67	-244	198		
Line C							
	Shearline force			3689	3689		
C-1	Right Opening 1	6.00	31.00	-325	275		
C-1	Left Opening 2	10.00	31.00	-183	-27		
C-1	Right Opening 2	13.00	31.00	-346	110		
C-1	Left Opening 3	24.00	31.00	-604	-627		
C-1	Right Opening 3	27.00	31.00	-766	-489		
C-1	Left Opening 4	35.00	31.00	-343	-902		
C-1	Right Opening 4	42.00	31.00	-722			
C-1	Left Opening 5	50.00	31.00	-995			
C-1	Right Opening 5	53.00	31.00	-1158	-77		
Level 2				Drag Strut Force [lbs]		Strap/Blocking Force [lbs]	
Line-Wall	Position on Wall or Opening	Location [ft]		---	---	---	---
		X	Y	---	---	---	---
Line 1							
	Shearline force			4651	4651		
1-1	Right Opening 1	0.00	10.00	-1500	1500		
1-1	Left Opening 2	0.00	21.00	1500	-1500		
Line 3							
	Shearline force			4645	4645		
3-1	Left Opening 1	68.00	5.50	-319	319		
3-1	Right Opening 1	68.00	10.50	-1068	1068		
3-1	Left Opening 2	68.00	15.00	-1646	1646		
3-1	Right Opening 2	68.00	20.00	-2395	2395		
Line A							
	Shearline force			1600	1600		
A-1	Left Opening 1	3.00	0.00	-61	61		
A-1	Right Opening 1	7.00	0.00	-155	155		
A-1	Left Opening 2	11.00	0.00	-230	230		
A-1	Right Opening 2	17.00	0.00	-371	371		
A-1	Left Opening 3	23.00	0.00	-464	464		
A-1	Right Opening 3	36.00	0.00	-769	769		
A-1	Left Opening 4	41.00	0.00	-855	855		
A-1	Right Opening 4	44.00	0.00	-925	925		
A-1	Left Opening 5	49.00	0.00	-1011	1011		
A-1	Right Opening 5	53.00	0.00	-1105	1105		
Line C							
	Shearline force			1172	1172		
C-1	Left Opening 1	5.00	31.00	276	-276		

COLLECTOR FORCES (rigid seismic design, continued)

C-1	Right Opening 1	7.50	31.00	233	-233
C-1	Left Opening 2	16.00	31.00	168	-168
C-1	Right Opening 2	17.50	31.00	142	-142
C-1	Left Opening 3	26.00	31.00	76	-76
C-1	Right Opening 3	38.00	31.00	-131	131
C-1	Left Opening 4	46.00	31.00	-198	198
C-1	Right Opening 4	47.50	31.00	-224	224
C-1	Left Opening 5	53.00	31.00	118	-118
C-1	Right Opening 5	57.00	31.00	49	-49

Legend:*Line-Wall - Shearline and wall number**Position...- Side of opening or wall end that drag strut is attached to**Location - Co-ordinates in Plan View**Drag strut Force - Axial force in transfer element at openings, gaps, or changes in design shear along shearline. + : tension; - : compression.**Based on ASD-factored shearline force shown. For SDC C-F, it is the greater of the design shearline force and the diaphragm force F_{px} , added to shearline force from story above and to forces transferred from discontinuous shearlines factored by overstrength (ω) as per 12.10.1.1.**Refer to Seismic Information table for diaphragm forces and ω factor.**For SDC D-F, if horizontal torsional irregularities 1a or 1b are detected, or if other horizontal irregularities are input, or if vertical irregularity 4 detected or input, 25% increase from 12.3.3.4 applied.**For perforated walls, this force is converted to v_{max} using 4.3.6.4.1.1.**Strap/Blocking Force – For FTAO walls, force transferred from above and below opening to shearwall pier.**-> Due to shearline force in the west-to-east or south-to-north direction**<- Due to shearline force in the east-to-west or north-to-south direction*

DEFLECTION (rigid seismic design)

Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 1														
Line 1														
1-1,1	2	S->N	Comb	376.0	11.00	9.00	16.5	.009	50.6	171	.025	.067	0.27	0.34
		N->S	Comb	531.6	11.00	9.00	16.5	.012	50.6	171	.025	.095	0.30	0.40
1-1,2		S->N	Comb	80.7	4.00	9.00	16.5	.005	50.6	171	.025	.014	0.67	0.69
		N->S	Comb	0.0	4.00	9.00	16.5	-	50.6	-	-	-	-	0.40
1-1,3		S->N	Comb	536.0	9.00	9.00	16.5	.015	50.6	171	.025	.095	0.02	0.13
		N->S	Comb	390.9	9.00	9.00	16.5	.011	50.6	171	.025	.070	0.32	0.40
Line 2														
2-1,1	3	S->N	1S	71.0	3.00	9.00	16.5	.006	25.3	171	.025	.025	0.86	0.89
		N->S	1S	66.7	3.00	9.00	16.5	.006	25.3	171	.025	.024	0.86	0.89
2-1,2		S->N	1S	492.4	12.75	9.00	16.5	.010	25.3	171	.025	.175	0.25	0.44
		N->S	1S	476.1	12.75	9.00	16.5	.009	25.3	171	.025	.170	0.25	0.43
Line 3														
3-1,1	2	S->N	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.41
		N->S	Comb	0.0	3.00	9.00	16.5	-	50.6	-	-	-	-	0.38
3-1,2		S->N	Comb	582.3	10.50	9.00	16.5	.014	50.6	171	.025	.104	0.29	0.41
		N->S	Comb	650.7	10.50	9.00	16.5	.016	50.6	171	.025	.116	0.25	0.38
3-1,3		S->N	Comb	98.6	8.50	9.00	16.5	.003	50.6	171	.025	.018	0.39	0.41
		N->S	Comb	41.5	8.50	9.00	16.5	.001	50.6	171	.025	.007	0.38	0.38
Line A														
A-1,1	1	W->E	ExtS	17.4	6.00	9.00	16.5	.001	25.3	171	.025	.006	0.00	0.01
		E->W	ExtS	86.0	6.00	9.00	16.5	.004	25.3	171	.025	.031	0.41	0.44
A-1,2		W->E	ExtS	20.7	7.00	9.00	16.5	.001	25.3	171	.025	.007	0.00	0.01
		E->W	ExtS	17.2	7.00	9.00	16.5	.001	25.3	171	.025	.006	0.00	0.01
A-1,3		W->E	ExtS	19.1	6.00	9.00	16.5	.001	25.3	171	.025	.007	0.00	0.01
		E->W	ExtS	101.2	6.00	9.00	16.5	.004	25.3	171	.025	.036	0.41	0.45
A-1,4		W->E	ExtS	205.8	9.00	9.00	16.5	.006	25.3	171	.025	.073	0.29	0.37
		E->W	ExtS	138.4	9.00	9.00	16.5	.004	25.3	171	.025	.049	0.00	0.06
A-1,5		W->E	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.37
		E->W	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.06
Line B														
B-1,1	1	W->E	1S	17.4	3.00	9.00	16.5	.001	25.3	171	.025	.006	0.82	0.83
		E->W	1S	123.7	3.00	9.00	16.5	.010	25.3	171	.025	.044	0.90	0.95
B-1,2		W->E	1S	23.4	15.08	9.00	16.5	.000	25.3	171	.025	.008	0.00	0.01
		E->W	1S	25.2	15.08	9.00	16.5	.000	25.3	171	.025	.009	0.15	0.16
Line C														
C-1,1	1	Both	ExtS	0.0	3.00	9.00	16.5	-	25.3	-	-	-	-	0.02
C-1,2		W->E	ExtS	11.2	4.00	9.00	16.5	.001	25.3	171	.025	.004	0.00	0.01
		E->W	ExtS	13.4	4.00	9.00	16.5	.001	25.3	171	.025	.005	0.00	0.01
C-1,3		W->E	ExtS	134.3	11.00	9.00	16.5	.003	25.3	171	.025	.048	0.23	0.28
		E->W	ExtS	147.8	11.00	9.00	16.5	.003	25.3	171	.025	.053	0.23	0.29
C-1,4		W->E	ExtS	124.8	8.00	9.00	16.5	.004	25.3	171	.025	.044	0.31	0.36
		E->W	ExtS	127.5	8.00	9.00	16.5	.004	25.3	171	.025	.045	0.31	0.36
C-1,5		W->E	ExtS	97.8	8.00	9.00	16.5	.003	25.3	171	.025	.035	0.31	0.35
		E->W	ExtS	0.0	8.00	9.00	16.5	-	25.3	-	-	-	-	0.02
C-1,6		W->E	ExtS	50.5	15.00	9.00	16.5	.001	25.3	171	.025	.018	0.00	0.02
		E->W	ExtS	46.6	15.00	9.00	16.5	.001	25.3	171	.025	.017	0.00	0.02
Wall, segment	W Gp	Dir	Srf	v plf	b ft	h ft	Bending A sq.in	Defl in	Ga kips/in	Nail slip Vn lbs	en in	Shear Defl in	Hold Defl in	Total Defl in
Level 2														
Line 1														
1-1,2	2	Both	Comb	604.0	11.00	8.00	16.5	.010	50.6	171	.025	.096	0.33	0.44
Line 3														
3-1,1	1	Both	ExtS	131.3	5.50	8.00	16.5	.004	25.3	171	.025	.042	0.44	0.49
3-1,2		Both	ExtS	30.5	4.50	8.00	16.5	.001	25.3	171	.025	.010	0.48	0.49
3-1,3		Both	ExtS	525.1	11.00	8.00	16.5	.008	25.3	171	.025	.166	0.31	0.49
Line A														
A-1,1	1	Both	ExtS	3.6	3.00	8.00	16.5	.000	25.3	171	.025	.001	0.00	0.00
A-1,2		Both	ExtS	6.2	4.00	8.00	16.5	.000	25.3	171	.025	.002	0.00	0.00
A-1,3		Both	ExtS	85.4	6.00	8.00	16.5	.003	25.3	171	.025	.027	0.38	0.41
A-1,4		Both	ExtS	8.8	5.00	8.00	16.5	.000	25.3	171	.025	.003	0.00	0.00
A-1,5		Both	ExtS	8.8	5.00	8.00	16.5	.000	25.3	171	.025	.003	0.00	0.00
A-1,6		Both	ExtS	110.0	15.00	8.00	16.5	.001	25.3	171	.025	.035	0.15	0.18
Line C														
C-1,1	1	Both	ExtS	32.8	5.00	8.00	16.5	.001	25.3	171	.025	.010	0.43	0.44
C-1,2		Both	ExtS	47.8	8.50	8.00	16.5	.001	25.3	171	.025	.015	0.25	0.26
C-1,3		Both	ExtS	47.8	8.50	8.00	16.5	.001	25.3	171	.025	.015	0.25	0.26
C-1,4		Both	ExtS	46.4	8.00	8.00	16.5	.001	25.3	171	.025	.015	0.26	0.28

DEFLECTION (rigid seismic design, continued)

C-1, 5	Both	ExtS	36.0	5.50	8.00	16.5	.001	25.3	171	.025	.011	0.39	0.40
C-1, 6	Both	ExtS	11.7	11.00	8.00	16.5	.000	25.3	171	.025	.004	0.00	0.01

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B.

W Gp – Wall design group, refer to Sheathing and Framing Materials tables.

Dir – Force direction.

Srf – Wall surface = Int(erior) or Ext(erior) for perimeter walls, 1 or 2 for interior partitions; Comb = Combined v and Ga for identical materials on each side; S = Ga from side with stronger shear resistance; W = 2 x Ga of weaker side.

v – Unfactored (strength-level) shear force per unit distance on wall segment = ASD force / 0.70, as per ASCE 7 12.8.6.

Unblocked walls = v / Cub as per SDPWS 4.3.4.3, Cub = Unblocked factor from 4.3.5.3, shown in the Shear Results table.

Perforated walls = vmax from Eqn. 4.3-9, as per 4.3.4.2.

FTAO walls = Unit shear force in pier beside opening(s).

b – Wall or segment length.

Segmented wall or FTAO wall segments = Width of wall segment between openings.

Perforated wall = Sum of FHS segments, modified as in 4.3.3.4 per 4.3.4.2.

FTAO wall = Length of wall including openings.

h – Wall height.

FTAO piers = Distance from bottom of opening to top of wall; for end segments, results using that distance and the wall height are averaged.

Defl – Horizontal shear wall deflection due to given term:

Bending = $8vh^3 / EAb$; A = Effective cross sectional area of segment end stud(s), E = stud mod. of elasticity in Framing Materials table

For i studs at one end and j at the other, $A = 2ij / (i + j) \times \text{area of one stud}$, based on Ex. C4.3.4-3

Shear = $vh / 1000 Ga$; Ga = $1.4 vs / (1.4 vs / Gvtv + 0.75 en)$ from SDPWS Eqn. C4.2.3-3.

vs = ASD sheathing capacity.

Gvtv = Shear stiffness from C4.3.4, shown in Sheathing Materials table.

en = Nail slip from Table C4.2.3D, of form aVn^b for WSP, varies linearly to value at capacity for other materials.

Vn = Strength-level shear force per nail along panel edge at ASD capacity = 1.4 vs.

Hold – Anchorage system (hold-down) = $da \times h / beff$.

da = Vertical hold-down displacement; refer to Hold-down Displacement table for components.

beff = Effective wall segment length = $b - (\text{tension stud pack width} + \text{hold-down anchor bolt offset}) - (1/2 \text{ compression stud pack width})$

beff is given in the Shear Wall Dimensions table.

For FTAO walls, hold-down device at end of wall is applied to all segments, as per APA T555.

Total Defl – Deflection from bending + shear + hold-down, as per Eqn. 4.3-2.

For FTAO walls, the average of the values for the segments, as per APA T555.

WARNING - On shearline(s) A, B, C, 1, 2 the program was unable to equalize deflections on the shearwall segments. Change design setting to capacity-based rigidity, or turn off the distribution to segments based on rigidity.

HOLD-DOWN DISPLACEMENT (rigid seismic design)

Wall, segment	Dir	Hold-down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 1													
Line 1													
1-1,1	S->N	HDU5-SDS	2129	.060	.002	0.062	-	-	.248	4220	0.01	0.32	0.27
	N->S	HDU5-SDS	3170	.089	.003	0.092	-	-	.248	5764	0.02	0.35	0.30
1-1,2	S->N	HDU5-SDS	449	.013	.000	0.013	-	-	.248	6369	0.02	0.28	0.67
	N->S	HDU5-SDS	0	.000	.000	0.000	-	-	.000	274	0.00	0.00	-
1-1,3	S->N	HDU5-SDS	0	.000	.000	0.000	-	-	.000	5631	0.01	0.01	0.02
	N->S	HDU5-SDS	2306	.065	.002	0.067	-	-	.248	-229	0.00	0.31	0.32
Line 2													
2-1,1	S->N	HDU5-SDS	446	.012	.000	0.013	-	-	.248	820	0.00	0.26	0.86
	N->S	HDU5-SDS	417	.012	.000	0.012	-	-	.248	778	0.00	0.26	0.86
2-1,2	S->N	HDU5-SDS	2987	.084	.003	0.086	-	-	.248	5044	0.01	0.35	0.25
	N->S	HDU5-SDS	2882	.081	.003	0.083	-	-	.248	4894	0.01	0.34	0.25
Line 3													
3-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
3-1,2	S->N	HDU5-SDS	2684	.075	.003	0.078	-	-	.248	2141	0.01	0.33	0.29
	N->S	HDU5-SDS	827	.023	.001	0.024	-	-	.248	5794	0.02	0.29	0.25
3-1,3	S->N	HDU5-SDS	3344	.094	.003	0.097	-	-	.248	6463	0.02	0.36	0.39
	N->S	HDU5-SDS	2854	.080	.003	0.083	-	-	.248	5581	0.01	0.34	0.38
Line A													
A-1,1	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	564	0.00	0.00	0.00
	E->W	HDU5-SDS	357	.010	.000	0.010	-	-	.248	1508	0.00	0.26	0.41
A-1,2	W->E	HDU5-SDS	19	.000	.000	0.000	-	-	.000	752	0.00	0.00	0.00
	E->W	HDU5-SDS	25	.000	.000	0.000	-	-	.000	435	0.00	0.00	0.00
A-1,3	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	368	0.00	0.00	0.00
	E->W	HDU5-SDS	444	.012	.000	0.013	-	-	.248	1401	0.00	0.26	0.41
A-1,4	W->E	HDU5-SDS	1105	.031	.001	0.032	-	-	.248	2538	0.00	0.28	0.29
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	1595	0.00	0.00	0.00
A-1,5	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
Line B													
B-1,1	W->E	HDU5-SDS	78	.002	.000	0.002	-	-	.248	294	0.00	0.25	0.82
	E->W	HDU5-SDS	809	.023	.001	0.023	-	-	.248	1338	0.00	0.27	0.90
B-1,2	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	660	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.001	.000	0.001	-	-	.248	711	0.00	0.25	0.15
Line C													
C-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
C-1,2	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	108	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	-80	0.00	0.00	0.00
C-1,3	W->E	HDU5-SDS	610	.017	.001	0.018	-	-	.248	2295	0.01	0.27	0.23
	E->W	HDU5-SDS	710	.020	.001	0.021	-	-	.248	2114	0.01	0.27	0.23
C-1,4	W->E	HDU5-SDS	438	.012	.000	0.013	-	-	.248	1871	0.00	0.27	0.31
	E->W	HDU5-SDS	479	.013	.000	0.014	-	-	.248	1943	0.01	0.27	0.31
C-1,5	W->E	HDU5-SDS	450	.013	.000	0.013	-	-	.248	2420	0.01	0.27	0.31
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	0	0.00	0.00	-
C-1,6	W->E	HDU5-SDS	0	.000	.000	0.000	-	-	.000	831	0.00	0.00	0.00
	E->W	HDU5-SDS	0	.000	.000	0.000	-	-	.000	404	0.00	0.00	0.00
Wall, segment	Dir	Hold-down	Tens. force lbs	Vert. Displacement			Slippage		Shrink +Extra in	Comp. force lbs	Crush da in	Total da in	Horz Defl in
				Manuf in	Add in	da in	Vf lbs	da in					
Level 2													
Line 1													
1-1,2	Both	HDU5-SDS	3234	.181	.001	0.182	-	-	.248	5613	0.01	0.44	0.33
Line 3													
3-1,1	Both	HDU5-SDS	657	.037	.000	0.037	-	-	.248	1435	0.00	0.29	0.44
3-1,2	Both	HDU5-SDS	88	.005	.000	0.005	-	-	.248	532	0.00	0.25	0.48
3-1,3	Both	HDU5-SDS	2782	.156	.001	0.157	-	-	.248	4968	0.01	0.42	0.31
Line A													
A-1,1	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	97	0.00	0.00	0.00
A-1,2	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	164	0.00	0.00	0.00
A-1,3	Both	HDU5-SDS	375	.021	.000	0.021	-	-	.248	1078	0.00	0.27	0.38
A-1,4	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	229	0.00	0.00	0.00
A-1,5	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	229	0.00	0.00	0.00
A-1,6	Both	HDU5-SDS	317	.018	.000	0.018	-	-	.248	1807	0.00	0.27	0.15
Line C													
C-1,1	Both	HDU5-SDS	90	.005	.000	0.005	-	-	.248	580	0.00	0.25	0.43
C-1,2	Both	HDU5-SDS	100	.006	.000	0.006	-	-	.248	911	0.00	0.26	0.25
C-1,3	Both	HDU5-SDS	100	.006	.000	0.006	-	-	.248	911	0.00	0.26	0.25
C-1,4	Both	HDU5-SDS	103	.006	.000	0.006	-	-	.248	870	0.00	0.26	0.26
C-1,5	Both	HDU5-SDS	98	.005	.000	0.005	-	-	.248	636	0.00	0.25	0.39
C-1,6	Both	HDU5-SDS	0	.000	.000	0.000	-	-	.000	296	0.00	0.00	0.00

Legend:

Wall, segment – Wall and segment between openings, e.g. B-3,2 = second segment on Wall 3 on Shearline B

Dir – Force direction

Tens., Comp. – Accumulated ASD hold-down tension force T and strength-level end compression force C from overturning, dead and vertical earthquake loads.

Tens. – ASD-factored force, used for proportion of manufacturer's maximum elongation

Comp. – Strength level force as per ASCE 12.8.6

da – Vertical displacements due to the following components:

Vert. Displacement – Elongation when slippage calculated separately; displacement when combined elongation/slippage used

Manuf – Using manufacturer's value for anchor bolt length, or no bolt contribution for connector-only elongation

Unless marked with * = (ASD tension force / ASD hold-down capacity) $\times$ max strength-level elongation or displacement

* - Maximum strength-level elongation or displacement is used. May result in higher than actual displacements for lightly loaded hold-downs, causing the segment to draw less force due to lower than actual stiffness.

Add – Due to longer anchor bolt length than manufacturer's value, or entire bolt length for connector-only elongation = $TL / (Ab \times Es)$

T = Strength level tension force (not shown)

Ab = bolt cross-sectional area

Es = steel modulus = 29000000 psi

$L = Lb - Lh$

Lb = Total bolt length shown in Storey Information table

Lh = Manufacturer's anchor bolt length for given displacement/elongation from hold-down database

Slippage – Due to vertical slippage of hold-down fasteners attached to stud(s) when not combined with elongation

Nails = en from SDPWS Table C4.2.3D using values for wood structural panels

Bolts = $V_f / (270,000 D^{1.5})$ (NDS 11.3.6); D = bolt diameter, V_f = Tension force T / number of fasteners

Shrink + Extra – Wood shrinkage plus extra displacement due to mis-cuts, gaps, etc.

Shrinkage = $0.002 \times (19\% \text{ fabrication} - 10\% \text{ in-service moisture contents}) \times L_s$

L_s = Length between anchor bolt fasteners subject to perp-to-grain shrinkage; see Story Information table

Crush – Deformation of bottom plate at compression end of wall segment

= $0.02'' \times [r / 0.73, r < 0.73; (1 + (r - 0.73) / 0.27), 0.73 < r < 1; 2r^3, r > 1]$

$r = f_{cp} / F_{cp}'$; $F_{cp}' = C_t CM F_{cp}$; $f_{cp} = C / A$, A = cross sectional area of end studs

Total da – Vert. Displacement + Slippage + Shrink + Crush + Extra

Horz Defl – Anchorage deflection term in SDPWS Eqn. C.4.3.4-1 = $h / beff \times da$

h = Wall height. For end segments in FTAO walls, h is the average of the wall height and the distance from the bottom of opening to top of wall

$beff$ = Effective wall segment length = $b - (\text{tension stud pack width} + \text{hold-down anchor bolt offset}) - (1/2 \text{ compression stud pack width})$

h and b are shown in Deflection table, $beff$ in the Shear Wall Dimensions table

STORY DRIFT (rigid seismic design)

Level	Dir	Actual Story Drift (in)							Allowable Story Drift			
		Const defl	Max dxe	Line	Max dx	Center of Mass	C of M dxe	C of M dx	hsx ft	Delta a in	Ratio Max	C of M
1	N<->S	0.20	0.40	1	0.60	34.51	0.76	0.92	9.83	2.95	0.21	0.31
	E<->W	0.37	0.45	A	0.70	15.47	0.87	1.43			0.24	0.49
2	N<->S	0.18	0.49	3	0.79	34.00	0.46	0.74	8.00	2.40	0.33	0.31
	E<->W	0.33	0.41	A	0.64	15.50	0.42	0.60			0.27	0.25

ASCE 7 Eqn. 12.8-15: $dx = dxc + (dxe - dxc) Cd / Ie$

Deflection amplification factor Cd from Table 12.2-1 = 4.0 (E-W), 2.0 (N-S)

Importance factor $Ie = 1.00$

Legend:

Const defl (dxc) – Deflection due to shrinkage, gaps, bolt hole, etc. (constant with respect to force)

Max dxe – Largest deflection for any shearline along a building edge; refer to Deflections table

Line – Shearline with largest deflection on level in this direction

hsx – Story height in ASCE Table 12.12-1 = Height of walls plus joist depth between this level and the one above.

Max dx – Largest amplified deflection on level in this direction using ASCE 7 Eq'n 12.8-15

C of M dxe - Deflection at the centre of mass of this level; from interpolating deflections at adjacent shearlines.

C of M dx - Amplified deflection at centre of mass using Eq'n 12.8-15.

Delta a = Allowable story drift on this level from ASCE 7 Table 12.12-1

Ratio - Proportion of allowable story drift experienced, on this level in this direction.

FOUNDATION

Foundation Discussion - The only foundations for this project requiring evaluation are the perimeter foundations and the basement floor ceiling beam post pads.

All foundation exterior footings and stemwalls are existing and in serviceable condition. The first floor structure has existing pony beam/post pads. No additions or alterations are proposed.

The only existing footings or stemwalls requiring review are the exterior foundations which will have added second floor loading.

The crawlspace pads will have no altered loading.

Considered in the determination that the existing exterior stemwalls and footing are adequate and require no adjustments is the understanding that in effect the footing will be supporting one level of floor (second floor) and perimeter roof support. The first floor loading is minor (and unchanged.)