ASCE/SEI 7-05 Snow Load Assessment

Client: Excel Homes
Job Number: EXLH042314-42
Description: 31217 Calcs.

Design Parameters:

Eave to ridge Distance, W =	13 ft
Ground Snow Load, p_g =	50 psf
Exposure Factor, C_e =	1.0
Thermal Factor, C_t =	1.1
Importance Factor, I_S =	1.0
Framing Type:	*Trusses/Other*

Snow Density (γ):

$\gamma = 0.13 p_g + 14 =$ 20.5 pcf
but not more than 30 pcf

Flat-Roof Snow Load (p_f):

$p_f = 0.7 C_e C_t I p_g =$ 38.5 psf

Rain on Snow Surcharge:

	amax =	0.26 deg
pg <= 20 psf	prss =	0.0 psf
	pf =	38.5 psf

Minimum Values for Low-Slope Roofs:
Applicable to roof slopes less than

	Monoslope roofs =	15.0 deg
or	$a_{min} = 70/W + 0.5 =$	5.9 deg
		2.38 deg
	amin =	15.0 deg

p_g <= 20 psf	$p_f = I_s P_g =$	50.0 psf
p_g > 20 psf	$p_f = 20 I_s =$	20.0 psf
	pfmin =	20.0 psf
	$p_f =$	**38.5 psf**

Unbalanced Snow Loads:
Applicable to roof slopes between:

a_{max} =	70.00 deg
$a_{min} = 70/W + 0.5 =$	5.88 deg
a_{min} =	2.38 deg
governing a_{min} =	2.38 deg

Unbalanced Loads:

S =	1.00 /1
$W = l_u$ =	13.0 ft
h_d =	1.31 ft

Sloped Roof Snow Loads:

a (deg)	C_s C_t = 1.0	C_t = 1.1	C_t = 1.2	**p_s (psf)**
45.0	0.63	0.77	1.00	**29.6**

Ice Dams Along Eves[2]:

$p_s = 2 p_f =$ 29.6 psf

Minimum Roof Live Load (Lr): (IBC 1607.11.2.1):

R_1 =	1.0
R_2 =	0.6
F =	12.0
$L_r = 20 R_1 R_2 =$	12.0 psf
$12 \le L_r \le 20$	

p_{WW} (psf)	p_{LW} Ridge (psf)	Length (ft)	Eave (psf)
8.9	**56.6**	**3.5**	**29.6**

Notes: 1. Higher loads may apply were sliding snow or drifting occurs due to aerodynamic shade from higher protions of the building.
2. Applies only to unventilated roofs with less than R-30, and ventilated roofs with less than R-20. No other loads, except dead loads shall be present on the roof when this uniformly distributed load is applied.

PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to
Factory Built Portion

1.4

Lateral Load Analysis (ASCE 7-05)

(Two-Story Building, Flexible Diaphragm)

Client: Excel Homes
Job Number: EXLH042314-42
Description: 31217 Calcs.

ALL HEIGHTS

Building Geometry:

Ridge Length, B =	46.0 ft		
Gable Width, L =	24.0 ft		
Module Width =	15.5 ft		
Blocking Height, h_b =	18.0 in.		
Sidewall/Eve Height, h_e =	244.0 in.		
Roof Slope, a =	12.0 /12 pitch		
Roof slope, a =	45.0 deg.		
Sidewall Overhang, L_{OH} =	12.0 in.		
Endwall Overhang, B_{OH} =	12.0 in.		

Loading Conditions:

Wind Speed =	100 mph
Exposure Category:	C

Height Above Grade:

Stories Above Grade =	2
Sidewall Eave (z) =	21.8 ft
Roof Peak (z) =	34.8 ft
Mean Roof Height (h) =	28.3 ft
Foundation Type:	Raised floor

Seismic Design Parameters:

Seismic Use Group: II	ASD Adjustment Factor = 0.7	
Importance Category, I_E : 1.00	IBC Seismic Design Cat.: D	
Site Class: D	IRC Seismic Design Cat.: C	
Response Factor, R: 6.5	SD_S = 0.54	
	Cs = 0.10	

	Ground	Other	Roof
Wall Height, h_w (in.)	108	96	n/a
Wall Dead Weight (psf)	5	5	n/a
Floor/Level Dead Weight (psf)	10	10	20
Bottom Chord Dead Weight (psf)	--	--	10
Seismic Live Load (psf)	0	0	7.7

Transverse Diaphragm Parameters:

Ground Floor Wall Height =	9.0 ft
Above Ground Floor Wall Height =	8.0 ft
Vertical Roof Projection =	13.0 ft
Misc. Framing Height =	1.1 ft/level
Blocking Height =	1.5 ft
Ground Floor Endwall Weight =	1080 lbf
Above Ground Floor Endwall Weight =	960 lbf
Gable Endwall Weight =	1740 lbf

Horizontal Wind Pressure (MWFRS)			
Transverse	**Net Wall**	End Zone	23.2
		Interior	23.2
	Net Roof	End Zone	0.0
		Interior	10.7
	Max. Wall	End Zone	12.7
		Interior	12.7
	Max. Roof	End Zone	27.0
		Interior	16.3

MWFRS End Zone, 2a = 6.0 ft

Transverse Lateral Forces		Wind Net	Seismic Weight	Seismic Net
2nd of 2 Story	End (plf)	176	--	--
	Interior (plf)	245	--	--
	Diaphragm (plf)	--	705	49
	Transverse Walls (lbf/wall)	--	1260	87
	Total Force to Transverse Walls (lbf)	10867	--	2425
	Level OTM (ft-kip)	86.9	--	19.4
1st of 2 Story	End (plf)	223	--	--
	Interior (plf)	223	--	--
	Diaphragm (plf)	--	325	23
	Transverse Walls (lbf/wall)	--	540	37
	Total Force to Transverse Walls (lbf)	21143	--	4498
	Level OTM (ft-kip)	312.8	--	67.6
Base of 2 Story	End (plf)	152	--	--
	Interior (plf)	152	--	--
	Diaphragm (plf)	--	285	20
	Transverse Walls (lbf/wall)	--	540	37
	Total Transverse Force at Base (lbf)	28152	--	5483
	Total OTM (ft-kip)	344.1	--	73.7

CONTROLS

PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

2.1

Lateral Load Analysis (ASCE 7-05)

(Two-Story Building, Flexible Diaphragm)

Client: Excel Homes
Job Number: EXLH042314-42
Description: 31217 Calcs.

Diaphragm Parameters:

Ground Floor Wall Height =	9.0	ft
Above Ground Floor Wall Height =	8.0	ft
Vertical Roof Projection =	13.0	ft
Misc. Framing Height =	1.1	ft/level
Blocking Height =	1.5	ft
Ground Floor Sidewall Weight =	2070	lbm
Above Ground Floor Sidewall Weight =	1840	lbm

Horizontal Wind Pressure (MWFRS)			
Logitudinal	Net Wall	End	23.2
		Interior	23.2
	Net Roof	End	--
		Interior	--
	Max. Wall	End	12.7
		Interior	12.7
	Max. Roof	End	--
		Interior	--

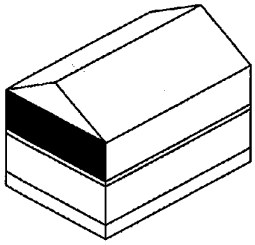
MWFRS End Zone, 2a = 6.0 ft

Longitudinal Lateral Forces		Wind Net	Seismic Weight	Seismic Net
2nd of 2 Story (Total)	End Max (plf)	245	--	--
	Min (plf)	106	--	--
CONTROLS	Interior Max (plf)	408	--	--
	Min (plf)	245	--	--
	Diaphragm (plf)	--	1435	100
	Longitudinal Walls (lbf/wall)	--	920	64
	Total Force to Longitudinal Walls (lbf)	6446	--	2518
	Level OTM (ft-kip)	51.6	--	20.1
Roof Diaphgram Only	End Max (plf)	70	--	--
	Min (plf)	0	--	--
	Interior Max (plf)	151	--	--
	Min (plf)	70	--	--
	Diaphragm (plf)	--	870	60
	Roof Force to Longitudinal Walls (lbf)	1674	--	1449
Ceiling Diaphgram Only	End Max (plf)	176	--	--
	Min (plf)	106	--	--
	Interior Max (plf)	257	--	--
	Min (plf)	176	--	--
	Diaphragm (plf)	--	565	39
	Ceiling Force to Longitudinal Walls (lbf)	4773	--	1069
1st of 2 Story	End Zone (plf)	223	--	--
		--	--	--
CONTROLS	Interior (plf)	223	--	--
		--	--	--
	Diaphragm (plf)	--	503	35
	Longitudinal Walls (lbf/wall)	--	1035	72
	Total Force to Longitudinal Walls (lbf)	11808	--	3627
	Level OTM (ft-kip)	178.1	--	59.6
Base of 2 Story	End Zone (plf)	141	--	--
		--	--	--
CONTROLS	Interior (plf)	141	--	--
		--	--	--
	Diaphragm (plf)	--	463	32
	Longitudinal Walls (lbf/wall)	--	1035	72
	Total Longitudinal Force at Base (lbf)	15186	--	4542
	Total OTM (ft-kip)	195.0	--	60.1

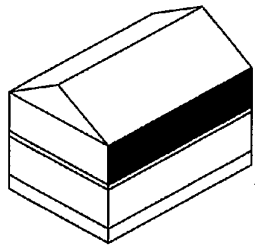
PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

Lateral Load Analysis (ASCE 7-05)

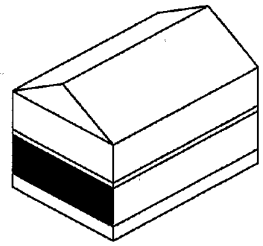
(Two-Story Building, Flexible Diaphragm)



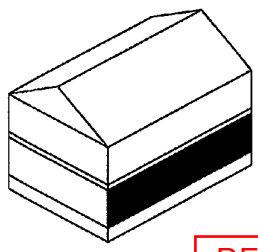
Transverse Walls Bracing 2nd Story	Wall Line	Wall Length	Location Along Length, X (ft)	(in.)	Stiffness R_x (k/in.)	R_xX (k)	d (ft)	R_xd (k)	R_xd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	1		0.0							5616	1213
	2		46.0							5616	1213
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
				Σ =	0.0	0					
					CR_x =	--	ft				



Longitudinal Walls Bracing 2nd Story	Wall Line	Wall Length	Location Along Width, Y (ft)	(in.)	Stiffness R_y (k/in.)	R_xX (k)	d (ft)	R_yd (k)	R_yd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	A		0.0							3223	1259
	B		24.0							3223	1259
	C										
	D										
	E										
	F										
	G										
	H										
	I										
	J										
				Σ =	0.0	0.0					
					CR_y =	--	ft				
					Overall J =	--					



Transverse Walls Bracing 1st Story	Wall Line	Wall Length	Location Along Length, X (ft)	(in.)	Stiffness R_x (k/in.)	R_xX (k)	d (ft)	R_xd (k)	R_xd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	1		0.0							10754	2249
	2		46.0							10754	2249
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
				Σ =	0.0	0.0					
					CR_x =	--	ft				



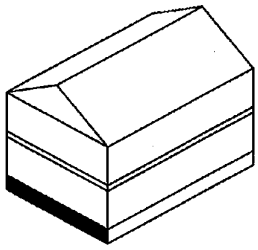
Longitudinal Walls Bracing 1st Story	Wall Line	Wall Length	Location Along Width, Y (ft)	(in.)	Stiffness R_y (k/in.)	R_xX (k)	d (ft)	R_yd (k)	R_yd^2 (k-in.)	Governing Lateral Loads (lbf) Wind	Seismic
	A		0.0							5904	1814
	B		24.0							5904	1814
	C										
	D										
	E										
	F										
	G										
	H										
	I										
	J										
				Σ =	0.0	0.0					
					CR_y =	--	ft				
					Overall J =	--					

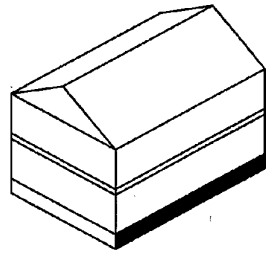
PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

2.3

Lateral Load Analysis (ASCE 7-05)

(Two-Story Building, Flexible Diaphragm)

Transverse Foundation Bracing 2 Story	Wall Line	Wall Length	Location Along Length, X (ft)	(in.)	Stiffness R_x (k/in.)	R_xX (k)	d (ft)	R_xd (k)	R_xd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	1		0.0							14258	2742
	2		46.0							14258	2742
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
				Σ =	0.0	0					
					CR_x =	--	ft				

Longitudinal Foundation Bracing 2 Story	Wall Line	Wall Length	Location Along Width, Y (ft)	(in.)	Stiffness R_y (k/in.)	R_xX (k)	d (ft)	R_yd (k)	R_yd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	A		0.0							7593	2271
	B		24.0							7593	2271
	C										
	D										
	E										
	F										
	G										
	H										
	I										
	J										
				Σ =	0.0	0.0					
					CR_y =	--	ft				
					Overall J =	--					

PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

2.4

Lateral Load Analysis (ASCE 7-05)

(Two-Story Building, Flexible Diaphragm)

Client: Excel Homes
Job Number: EXLH042314-42
Description: 31217 Calcs.

LOW RISE

Building Geometry:

Ridge Length, B =	46.0	ft
Gable Width, L =	24.0	ft
Module Width =	15.5	ft
Blocking Height, h_b =	18.0	in.
Sidewall/Eve Height, h_e =	244.0	in.
Roof Slope, a =	12.0	/12 pitch
Roof slope, a =	45.0	deg.
Sidewall Overhang, L_{OH} =	12.0	in.
Endwall Overhang, B_{OH} =	12.0	in.

Loading Conditions:

Wind Speed =	100	mph
Exposure Category:	C	

Height Above Grade:

Stories Above Grade =	2	
Sidewall Eave (z) =	21.8	ft
Roof Peak (z) =	34.8	ft
Mean Roof Height (h) =	28.3	ft
Foundation Type:	Raised floor	

Seismic Design Parameters:

Seismic Use Group: II
Importance Category, I_E : 1.00
Site Class: D
Response Factor, R: 6.5

ASD Adjustment Factor = 0.7
IBC Seismic Design Cat.: D
IRC Seismic Design Cat.: C
SD_S = 0.54
Cs = 0.10

	Ground	Other	Roof
Wall Height, h_w (in.)	108	96	n/a
Wall Dead Weight (psf)	5	5	n/a
Floor/Level Dead Weight (psf)	10	10	20
Bottom Chord Dead Weight (psf)	--	--	10
Seismic Live Load (psf)	0	0	7.7

Transverse Diaphragm Parameters:

Ground Floor Wall Height =	9.0	ft
Above Ground Floor Wall Height =	8.0	ft
Vertical Roof Projection =	13.0	ft
Misc. Framing Height =	1.1	ft/level
Blocking Height =	1.5	ft
Ground Floor Endwall Weight =	1080	lbf
Above Ground Floor Endwall Weight =	960	lbf
Gable Endwall Weight =	1740	lbf

Horizontal Wind Pressure (MWFRS)

Transverse	**Net Wall**	End Zone	24.6
		Interior	19.6
	Net Roof	End Zone	16.8
		Interior	13.5
	Max. Wall	End Zone	13.9
		Interior	11.6
	Max. Roof	End Zone	14.9
		Interior	12.8

MWFRS End Zone, 2a = 6.0 ft

Transverse Lateral Forces		**Wind Net**	**Seismic Weight**	**Seismic Net**
2nd of 2 Story	End (plf)	331	--	--
	Interior (plf)	264	--	--
CONTROLS	Diaphragm (plf)	--	705	49
	Transverse Walls (lbf/wall)	--	1260	87
	Total Force to Transverse Walls (lbf)	12550	--	2425
	Level OTM (ft-kip)	100.4	--	19.4
1st of 2 Story	End (plf)	237	--	--
	Interior (plf)	188	--	--
CONTROLS	Diaphragm (plf)	--	325	23
	Transverse Walls (lbf/wall)	--	540	37
	Total Force to Transverse Walls (lbf)	21490	--	4498
	Level OTM (ft-kip)	331.6	--	67.6
Base of 2 Story	End (plf)	161	--	--
	Interior (plf)	128	--	--
	Diaphragm (plf)	--	285	20
	Transverse Walls (lbf/wall)	--	540	37
	Total Transverse Force at Base (lbf)	27588	--	5483
	Total OTM (ft-kip)	362.3	--	73.7

PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

2.5

Lateral Load Analysis (ASCE 7-05)

(Two-Story Building, Flexible Diaphragm)

Client: Excel Homes
Job Number: EXLH042314-42
Description: 31217 Calcs.

Diaphragm Parameters:

Ground Floor Wall Height =	9.0	ft
Above Ground Floor Wall Height =	8.0	ft
Vertical Roof Projection =	13.0	ft
Misc. Framing Height =	1.1	ft/level
Blocking Height =	1.5	ft
Ground Floor Sidewall Weight =	2070	lbm
Above Ground Floor Sidewall Weight =	1840	lbm

Horizontal Wind Pressure (MWFRS)			
Logitudinal	Net Wall	End	21.9
		Interior	14.5
	Net Roof	End	--
		Interior	--
	Max. Wall	End	13.9
		Interior	11.6
	Max. Roof	End	--
		Interior	--

MWFRS End Zone, 2a = 6.0 ft

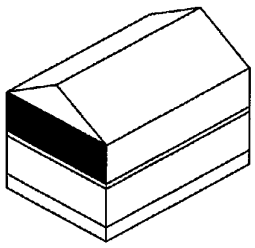
Longitudinal Lateral Forces		Wind Net	Seismic Weight	Seismic Net
2nd of 2 Story (Total)	End Max (plf)	231	--	--
	Min (plf)	100	--	--
	Interior Max (plf)	255	--	--
	Min (plf)	153	--	--
	Diaphragm (plf)	--	1435	100
	Longitudinal Walls (lbf/wall)	--	920	64
	Total Force to Longitudinal Walls (lbf)	4403	--	2518
	Level OTM (ft-kip)	35.2	--	20.1
Roof Diaphgram Only	End Max (plf)	66	--	--
	Min (plf)	0	--	--
	Interior Max (plf)	94	--	--
	Min (plf)	44	--	--
	Diaphragm (plf)	--	870	60
	Roof Force to Longitudinal Walls (lbf)	1111	--	1449
Ceiling Diaphgram Only	End Max (plf)	165	--	--
	Min (plf)	100	--	--
	Interior Max (plf)	160	--	--
	Min (plf)	110	--	--
	Diaphragm (plf)	--	565	39
	Ceiling Force to Longitudinal Walls (lbf)	3292	--	1069
1st of 2 Story	End Zone (plf)	210	--	--
		--	--	--
	Interior (plf)	139	--	--
		--	--	--
	Diaphragm (plf)	--	503	35
	Longitudinal Walls (lbf/wall)	--	1035	72
	Total Force to Longitudinal Walls (lbf)	8176	--	3627
	Level OTM (ft-kip)	122.8	--	59.6
Base of 2 Story	End Zone (plf)	132	--	--
		--	--	--
	Interior (plf)	88	--	--
		--	--	--
	Diaphragm (plf)	--	463	32
	Longitudinal Walls (lbf/wall)	--	1035	72
	Total Longitudinal Force at Base (lbf)	10552	--	4542
	Total OTM (ft-kip)	134.5	--	60.1

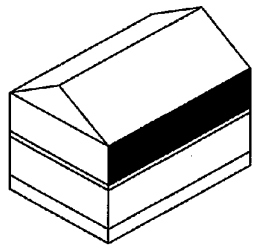
PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

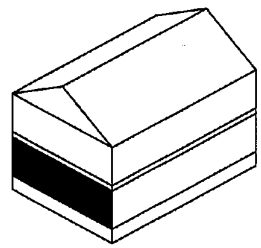
2.6

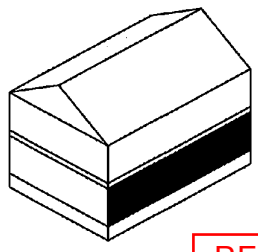
Lateral Load Analysis (ASCE 7-05)

(Two-Story Building, Flexible Diaphragm)

Transverse Walls Bracing 2nd Story	Wall Line	Wall Length	Location Along Length, X (ft)	(in.)	Stiffness R_x (k/in.)	R_xX (k)	d (ft)	R_xd (k)	R_xd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	1		0.0							6449	1213
	2		46.0							6449	1213
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
				Σ =	0.0	0					
					CR_x =	--	ft				

Longitudinal Walls Bracing 2nd Story	Wall Line	Wall Length	Location Along Width, Y (ft)	(in.)	Stiffness R_y (k/in.)	R_xX (k)	d (ft)	R_yd (k)	R_yd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	A		0.0							2338	1259
	B		24.0							2338	1259
	C										
	D										
	E										
	F										
	G										
	H										
	I										
	J										
				Σ =	0.0	0.0					
					CR_y =	--	ft				
					Overall J =	--					

Transverse Walls Bracing 1st Story	Wall Line	Wall Length	Location Along Length, X (ft)	(in.)	Stiffness R_x (k/in.)	R_xX (k)	d (ft)	R_xd (k)	R_xd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	1		0.0							11046	2249
	2		46.0							11046	2249
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
				Σ =	0.0	0.0					
					CR_x =	--	ft				

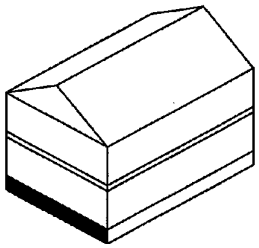
Longitudinal Walls Bracing 1st Story	Wall Line	Wall Length	Location Along Width, Y (ft)	(in.)	Stiffness R_y (k/in.)	R_xX (k)	d (ft)	R_yd (k)	R_yd^2 (k-in.)	Governing Lateral Loads (lbf) Wind	Seismic
	A		0.0							4383	1814
	B		24.0							4383	1814
	C										
	D										
	E										
	F										
	G										
	H										
	I										
	J										
				Σ =	0.0	0.0					
					CR_y =	--	ft				
					Overall J =	--					

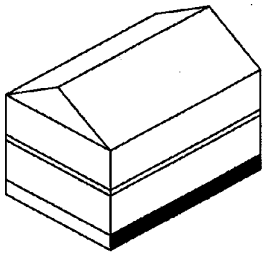
PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

2.7

Lateral Load Analysis (ASCE 7-05)

(Two-Story Building, Flexible Diaphragm)

Transverse Foundation Bracing 2 Story	Wall Line	Wall Length	Location Along Length, X (ft)	(in.)	Stiffness R_x (k/in.)	R_xX (k)	d (ft)	R_xd (k)	R_xd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	1		0.0							14181	2742
	2		46.0							14181	2742
	3										
	4										
	5										
	6										
	7										
	8										
	9										
	10										
				Σ =	0.0	0					
					CR_x =	--	ft				

Longitudinal Foundation Bracing 2 Story	Wall Line	Wall Length	Location Along Width, Y (ft)	(in.)	Stiffness R_y (k/in.)	R_xX (k)	d (ft)	R_yd (k)	R_yd^2 (ft-k)	Governing Lateral Loads (lbf) Wind	Seismic
	A		0.0							5672	2271
	B		24.0							5672	2271
	C										
	D										
	E										
	F										
	G										
	H										
	I										
	J										
				Σ =	0.0	0.0					
					CR_y =	--	ft				
					Overall J =	--					

PFS Corporation
Northeast Region
APPROVED
R Wenner - 1
5/15/14
Approval limited to Factory Built Portion

2.9