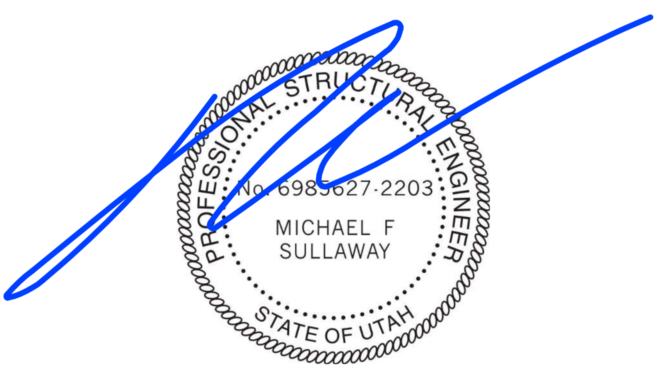
Blackwell
Structural Engineers

KIMMELMAN MAY RESIDENCE



Our Project - 170266

Design Calculation Package

August 10, 2017

Blackwell

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MATERIAL DEFINITION

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Wood Material Properties

	Label	Type	Database	Species	Grade	Cm	Emod	Nu	Ther...	Dens[k...
1	Spruce-Pine-Fir	Solid Sawn	Visually Graded	Spruce-Pine-fir	No.2		1	.3	.3	.026
2	2.0E Microllam LVL	Custom	N/A	2.0E Microllam LVL	na		1	.3	.3	.035

Custom Wood Properties

	Label	Fb [ksi]	Ft [ksi]	Fv [ksi]	Fc [ksi]	E [ksi]	E05 [ksi]	Type	CF
1	LVL_PRL_1.5E_2250F	2.25	1.5	.22	1.95	1500	1005	SCL	
2	LVL_PRL_2.0E_2900F	2.9	1.9	.285	2.75	2000	1340	SCL	
3	LVL_Microllam_1.9E_2600F	2.6	1.555	.285	2.51	1900	1273	SCL	
4	PSL_Parallam_2.0E_2900F	2.9	2.025	.29	2.9	2000	1340	SCL	
5	PSL_Parallam_1.8E	2.4	1.755	.18	2.5	1800	1206	SCL	
6	LSL_TimberStrand_1.55E_2325F	2.325	1.07	.31	2.05	1550	1038.5	SCL	
7	LSL_TimberStrand_1.3E_1700F	1.7	1.075	.4	1.4	1300	871	SCL	
8	2.0E Microllam LVL	2.6	1.555	.285	2.51	2000	184.6	SCL	0

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VOLUME 1 (Library)

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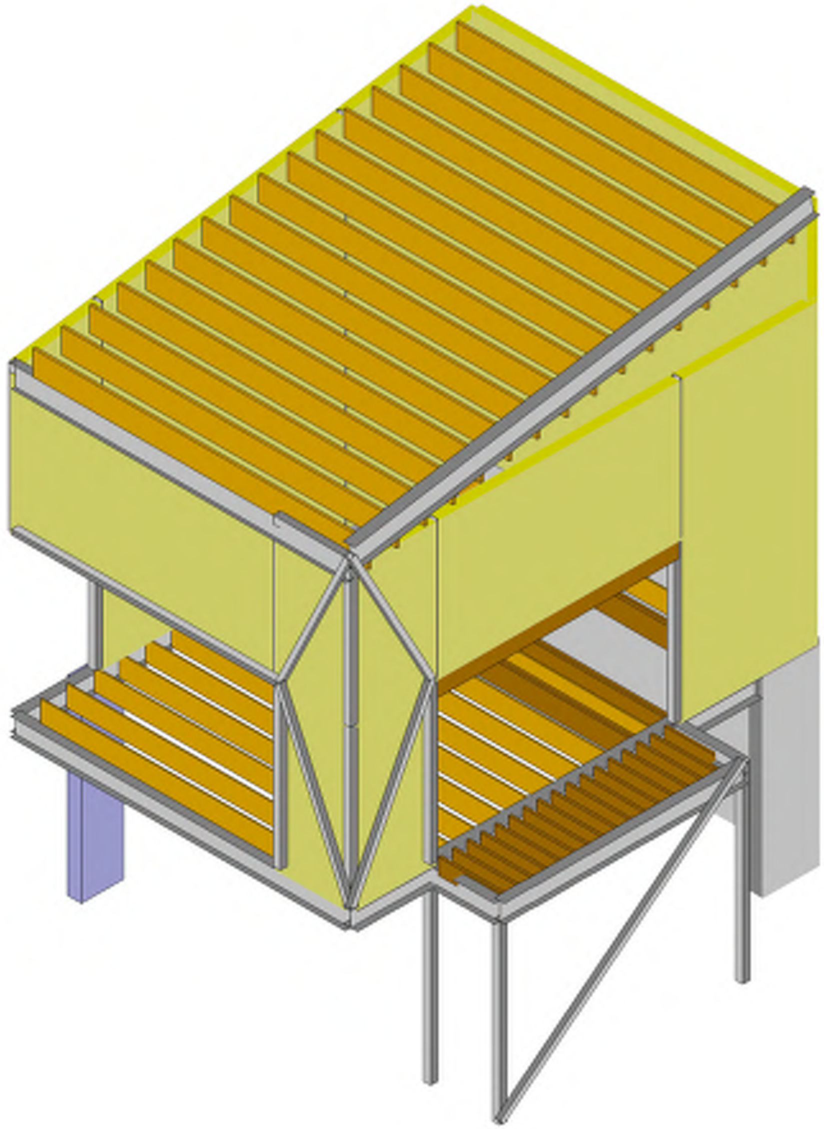

*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	Full Model	GENERAL RENDER
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:27 PM
170266		Volume 1.rfl

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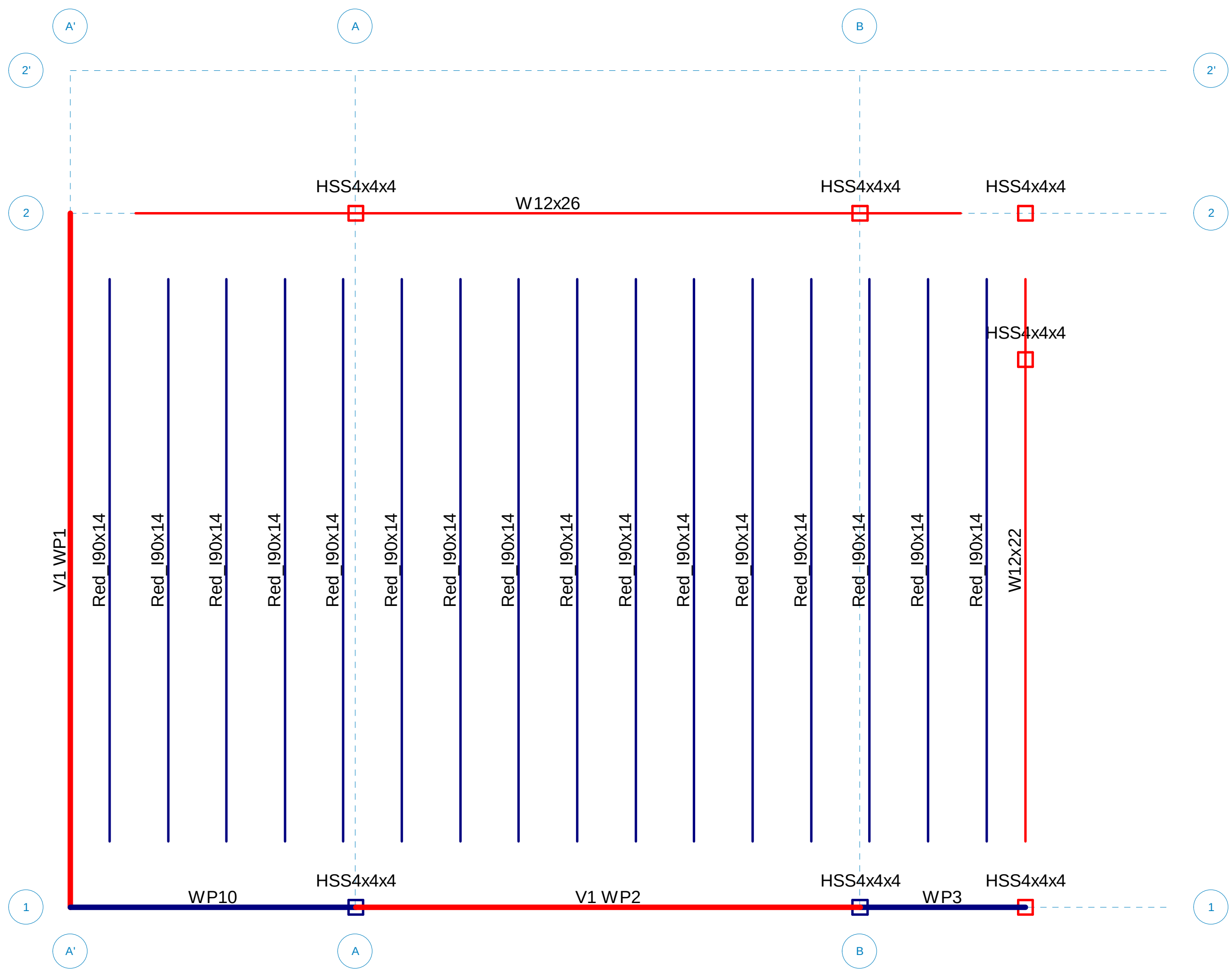
GRAVITY SYSTEM

Designed using RISAFloor

Gravity Geometry and Shapes Definition

Lateral
Gravity



Blackwell Structural Engineers	Roof	ROOF PLAN
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:34 PM
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X
Y Z

Lateral
Gravity

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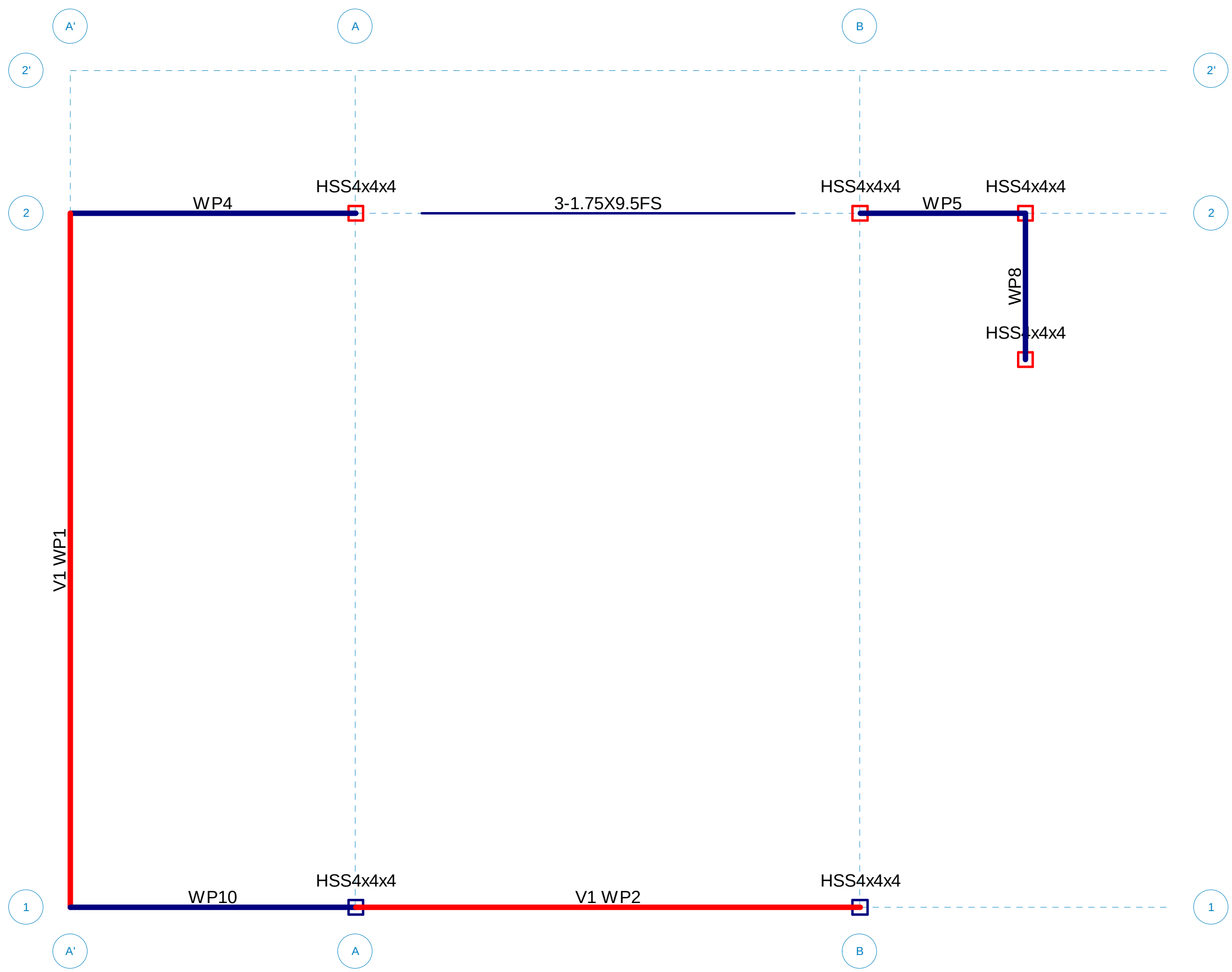
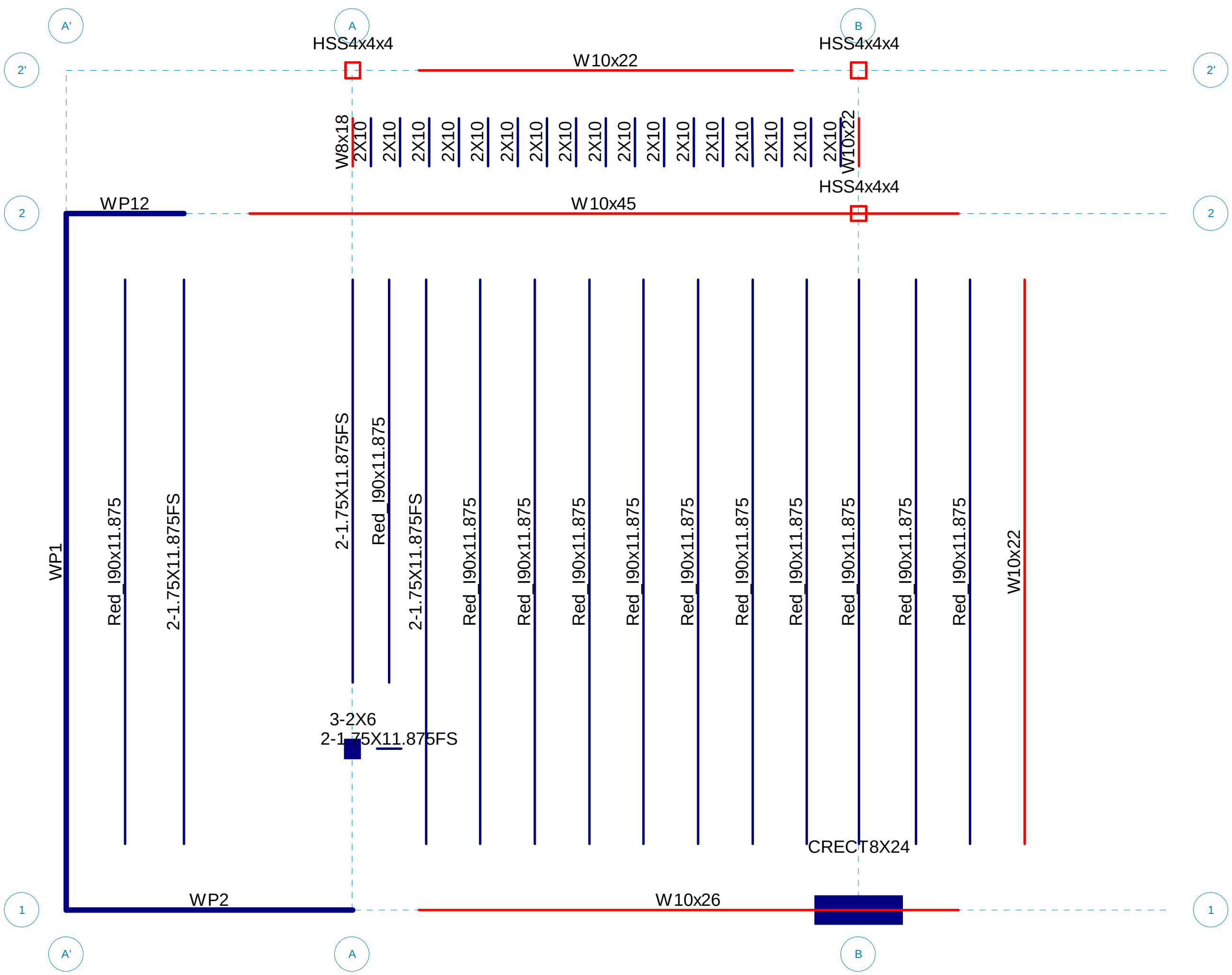


Note due to modeling requirements some members are only modeled and designed in RISA3D

Blackwell Structural Engineers	26'-6"	26'-6" PLAN
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:36 PM
170266		Volume 1.rfl

Lateral
Gravity

Blackwell



Blackwell Structural Engineers	19'	19'-0" PLAN
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:36 PM
170266		Volume 1.rfl

Gravity Wall and Member Designation

Lateral
Gravity

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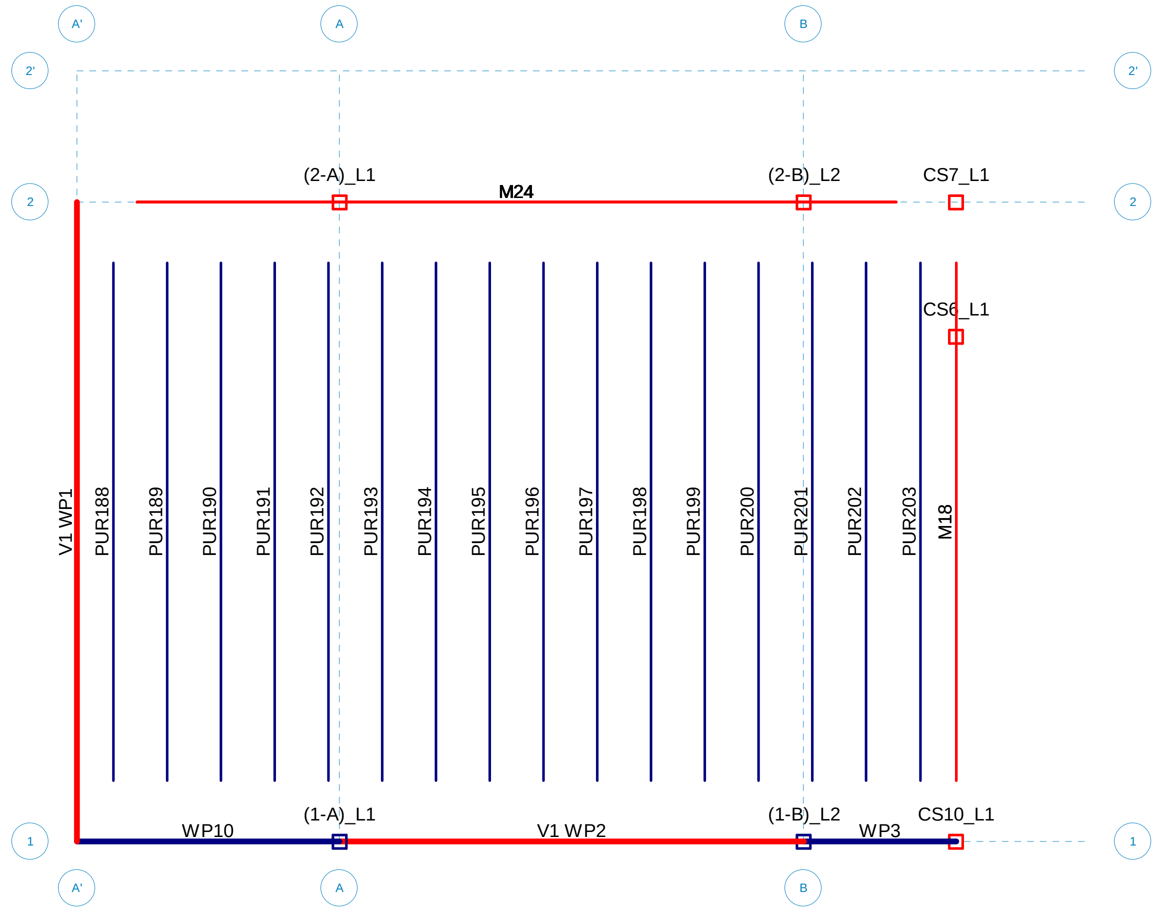

Blackwell Structural Engineers	Roof	ROOF MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:41 PM
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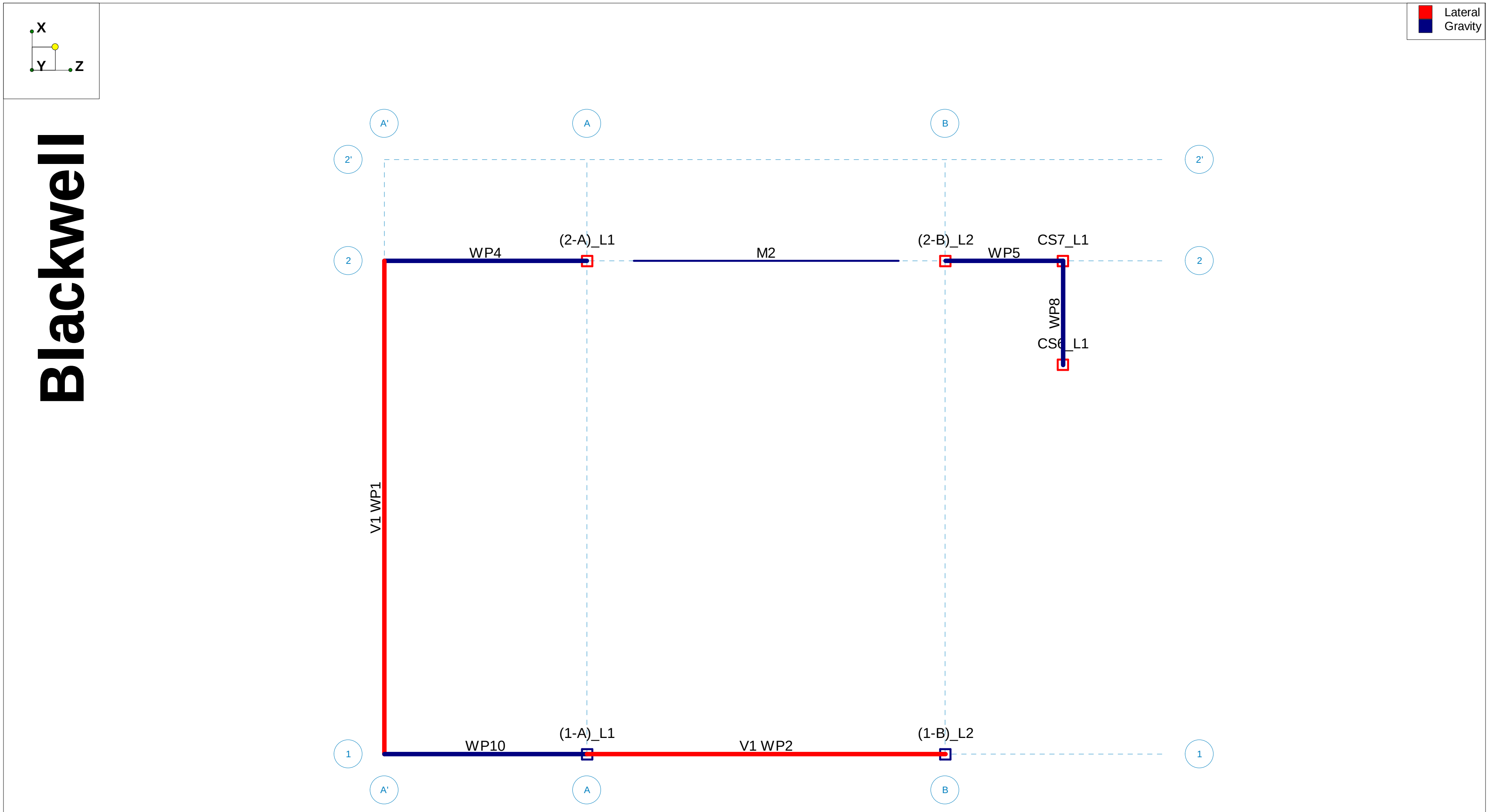

Note due to modeling requirements some members are only modeled and designed in RISA3D

Blackwell Structural Engineers	26'-6"	26'-6" MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:41 PM
170266		Volume 1.rfl

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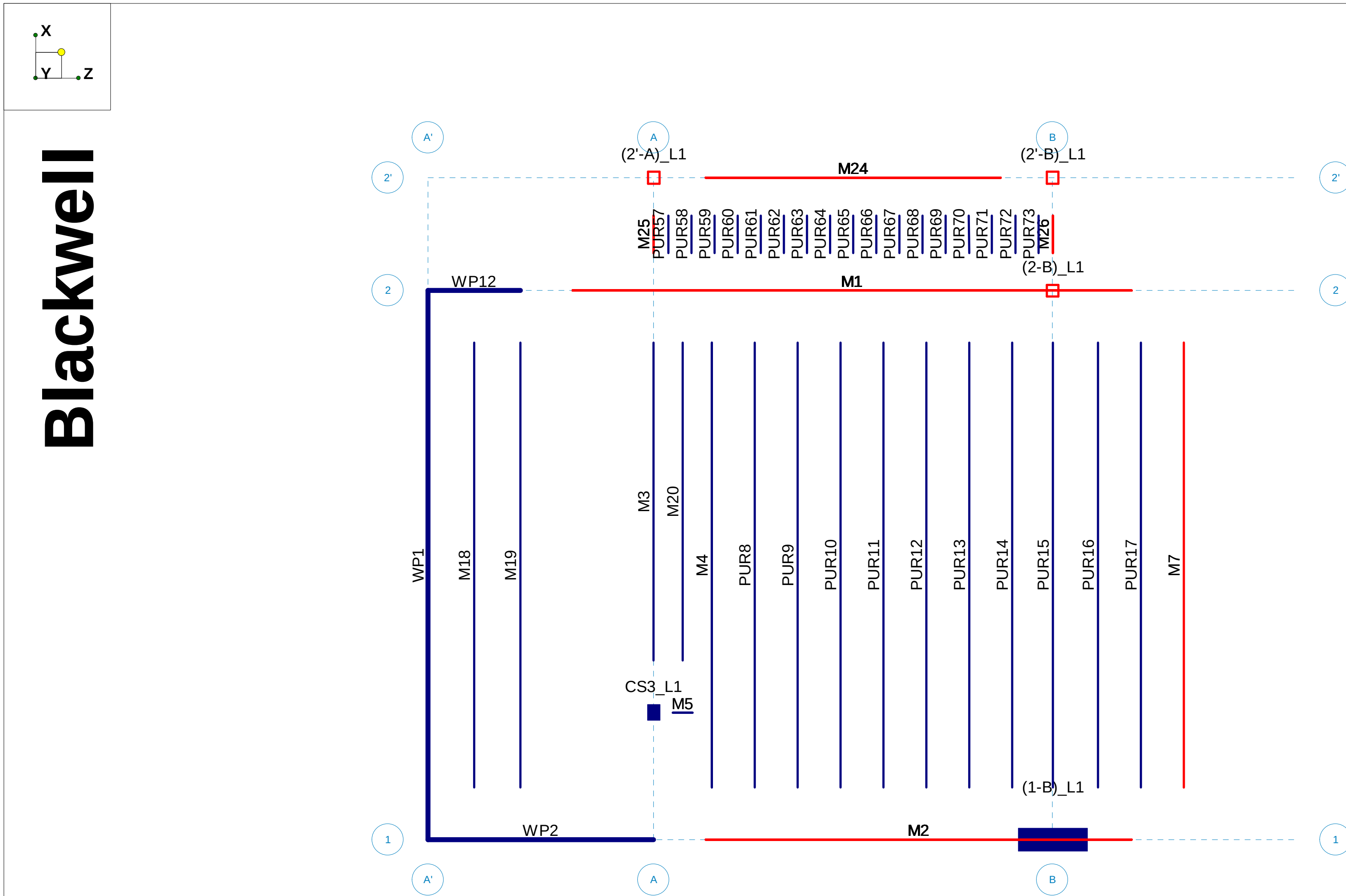
Lateral
Gravity



Blackwell Structural Engineers	19'	19'-0" MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:42 PM
170266		Volume 1.rfl

Column Stacks

	Stack L...	Project...	Z [ft]	X [ft]	Lift ...	Lengt...	Bot El..	Top E...	Shape	Material	Funct...	Design ...	Flexural La...	Shear Lay...
1	(2-B)	2-B	18	15.8...	1	9	10	19	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
2					2	14.991	19	33.991	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
3	CS3	-	6.5	3.667	1	9	10	19	3-2X6	Spruce-Pine-Fir	Gravity	Typical	N/A	N/A
4	(1-B)	1-B	18	0	1	9	10	19	CRECT8X24	Conc25NW	Gravity	Typical	Use Desig...	Use Desig...
5					2	14.991	19	33.991	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
6	(2'-A)	2'-A	6.5	19.0...	1	9	10	19	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
7	(2'-B)	2'-B	18	19.0...	1	9	10	19	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
8	(1-A)	1-A	6.5	0	1	16.907	19	35.907	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
9	CS6	-	21.7...	12.5	1	14.362	19	33.362	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
10	(2-A)	2-A	6.5	15.8...	1	16.907	19	35.907	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
11	CS7	-	21.7...	15.8...	1	14.362	19	33.362	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
12	CS10	-	21.7...	0	1	6.862	26.5	33.362	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A

Beam Primary Data : Roof

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M18	N8	N9	W12x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
2	M24	N2	N8	W12x26	A992	Typical	Lateral	Strong Axis	Fixed	Fixed	
3	PUR188	N364	N365	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	PUR189	N366	N367	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	PUR190	N368	N369	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
6	PUR191	N370	N371	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
7	PUR192	N372	N373	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
8	PUR193	N374	N375	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
9	PUR194	N376	N377	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
10	PUR195	N378	N379	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
11	PUR196	N380	N381	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
12	PUR197	N382	N383	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
13	PUR198	N384	N385	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
14	PUR199	N386	N387	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
15	PUR200	N388	N389	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
16	PUR201	N390	N391	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
17	PUR202	N392	N393	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
18	PUR203	N394	N395	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : Dummy Floor for Walls

Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
No Data to Print ...										

Beam Primary Data : 26'-6"

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M2	N7	N6	3-1.75X9.5FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 19'

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M1	N42	N10	W10x45	A992	Typical	Lateral	Strong Axis	Fixed	Fixed	
2	M2	N11	N13	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Fixed	
3	M3	N7	N8	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	M4	N14	N15	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	M5	N8	N16	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
6	M7	N13	N10	W10x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	

Beam Primary Data : 19' (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
7	PUR8	N17	N18	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
8	PUR9	N19	N20	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
9	PUR10	N21	N22	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
10	PUR11	N23	N24	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
11	PUR12	N25	N26	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
12	PUR13	N27	N28	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
13	PUR14	N29	N30	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
14	PUR15	N2	N6	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
15	PUR16	N33	N34	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
16	PUR17	N35	N36	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
17	M18	N39	N38	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
18	M19	N41	N42	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
19	M20	N43	N44	Red_I90x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
20	M24	N40	N45	W10x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
21	M25	N7	N40	W8x18	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
22	M26	N45	N6	W10x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
23	PUR57	N124	N125	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
24	PUR58	N126	N127	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
25	PUR59	N128	N129	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
26	PUR60	N130	N131	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
27	PUR61	N132	N133	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
28	PUR62	N134	N135	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
29	PUR63	N136	N137	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
30	PUR64	N138	N139	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
31	PUR65	N140	N141	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
32	PUR66	N142	N143	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
33	PUR67	N144	N145	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
34	PUR68	N146	N147	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
35	PUR69	N148	N149	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
36	PUR70	N28	N151	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
37	PUR71	N152	N153	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
38	PUR72	N154	N155	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
39	PUR73	N156	N157	2X10	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 10'

Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
No Data to Print ...										

Wood Wall Panel Parameters

	Label	Top Plate	Sill Plate	Studs	Min Stud Sp...	Max Stud Sp...	Green Lumb...	Header Size	Header Matl
1	Typical	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall

Additional Wood Wall Panel Parameters

	Label	Schedule	Min. Panel...	Max. Pane...	Double Sid...	Max. Nail ...	Min. Nail S...	HD Chords	HD Chord ...	Hold Down
1	Typical	0.469 (8d) Pan...	.295	.61	No	6-in.	2-in.	2-2X6	Same as ...	HDU_DF-SP

Wall Panel Parameters

	Label	Top Floor	Bottom Floor	Start ...	End ...	Material T...	Material Set	Thickne...	Function	Design R...	Distance Below ...	Parapet...
1	WP1	19'	10'	N3	N1	Concrete	Conc25NW	8	Gravity	Typical	9	NA
2	WP2	19'	10'	N11	N1	Concrete	Conc25NW	8	Gravity	Typical	9	NA
3	WP3	Roof	26'-6"	N4	N9	Wood	Spruce-Pi...	5.5 (stu...	Gravity	Typical	6.5	Default ...
4	WP4	Dummy Floo...	19'	N3	N4	Wood	Spruce-Pi...	5.5 (stu...	Gravity	Typical	7.5	NA
5	WP5	Dummy Floo...	19'	N5	N6	Wood	Spruce-Pi...	5.5 (stu...	Gravity	Typical	7.5	NA
6	WP6	Dummy Floo...	26'-6"	N4	N5	Wood	Spruce-Pi...	5.5 (stu...	Gravity	Typical	6.5	NA
7	WP7	Dummy Floo...	26'-6"	N7	N9	Wood	Spruce-Pi...	5.5 (stu...	Gravity	Typical	6.5	NA
8	WP8	Dummy Floo...	19'	N9	N6	Wood	Spruce-Pi...	5.5 (stu...	Gravity	Typical	7.5	NA
9	V1 WP1	Roof	19'	N1	N2	Wood	Spruce-Pi...	5.5 (stu...	Lateral	Typical	7.5	Default ...
10	WP10	Roof	19'	N1	GRD...	Wood	Spruce-Pi...	5.5 (stu...	Gravity	Typical	7.5	Default ...
11	V1 WP2	Roof	19'	GRD...	N4	Wood	Spruce-Pi...	5.5 (stu...	Lateral	Typical	7.5	Default ...
12	WP12	19'	10'	N3	N42	Concrete	Conc25NW	8	Gravity	Typical	9	NA

Wall Panel Advanced Parameters

	Label	Design Method	In-plane Icr Factor	Out-plane Icr Factor	K
1	WP1	N/A			
2	WP2	N/A			
3	WP3	Segmented	N/A	N/A	
4	WP4	Segmented	N/A	N/A	
5	WP5	Segmented	N/A	N/A	
6	WP6	Segmented	N/A	N/A	
7	WP7	Segmented	N/A	N/A	
8	WP8	Segmented	N/A	N/A	
9	V1 WP1	Segmented	N/A	N/A	
10	WP10	Segmented	N/A	N/A	
11	V1 WP2	Segmented	N/A	N/A	
12	WP12	N/A			

Gravity Loading

Floors

	Label	Elevati..	Area Load De..	Floor T...	Deck D...	Deck A...	Parent	Inacti...	Splice Distance ...	Splice Type	No Wind/...	Para...
1	Roof	33.362	Roof	Floor B...	Roof D...	0	None		.083	Shear		0
2	Dummy Floor for...	33	Floor	Floor B...	Interior ...	0	None		6.5	Shear		0
3	26'-6"	26.5	Floor	Floor B...	Interior ...	0	None		.083	Shear		0
4	19'	19	Floor	Floor B...	Interior ...	0	None		.083	Shear		0
5	10'	10	Floor	Floor B...	Interior ...	0	None		.083	Shear		0

Deck General Properties

	Label	Material Type	Deck	Unbraced[ft]	Max Spa...
1	Interior Wood w/ Topping	Wood Deck	1 in	1	4
2	Roof Deck	Wood Deck	1 in	1	4

Deck Loads

	Label	Two Way	Self Wt [psf]	Super DL [psf]	Const DL [psf]	Const LL [psf]
1	Interior Wood w/ Topping		3	37	0	0
2	Roof Deck		3	22	0	0

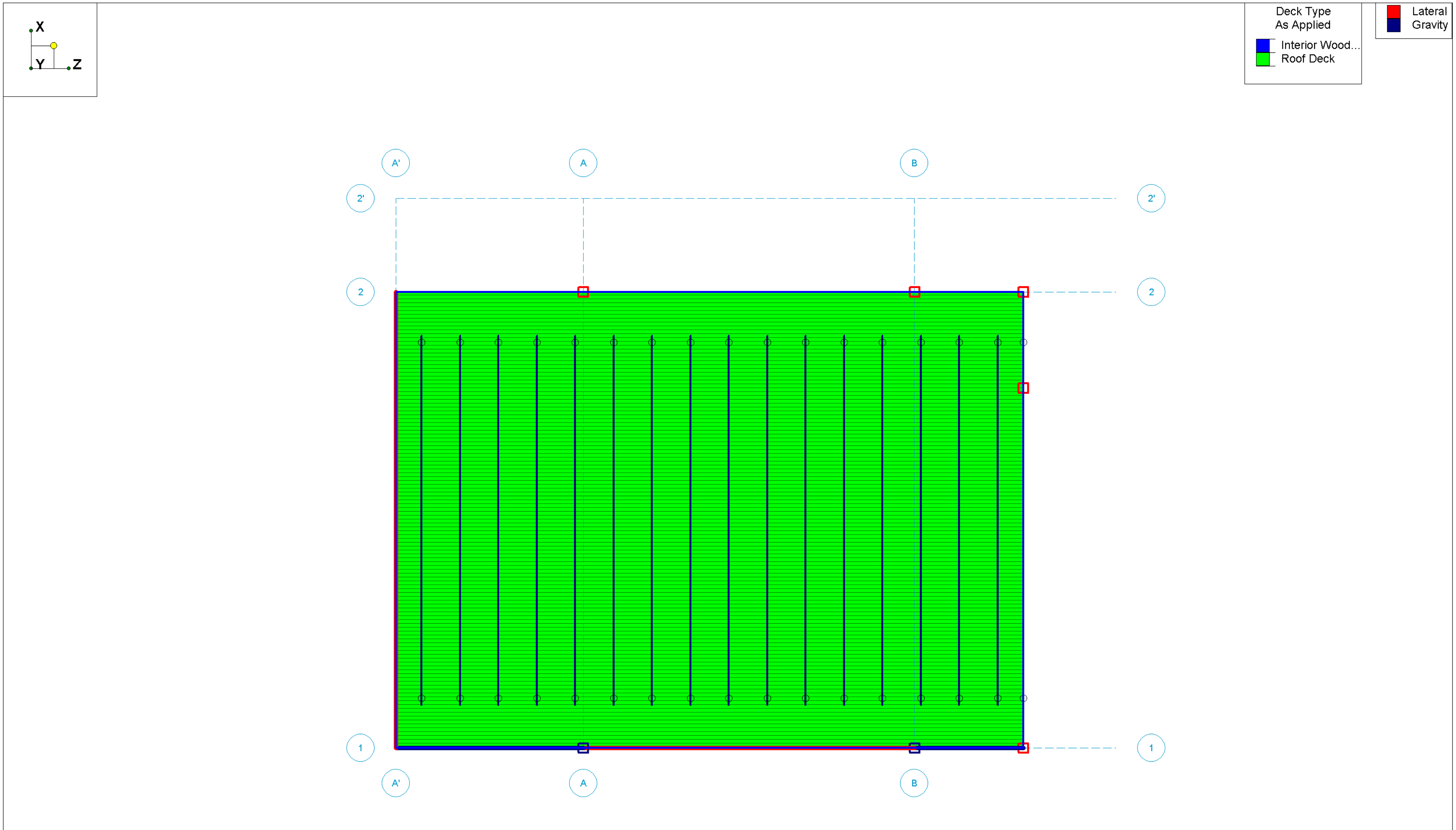
Uniform Area Loads

	Label	Additive	PreDL[psf]	PostDL[psf]	LL[psf]	LL Type	VL[psf]	Dyn Load[psf]
1	Floor				40	LL-Non		
2	Roof				192	SL		$\boxed{57.6}$

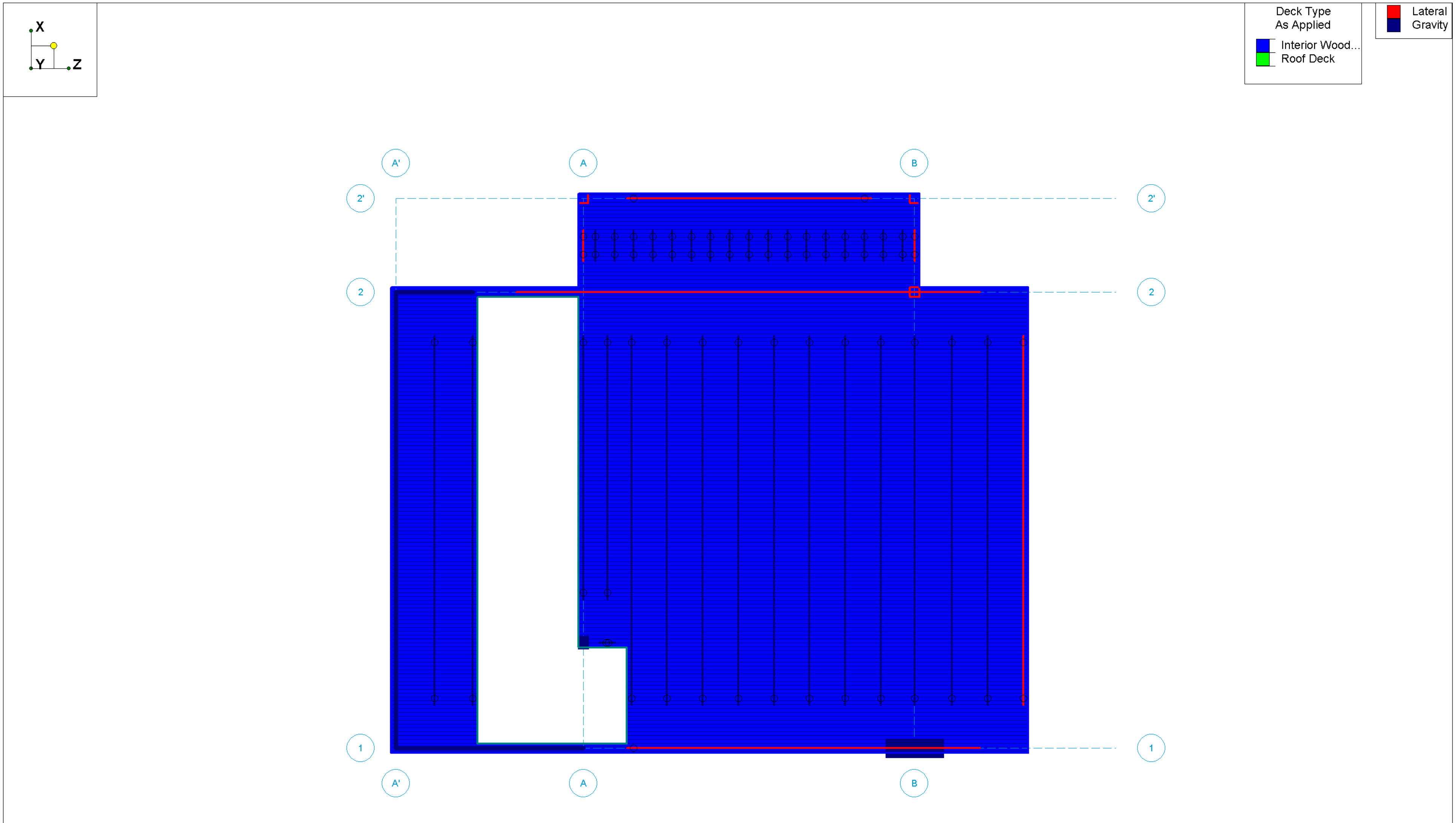
Combinations

	Label	Sol..	Cat...	Fa...	Cat...	Fa...	Cat...	Fa...	Cat...	Fa...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...
1	ASCE Strength 1 ...	Yes	DL	1.4																		
2	ASCE Strength 2 (...	Yes	DL	1.2	LL	1.6																
3	ASCE Strength 2 (...	Yes	DL	1.2	LL	1.6	SL	.5														
4	ASCE Strength 3 (...	Yes	DL	1.2	LL	.5																
5	ASCE Strength 3 (...	Yes	DL	1.2	SL	1.6	LL	.5														
6	ASCE ASD 1 Post	Yes	DL	1																		
7	ASCE ASD 2 Post	Yes	DL	1	LL	1																
8	ASCE ASD 3 (b) ...	Yes	DL	1	SL	1																
9	ASCE ASD 4 (a) ...	Yes	DL	1	LL	.75																
10	ASCE ASD 4 (b) ...	Yes	DL	1	LL	.75	SL	.75														

This load is 30% of the roof snow load and only contributes to the mass for seismic load calculations completed in RISA3D



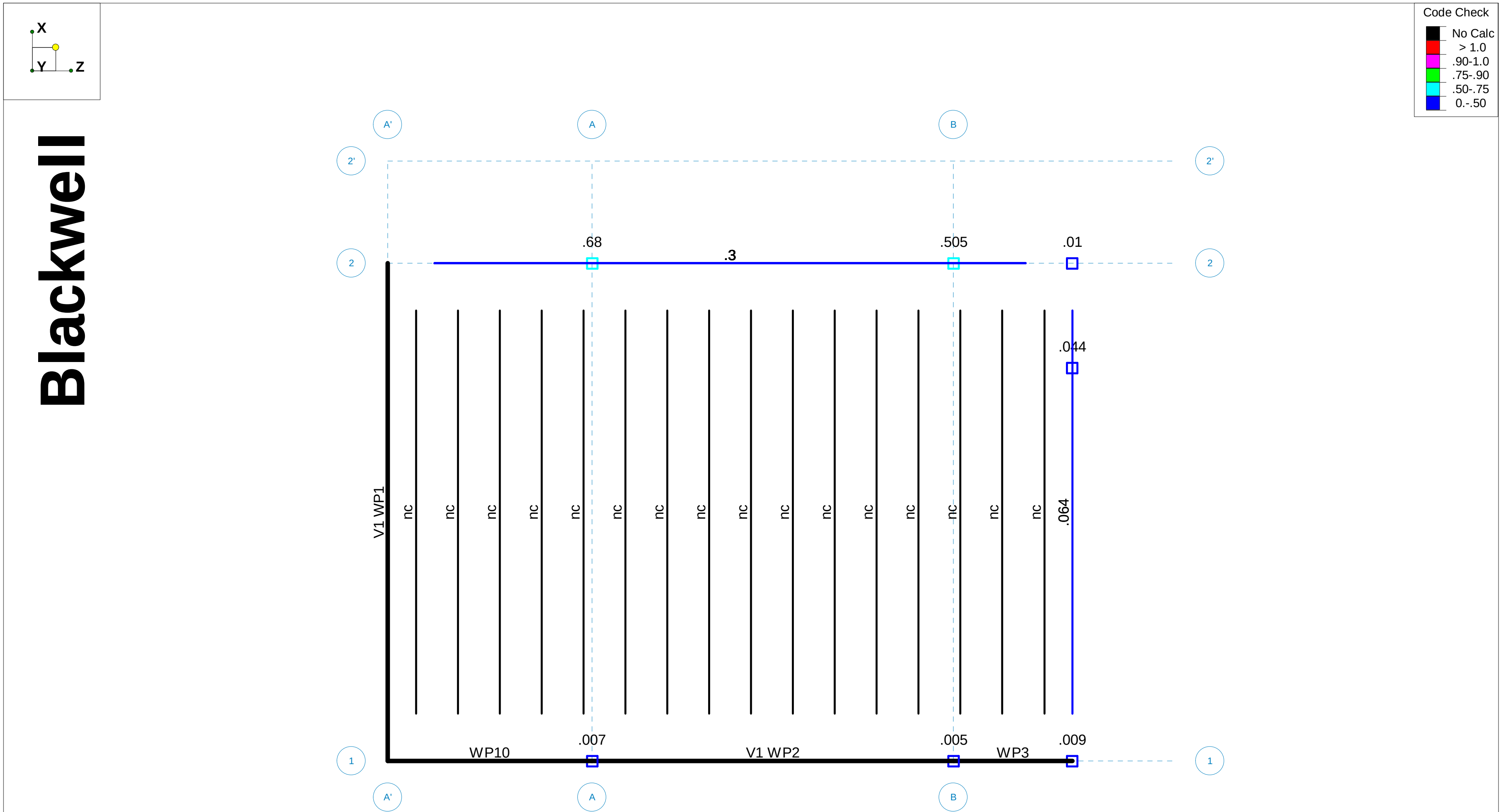
Blackwell Structural Engineers	Roof	ROOF DECK
BG	Kimmelman May Residence Volume 1	July 27, 2017 at 10:36 AM
170266		Volume 1.rfl



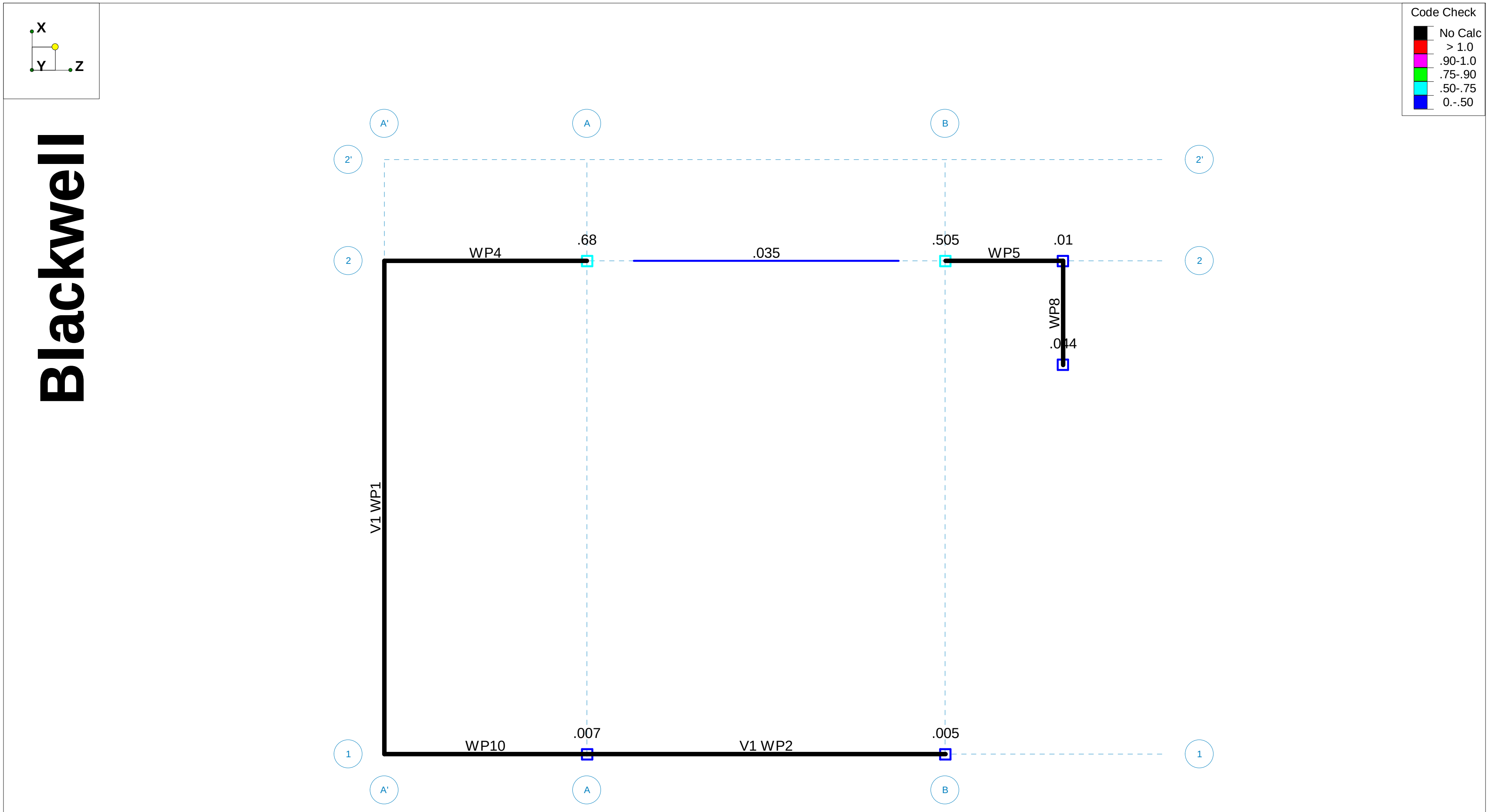
Blackwell Structural Engineers	19'	19'-0" DECK ASSIGNMENT
BG	Kimmelman May Residence Volume 1	July 27, 2017 at 10:34 AM
170266		Volume 1.rfl

Gravity Steel and Wood Member Utilization

Blackwell

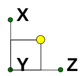


Blackwell Structural Engineers	Roof	ROOF BENDING CHECKS
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:45 PM
170266		Volume 1.rfl

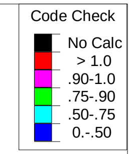


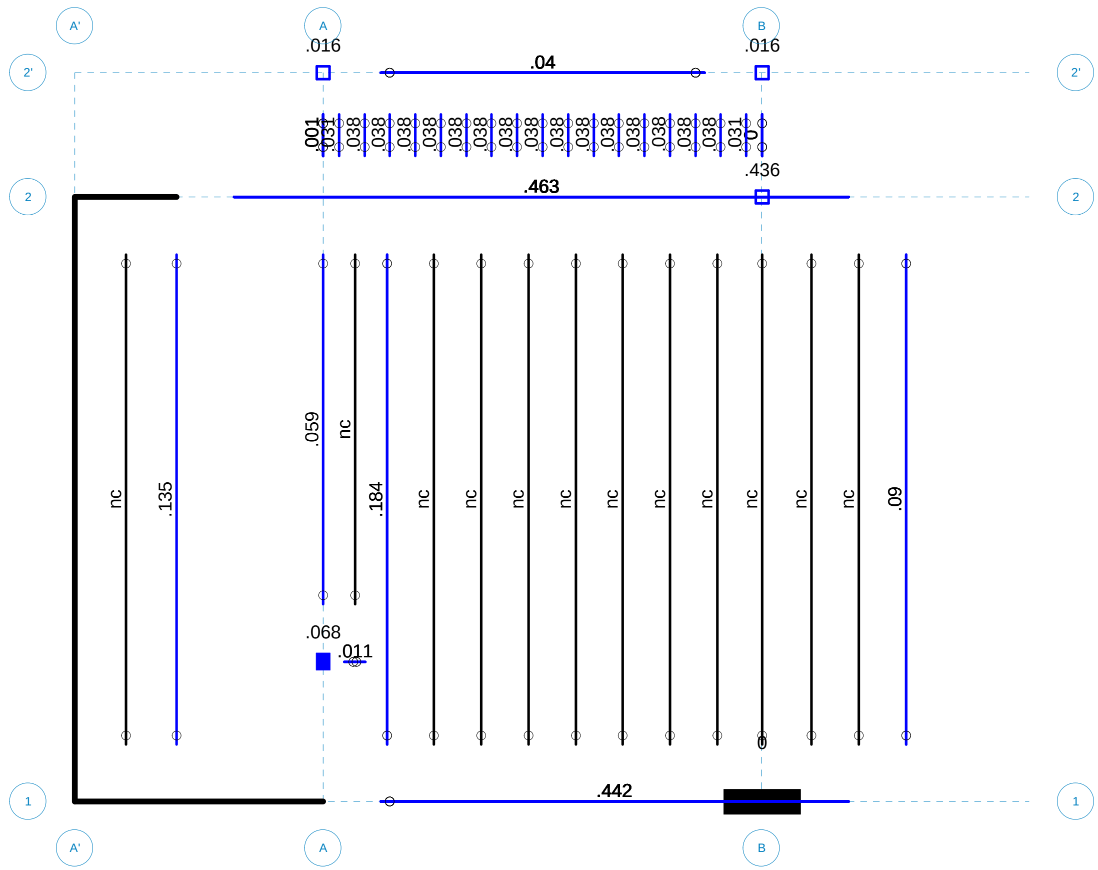
Note due to modeling requirements some members are only modeled and designed in RISA3D

Blackwell Structural Engineers	26'-6"	26'-6" BENDING CHECK
BG	Kimmelman May Residence Volume 1	July 26, 2017 at 6:46 PM
170266		Volume 1.rfl



Blackwell





Blackwell Structural Engineers	19'	19'-0" BENDING CHECK
BG	Kimmelman May Residence Volume 1	July 27, 2017 at 10:42 AM
170266		Volume 1.rfl

Beam Code Summary for Hot Rolled : Roof

	Label	Size	Explicit	Studs	Camb..	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M18	W12x22	Yes		0	A992	.064	3.299	5	.036	0	LL	.013	3.463	5
2	M24	W12x26	Yes		0	A992	.3	6.667	5	.117	12.415	LL	.174	6.667	5

Beam Code Summary for Hot Rolled : Dummy Floor for Walls

Label	Size	Explicit	Studs	Camb..	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC

No Data to Print ...

Beam Code Summary for Hot Rolled : 26'-6"

Label	Size	Explicit	Studs	Camb..	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC

No Data to Print ...

Beam Code Summary for Hot Rolled : 19'

	Label	Size	Explicit	Studs	Camb..	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M1	W10x45	Yes		0	A992	.463	3.981	5	.704	19.108	LL	.238	0	5
2	M2	W10x26	Yes		0	A992	.442	5.249	5	.61	15.271	LL	.23	11.4...	5
3	M7	W10x22	Yes		0	A992	.09	12.37	5	.106	8.576	DL+...	.039	15.8...	5
4	M24	W10x22	Yes		0	A992	.04	5.75	3	.037	5.75	DL+...	.018	0	2
5	M25	W8x18	Yes		0	A992	.001	1.625	2	.036	0	LL	.002	3.25	2
6	M26	W10x22	Yes		0	A992	0	1.625	2	.036	0	LL	.002	0	2

Beam Code Summary for Wood : Roof

Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC

No Data to Print ...

Beam Code Summary for Wood : Dummy Floor for Walls

Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC

No Data to Print ...

Beam Code Summary for Wood : 26'-6"

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M2	3-1.75X9.5FS	Yes	2.0E ...	.035	5.75	6	.036	0	LL	.022	0	6

Beam Code Summary for Wood : 19'

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M3	2-1.75X11.875FS	Yes	2.0E ...	.059	6.083	7	.047	6.083	DL+...	.044	12.1...	7
2	M4	2-1.75X11.875FS	Yes	2.0E ...	.184	8.411	7	.194	8.246	DL+...	.108	15.8...	7
3	M5	2-1.75X11.875FS	Yes	2.0E ...	.011	.833	7	.036	0	LL	.03	0	7
4	M19	2-1.75X11.875FS	Yes	2.0E ...	.135	7.917	7	.14	7.917	DL+...	.077	0	7
5	PUR57	2X10	Yes	Spruc...	.031	1.625	7	.036	0	LL	.06	3.25	7
6	PUR58	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
7	PUR59	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
8	PUR60	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
9	PUR61	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
10	PUR62	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
11	PUR63	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
12	PUR64	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
13	PUR65	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
14	PUR66	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7

Beam Code Summary for Wood : 19' (Continued)

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
15	PUR67	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
16	PUR68	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
17	PUR69	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
18	PUR70	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
19	PUR71	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
20	PUR72	2X10	Yes	Spruc...	.038	1.625	7	.036	0	LL	.073	3.25	7
21	PUR73	2X10	Yes	Spruc...	.031	1.625	7	.036	0	LL	.06	3.25	7

Beam Design for Wood Products : Roof

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
1	PUR188	Red_I90x14	Yes	-1.95	2.921	-7.717	13.144	1.95	1.95	.262	.262
2	PUR189	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
3	PUR190	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
4	PUR191	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
5	PUR192	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
6	PUR193	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
7	PUR194	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
8	PUR195	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
9	PUR196	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
10	PUR197	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
11	PUR198	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
12	PUR199	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
13	PUR200	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
14	PUR201	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
15	PUR202	Red_I90x14	Yes	-2.332	2.921	-9.232	13.144	2.332	2.332	.306	.306
16	PUR203	Red_I90x14	Yes	-1.95	2.921	-7.717	13.144	1.95	1.95	.262	.262

Beam Design for Wood Products : Dummy Floor for Walls

Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
No Data to Print ...										

Beam Design for Wood Products : 26'-6"

Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
No Data to Print ...										

Beam Design for Wood Products : 19'

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
1	PUR8	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
2	PUR9	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
3	PUR10	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
4	PUR11	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
5	PUR12	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
6	PUR13	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
7	PUR14	Red_I90x11....	Yes	-.8	2.255	-3.168	9.605	.8	.8	.418	.418
8	PUR15	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
9	PUR16	Red_I90x11....	Yes	-.839	2.255	-3.321	9.605	.839	.839	.438	.438
10	PUR17	Red_I90x11....	Yes	-.82	2.255	-3.244	9.605	.82	.82	.428	.428
11	M18	Red_I90x11....	Yes	-.88	2.255	-3.482	9.605	.88	.88	.458	.458
12	M20	Red_I90x11....	Yes	-.434	2.255	-1.319	9.605	.434	.434	.231	.231

Hot Rolled Steel Column Code Checks

	Stack	Lift	Shape	Code Ch...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	phi*Pnc ...	phi*Pnt [k]	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	(2-B)	1	HSS4x4x4	.436	10	5	.000	10		10	99.405	139.518	16.181	16.181	1	H1-1a
2		2	HSS4x4x4	.505	19	5	.000	19		10	54.475	139.518	16.181	16.181	1	H1-1a
3	(1-B)	2	HSS4x4x4	.005	19	1	.000	19		10	54.475	139.518	16.181	16.181	1	H1-1b*
4	(2'-A)	1	HSS4x4x4	.016	10	3	.000	10		10	99.405	139.518	16.181	16.181	1	H1-1b*
5	(2'-B)	1	HSS4x4x4	.016	10	2	.000	10		10	99.405	139.518	16.181	16.181	1	H1-1b*
6	(1-A)	1	HSS4x4x4	.007	19	1	.000	19		10	42.809	139.518	16.181	16.181	1	H1-1b*
7	CS6	1	HSS4x4x4	.044	19	5	.000	19		10	58.847	139.518	16.181	16.181	1	H1-1b*
8	(2-A)	1	HSS4x4x4	.680	19	5	.000	19		10	42.809	139.518	16.181	16.181	1	H1-1a
9	CS7	1	HSS4x4x4	.010	33.063	5	.000	19		10	58.847	139.518	16.181	16.181	1	H1-1b
10	CS10	1	HSS4x4x4	.009	26.5	5	.000	26.5		10	114.564	139.518	16.181	16.181	1	H1-1b*

Wood Column Code Checks

	Stack	Lift	Shape	Code C...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	Eqn
1	CS3	1	3-2X6	.068	10	7	.000	10	z	10	.368	.585	1.134	1.308	.135	3.6.3

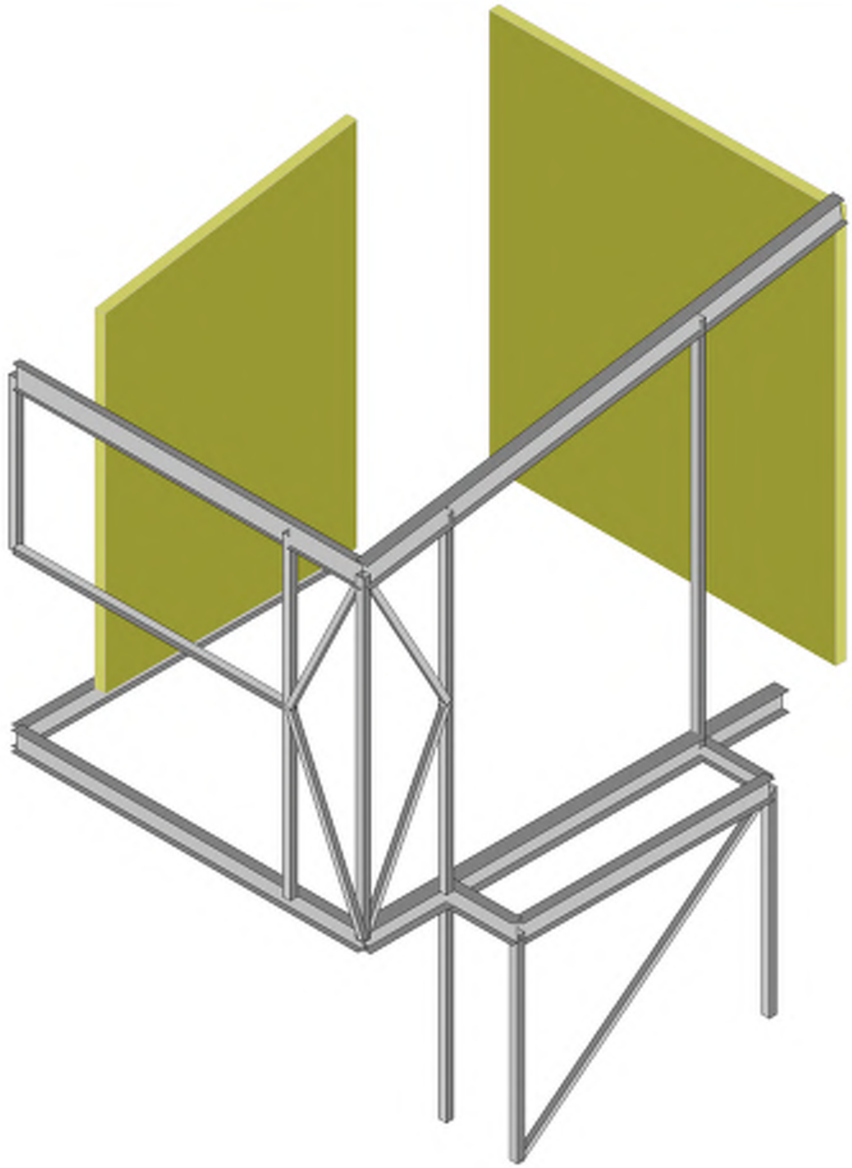
Gravity Wall Utilization

Wall Results, Wood Wall Panel

	Wall Panel	Region	Stud Size	Stud Spacing[in]	Axial Check	Gov LC
1	WP3	R1	2X6	16	.175	8
2	WP4	R1	2X6	16	.014	6
3	WP5	R1	2X6	16	.014	6
4	WP6	R1	2X6	16	.003	6
5	WP7	R1	2X6	16	.003	6
6	WP8	R1	2X6	16	.016	6
7	V1 WP1	R1	2X6	16	.106	8
8	WP10	R1	2X6	16	.562	8
9	V1 WP2	R1	2X6	16	.556	8

LATERAL SYSTEM
Designed using RISA3D integrated
with RISAFloor

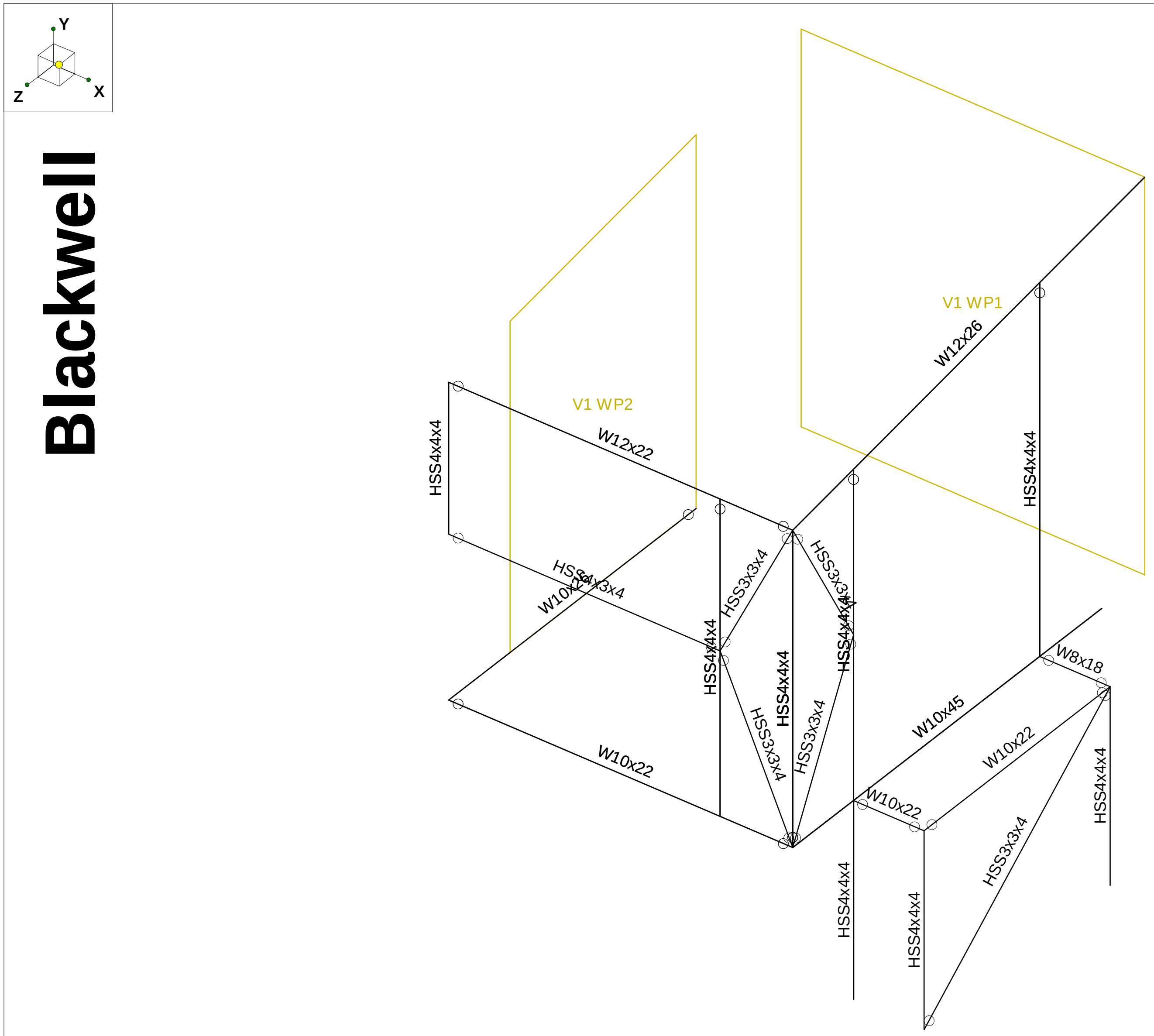
Blackwell



*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	Kimmelman May Residence Volume 1	GENERAL LATERAL RENDER
BG		July 27, 2017 at 10:51 AM
170266		Volume 1.rfl

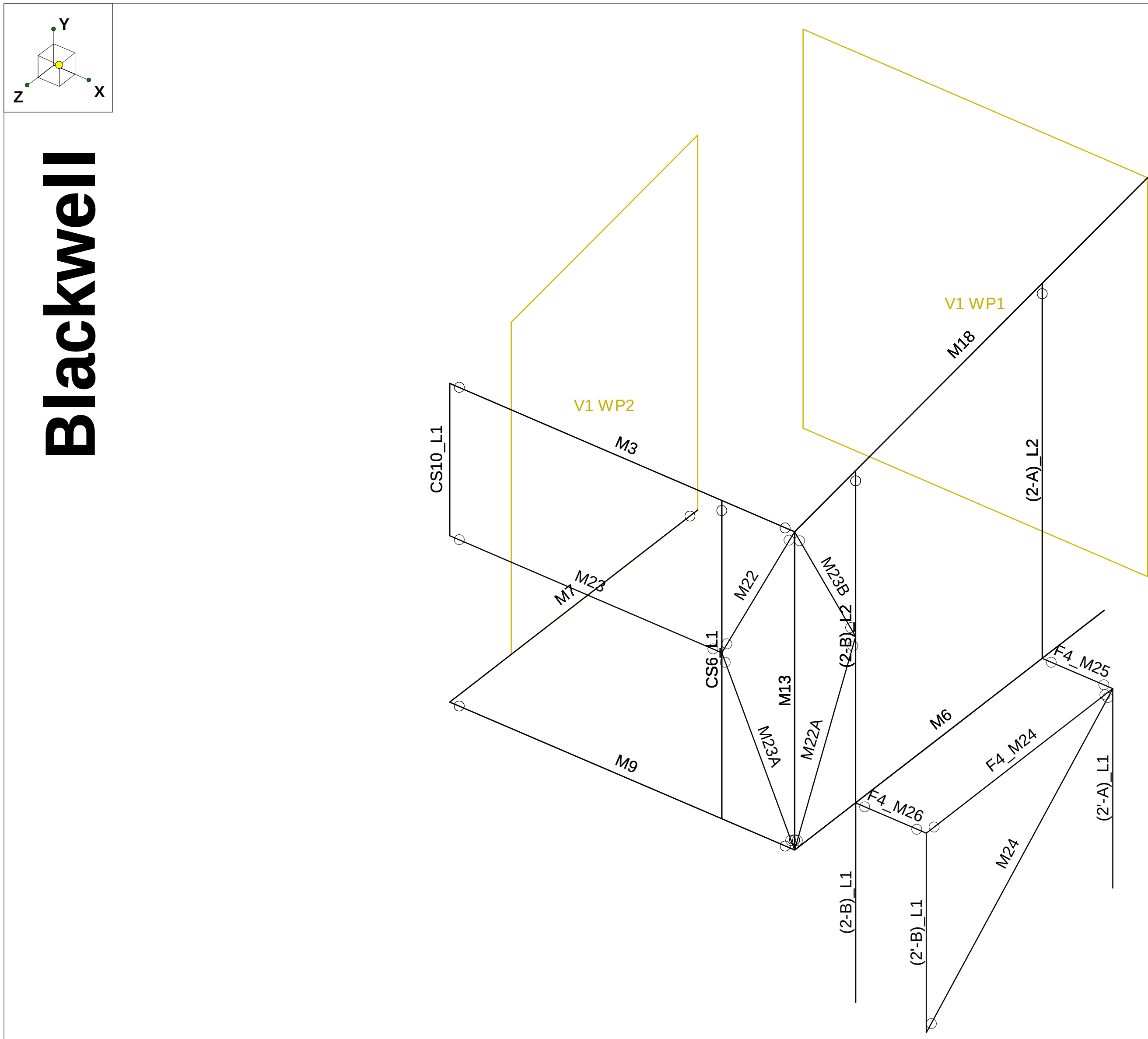
Lateral Geometry Definition



Blackwell Structural Engineers	Kimmelman May Residence Volume 1	MEMBER SHAPES
BG		July 27, 2017 at 10:53 AM
170266		Volume 1.rfl

Lateral Wall and Member Designation

Linked to RISAFloor



Blackwell Structural Engineers	Kimmelman May Residence Volume 1	MEMBER DESIGNATIONS
BG		July 27, 2017 at 10:52 AM
170266		Volume 1.rfl

Floor Diaphragms

	Elev...	Mas...	Mas...	Center o...	Plus X...	Minus ...	Plus Z...	Minus ...	Inac...	Diaphr...	Type	Region	Design ...	SGAF	Material	Thickn...	No ...
1	33.3...	31.6...	199...	8.028, 1...	%5	%5	%5	%5		D3	Flexible		N/A	N/A	N/A	N/A	
2	19	30.0...	333...	8.143, 8...	%5	%5	%5	%5		D2	Flexible		N/A	N/A	N/A	N/A	

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M3	N10	N1			W12x22	Beam	None	A992	Typical
2	M6	F4_N42	N24			W10x45	Beam	None	A992	Typical
3	M7	N25	N26			W10x26	Beam	None	A992	Typical
4	M9	N26	N24			W10x22	Beam	None	A992	Typical
5	M13	N24	N10			HSS4x4x4	Column	None	A500 Gr.B...	Typical
6	M18	N5	N10			W12x26	Beam	None	A992	Typical
7	(2-A)_L2	N23	N9			HSS4x4x4	Column	None	A500 Gr.B...	Typical
8	(2'-A)_L1	N46	N42			HSS4x4x4	Column	None	A500 Gr.B...	Typical
9	(2'-B)_L1	N47	N43			HSS4x4x4	Column	None	A500 Gr.B...	Typical
10	CS6_L1	N32	N8			HSS4x4x4	Column	None	A500 Gr.B...	Typical
11	F4_M25	N23	N42			W8x18	Beam	None	A992	Typical
12	F4_M26	N43	N22			W10x22	Beam	None	A992	Typical
13	F4_M24	N42	N43			W10x22	Beam	None	A992	Typical
14	M23	N2	N16		90	HSS4x3x4	Beam	Tube	A992	Typical
15	M24	N47	N42			Brace	VBrace	Wide Flange	A992	Typical
16	M22	N10	N2			Brace	VBrace	Wide Flange	A992	Typical
17	M23A	N2	N24			Brace	VBrace	Wide Flange	A992	Typical
18	M22A	N24	N12			Brace	VBrace	Wide Flange	A992	Typical
19	M23B	N12	N10			Brace	VBrace	Wide Flange	A992	Typical
20	CS10_L1	N16	N1			HSS4x4x4	Column	None	A500 Gr.B...	Typical
21	(2-B)_L1	N44	N22			HSS4x4x4	Column	None	A500 Gr.B...	Typical
22	(2-B)_L2	N22	N6			HSS4x4x4	Column	None	A500 Gr.B...	Typical

Hot Rolled Steel Design Parameters

	Label	Shape	Length[...	Lbyy[ft]	Lbzz[ft]	Lcomp top...	Lcomp bot...	L-torq...	Kyy	Kzz	Cb	Function
1	M3	W12x22	15.833	2.667	1.33	.5						Lateral
2	M6	W10x45	19.108	1.333		.5						Lateral
3	M7	W10x26	15.271	1.333		.5						Lateral
4	M9	W10x22	15.833	2.667		.5						Lateral
5	M13	HSS4x4x4	14.362	Floor	Floor	Floor	Floor	Floor				Lateral
6	M18	W12x26	22.071	1.33	1.33	.5						Lateral
7	(2-A)_L2	HSS4x4x4	16.907	Floor	Floor	Floor	Floor	Floor				Lateral
8	(2'-A)_L1	HSS4x4x4	9	Floor	Floor	Floor	Floor	Floor				Lateral
9	(2'-B)_L1	HSS4x4x4	9	Floor	Floor	Floor	Floor	Floor				Lateral
10	CS6_L1	HSS4x4x4	14.362	Floor	Floor	Floor	Floor	Floor				Lateral
11	F4_M25	W8x18	3.25			Floor						Lateral
12	F4_M26	W10x22	3.25			Floor						Lateral
13	F4_M24	W10x22	11.5			Floor						Lateral
14	M23	HSS4x3x4	12.5			Lbyy						Lateral
15	M24	Brace	14.603									Lateral
16	M22	Brace	7.629									Lateral
17	M23A	Brace	8.207									Lateral
18	M22A	Brace	8.395									Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[...	Lbyy[ft]	Lbzz[ft]	Lcomp top...	Lcomp bot...	L-torq...	Kyy	Kzz	Cb	Function
19	M23B	Brace	7.83									Lateral
20	CS10_L1	HSS4x4x4	6.862	Floor	Floor	Floor	Floor	Floor				Lateral
21	(2-B)_L1	HSS4x4x4	9	Floor	Floor	Floor	Floor	Floor				Lateral
22	(2-B)_L2	HSS4x4x4	14.991	Floor	Floor	Floor	Floor	Floor				Lateral

Wall Panel Data

	Label	A Joint	B Joint	C Joint	D Joint	Material Ty...	Material Set	Thicknes...	Design Rule	Panel/Spacing
1	V1 WP1	N4	N5	N21	N19	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@6 | 16
2	V1 WP2	N7	N33	N20	N25	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@6 | 16

Wood Wall Panel Parameters

	Label	Top Plate	Sill Plate	Studs	Min Stud S...	Max Stud ...	Green Lumber?	Header Size	Header Matl
1	Typical	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall

Additional Wood Wall Panel Parameters

	Label	Schedule	Min. P...	Max. P...	Double Sided ...	Max. N...	Min. N...	HD Chor...	HD Chord M...	Hold Down	Ecce...
1	Typical	0.469 (8d) Panel Group	.295	.61	No	6-in.	2-in.	2-2X6	Same as Wall	HDU_DF-SP	Yes

Lateral Loading
Note: vertical loads applied via RISAFloor

Wind Generation Input

Wind Code:	ASCE 7-10	Topographic Factor K1:	0
Wind Speed, V(mph):	115	Topographic Factor K2:	0
		Topographic Factor K3:	0
Exposure Category:	C	Directionality Factor Kd:	.85
Base Elevation(ft):	19	Parapet Height(ft):	0

Wind Generation Detail Results

		Kzt:	1
Exposure Constant Alpha:	9.5	h (ft):	16.176
Exposure Constant zg:	900	Kh:	.862
Gust Effect Factor, G:	.85	Windward Cp:	.8
		qh (psf):	24.82
		GCpn (windward):	+1.5
		GCpn (leeward):	-1.0

Wind Generation Floor Geometry Results

Floor Level	Height (ft)	Kz	Width (X) (ft)	Length (Z) (ft)	Leeward Cp(X)	Leeward Cp(Z)
Roof	14.362	.849	15.833	21.771	.5	.425
Sloped Roof	17.991	.882	39.498/39.498 (ft^2)	57.45/0 (ft^2)	.5	.425

Wind Generation Floor Force Results

Floor Level	qz (psf)	Windward Pres. (psf)	Leeward Pres. X (psf)	Leeward Pres. Z (psf)	Force X (k)	Force Z (k)
Roof	24.429	16.612	10.549	8.966	4.246	2.908
Sloped Roof	25.382	17.26	10.549	8.966	1.098	.992
Total					5.345	3.9

Seismic Generation Input

Seismic Code:	ASCE 7-10				
Ct_X:	.02	T_X (sec):	Not Entered	R_X:	3.25
Ct_Z:	.02	T_Z (sec):	Not Entered	R_Z:	3.25
Ct Exp. X:	.75	Ct Exp. Z:	.75		
Risk Cat	I or II	TL (sec):	8		
SD1 (g):	.363	SDS (g):	.683	S1 (g):	.304
Base Elev (ft):	19	Parapet Ht (ft):	0		

Seismic Generation Detail Results

T_X Used (sec):	.148	T_X Method A:	.148	T_X Upper Limit:	.207
T_Z Used (sec):	.148	T_Z Method A:	.148	T_Z Upper Limit:	.207
Importance Fac.:	1	Design Cat.:	D		
V_X (k):	6.652	Gov. Eqn.	ASCE Eqn 12.8-2	Cs_X:	0.210
V_Z (k):	6.652	Gov. Eqn.	ASCE Eqn 12.8-2	Cs_Z:	0.210

Seismic Generation Force Results

Floor Level	Height (ft)	Weight (k)	Force X (k)	Force Z (k)	CG X (ft)	CG Z (ft)
Roof	14.362	31.653	6.652	6.652	8.028	10.937
Totals		31.653	6.652	6.652		

Seismic Generation Diaphragm Results

Floor Level	Width (X) (ft)	Length (Z) (ft)	X Plus (ft)	X Minus (ft)	Z Plus (ft)	Z Minus (ft)
Roof	15.833	21.771	.792	.792	1.089	1.089

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Gravi...	Joint	Point	Distributed	Area(M...	Surfac...
1	Dead Load	DL		-1		3	80	22		
2	Live Load	LL				1	56	17		
3	Live Load Special (public asse...	LLS								
4	Roof Live Load	RLL								
5	Snow Load	SL					24	2		
6	Snow Load Nonshedding	SLN								
7	Rain Load	RL								
8	Wind Load X	WLX				1				
9	Partial X Wind Load 1	WLXP1				1				
10	Partial X Wind Load 2	WLXP2				1				
11	Wind Load Z	WLZ				1				
12	Partial Z Wind Load 1	WLZP1				1				
13	Partial Z Wind Load 2	WLZP2				1				
14	Earthquake Load X	ELX				1				
15	Earthquake Load X Plus Z Ecc...	ELX+Z				1				
16	Earthquake Load X Minus Z Ec...	ELX-Z				1				
17	Earthquake Load Z	ELZ				1				
18	Earthquake Load Z Plus X Ecc...	ELZ+X				1				
19	Earthquake Load Z Minus X Ec...	ELZ-X				1				
20	Other Load 1	OL1								
21	Other Load 2	OL2								
22	Other Load 3	OL3								
23	Other Load 4	OL4								
24	Wind Load Roof +X	WLX+R								
25	Wind Load Roof -X	WLX-R								
26	Wind Load Roof +Z	WLZ+R							1	
27	Wind Load Roof -Z	WLZ-R							1	
28	BLC 8 Transient Area Loads	None						20		
29	BLC 11 Transient Area Loads	None						20		
30	BLC 14 Transient Area Loads	None						20		
31	BLC 17 Transient Area Loads	None						20		
32	BLC 26 Transient Area Loads	None						92		
33	BLC 27 Transient Area Loads	None						92		

Load Combinations

	Description	Sol...	P...	S...	BLC	Fa...	BLC	Fac...	BLC	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac...
1	Dead Load		Y		DL	1																
2	Live Load		Y		LL	1																
3	Snow Load		Y		SL	1																
4	Wind Load X		Y		WLX	1																
5	Partial X Wind Load 1		Y		WL...	1																
6	Partial X Wind Load 2		Y		WL...	1																
7	Wind Load Z		Y		WLZ	1																
8	Partial Z Wind Load 1		Y		WL...	1																
9	Partial Z Wind Load 2		Y		WL...	1																
10	Earthquake Load X		Y		ELX	1																
11	Earthquake Load X P...		Y		ELX...	1																
12	Earthquake Load X ...		Y		ELX-Z	1																
13	Earthquake Load Z		Y		ELZ	1																

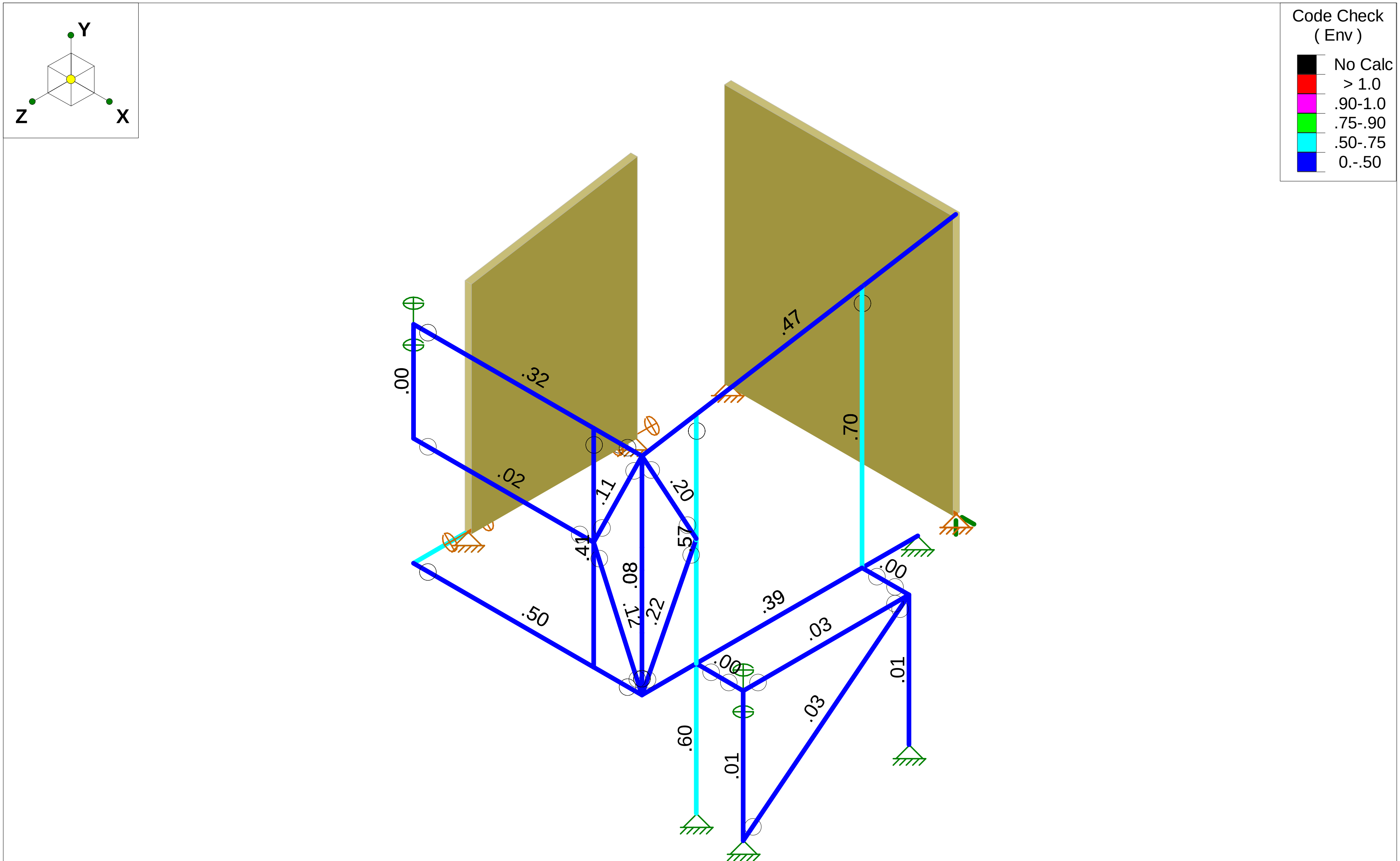
Load Combinations (Continued)

	Description	Sol...	P...	S...	BLC	Fa...	BLC	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
14	Earthquake Load Z P...		Y		ELZ...	1																		
15	Earthquake Load Z ...		Y		ELZ-X	1																		
16	Wind Load Roof +X		Y		WL...	1																		
17	Wind Load Roof -X		Y		WL...	1																		
18	Wind Load Roof +Z		Y		WL...	1																		
19	Wind Load Roof -Z		Y		WL...	1																		
20			Y																					
21	ASCE Strength 3 (b) ...	Yes	Y		DL	1.2	WLX	.5	WL...	.5														
22	ASCE Strength 3 (b) ...	Yes	Y		DL	1.2	WLZ	.5	WLZ...	.5														
23	ASCE Strength 3 (b) ...	Yes	Y		DL	1.2	WLX	-.5	WL...	.5														
24	ASCE Strength 3 (b) ...	Yes	Y		DL	1.2	WLZ	-.5	WLZ...	.5														
25	ASCE Strength 3 (d) ...	Yes	Y		DL	1.2	SL	1.6	SLN	1.6	W...	.5	W...	.5										
26	ASCE Strength 3 (d) ...	Yes	Y		DL	1.2	SL	1.6	SLN	1.6	W...	.5	W...	.5										
27	ASCE Strength 3 (d) ...	Yes	Y		DL	1.2	SL	1.6	SLN	1.6	W...	-.5	W...	.5										
28	ASCE Strength 3 (d) ...	Yes	Y		DL	1.2	SL	1.6	SLN	1.6	W...	-.5	W...	.5										
29	ASCE Strength 4 (a) ...	Yes	Y		DL	1.2	WLX	1	LL	.5	LLS	1	W...	1										
30	ASCE Strength 4 (a) ...	Yes	Y		DL	1.2	WLZ	1	LL	.5	LLS	1	W...	1										
31	ASCE Strength 4 (a) ...	Yes	Y		DL	1.2	WLX	-1	LL	.5	LLS	1	W...	1										
32	ASCE Strength 4 (a) ...	Yes	Y		DL	1.2	WLZ	-1	LL	.5	LLS	1	W...	1										
33	ASCE Strength 4 (b) ...	Yes	Y		DL	1.2	WLX	1	LL	.5	LLS	1	SL	.5	S...	.5	W...	1						
34	ASCE Strength 4 (b) ...	Yes	Y		DL	1.2	WLZ	1	LL	.5	LLS	1	SL	.5	S...	.5	W...	1						
35	ASCE Strength 4 (b) ...	Yes	Y		DL	1.2	WLX	-1	LL	.5	LLS	1	SL	.5	S...	.5	W...	1						
36	ASCE Strength 4 (b) ...	Yes	Y		DL	1.2	WLZ	-1	LL	.5	LLS	1	SL	.5	S...	.5	W...	1						
37	ASCE Strength 6 (a)	Yes	Y		DL	.9	WLX	1	WL...	1														
38	ASCE Strength 6 (b)	Yes	Y		DL	.9	WLZ	1	WLZ...	1														
39	ASCE Strength 6 (c)	Yes	Y		DL	.9	WLX	-1	WL...	1														
40	ASCE Strength 6 (d)	Yes	Y		DL	.9	WLZ	-1	WLZ...	1														
41	ASCE Strength 5 (a)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	1	LL	.5	LLS	1	SL	.2	S...	.2						
42	ASCE Strength 5 (b)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	1	LL	.5	LLS	1	SL	.2	S...	.2						
43	ASCE Strength 5 (c)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	-1	LL	.5	LLS	1	SL	.2	S...	.2						
44	ASCE Strength 5 (d)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	-1	LL	.5	LLS	1	SL	.2	S...	.2						
45	ASCE Strength 7 (a)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	1														
46	ASCE Strength 7 (b)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	1														
47	ASCE Strength 7 (c)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	-1														
48	ASCE Strength 7 (d)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	-1														
49	ASCE ASD 5 (a) (a)	Yes	Y		DL	1	WLX	.6	WL...	.6														
50	ASCE ASD 5 (a) (b)	Yes	Y		DL	1	WLZ	.6	WLZ...	.6														
51	ASCE ASD 5 (a) (c)	Yes	Y		DL	1	WLX	-.6	WL...	.6														
52	ASCE ASD 5 (a) (d)	Yes	Y		DL	1	WLZ	-.6	WLZ...	.6														
53	ASCE ASD 6 (a) (a)	Yes	Y		DL	1	WLX	.45	LL	.75	LLS	.75	W...	.45										
54	ASCE ASD 6 (a) (b)	Yes	Y		DL	1	WLZ	.45	LL	.75	LLS	.75	W...	.45										
55	ASCE ASD 6 (a) (c)	Yes	Y		DL	1	WLX	-.45	LL	.75	LLS	.75	W...	.45										
56	ASCE ASD 6 (a) (d)	Yes	Y		DL	1	WLZ	-.45	LL	.75	LLS	.75	W...	.45										
57	ASCE ASD 6 (c) (a)	Yes	Y		DL	1	WLX	.45	LL	.75	LLS	.75	SL	.75	S...	.75	W...	.45						
58	ASCE ASD 6 (c) (b)	Yes	Y		DL	1	WLZ	.45	LL	.75	LLS	.75	SL	.75	S...	.75	W...	.45						
59	ASCE ASD 6 (c) (c)	Yes	Y		DL	1	WLX	-.45	LL	.75	LLS	.75	SL	.75	S...	.75	W...	.45						
60	ASCE ASD 6 (c) (d)	Yes	Y		DL	1	WLZ	-.45	LL	.75	LLS	.75	SL	.75	S...	.75	W...	.45						
61	ASCE ASD 7 (a)	Yes	Y		DL	.6	WLX	.6	WL...	.6														
62	ASCE ASD 7 (b)	Yes	Y		DL	.6	WLZ	.6	WLZ...	.6														
63	ASCE ASD 7 (c)	Yes	Y		DL	.6	WLX	-.6	WL...	.6														
64	ASCE ASD 7 (d)	Yes	Y		DL	.6	WLZ	-.6	WLZ...	.6														
65	ASCE ASD 5 (b) (a)	Yes	Y		DL	1	Sds*...	.14	Rho*...	.7														

Load Combinations (Continued)

	Description	Sol...	P...	S...	BLC	Fa...	BLC	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
66	ASCE ASD 5 (b) (b)	Yes	Y		DL	1	Sds*...	.14	Rho*...	.7														
67	ASCE ASD 5 (b) (c)	Yes	Y		DL	1	Sds*...	.14	Rho*...	-.7														
68	ASCE ASD 5 (b) (d)	Yes	Y		DL	1	Sds*...	.14	Rho*...	-.7														
69	ASCE ASD 6 (b) (a)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75										
70	ASCE ASD 6 (b) (b)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75										
71	ASCE ASD 6 (b) (c)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75										
72	ASCE ASD 6 (b) (d)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75										
73	ASCE ASD 6 (d) (a)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75	SL	.75	S...	.75						
74	ASCE ASD 6 (d) (b)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75	SL	.75	S...	.75						
75	ASCE ASD 6 (d) (c)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75	SL	.75	S...	.75						
76	ASCE ASD 6 (d) (d)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75	SL	.75	S...	.75						
77	ASCE ASD 8 (a)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	.7														
78	ASCE ASD 8 (b)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	.7														
79	ASCE ASD 8 (c)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	-.7														
80	ASCE ASD 8 (d)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	-.7														

Lateral Steel Member Utilization



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Blackwell Structural Engineers	Kimmelman May Residence Volume 1	
BG		July 27, 2017 at 11:36 AM
170266		Volume 1.rfl

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

	Member	Shape	Code Che...	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pnc [..	phi*Pnt [..	phi*Mn y...	phi*Mn z-...	Cb	Eqn
1	M3	W12x22	.316	3.299	25	.053	3.299	y	25	250.738	291.6	13.725	52.003	1.6...	H1-1b
2	M6	W10x45	.389	3.782	28	.199	0	y	28	486.999	598.5	76.125	205.875	1	H1-1b
3	M7	W10x26	.599	11.612	43	.100	11.453	y	27	300.776	342.45	28.125	117.375	1.9...	H1-1b
4	M9	W10x22	.497	12.37	43	.192	15.833	y	43	250.933	292.05	22.875	97.5	1	H1-1b
5	M13	HSS4x4x4	.077	0	45	.032	14.063	y	43	58.847	139.518	16.181	16.181	1.6...	H1-1...
6	M18	W12x26	.469	18.163	46	.209	17.243	y	26	315.692	344.25	30.637	91.942	1.91	H1-1b
7	(2-A)_L2	HSS4x4x4	.695	7.397	28	.030	14.089	z	27	42.809	139.518	16.181	16.181	1.6...	H1-1a
8	(2'-A)_L1	HSS4x4x4	.013	0	44	.000	0	z	28	99.405	139.518	16.181	16.181	1.6...	H1-1...
9	(2'-B)_L1	HSS4x4x4	.012	0	41	.000	0	z	44	99.405	139.518	16.181	16.181	1.6...	H1-1...
10	CS6_L1	HSS4x4x4	.406	0	43	.085	14.063	y	34	58.847	139.518	16.181	16.181	1.9...	H1-1a
11	F4_M25	W8x18	.001	1.625	43	.020	0	z	28	219.949	236.7	17.475	63.75	1.0...	H1-1b
12	F4_M26	W10x22	.001	1.625	43	.033	0	z	44	269.604	292.05	22.875	97.5	1.0...	H1-1b
13	F4_M24	W10x22	.029	5.75	44	.018	11.5	y	43	132.186	292.05	22.875	97.5	1.0...	H1-1b
14	M23	HSS4x3x4	.022	6.25	41	.004	12.5	z	44	39.259	130.95	11.7	14.287	1	H1-1b
15	M24	HSS3x3x4	.025	7.149	42	.002	0	y	41	22.218	109.8	9.3	9.3	1.1...	H1-1b
16	M22	HSS3x3x4	.112	7.629	43	.047	7.629	y	34	66.927	109.8	9.3	9.3	1.1...	H1-1...
17	M23A	HSS3x3x4	.121	8.207	41	.024	0	y	34	61.908	109.8	9.3	9.3	1.1...	H1-1...
18	M22A	HSS3x3x4	.225	3.848	42	.018	0	y	43	60.291	109.8	9.3	9.3	1.1...	H1-1a
19	M23B	HSS3x3x4	.199	0	44	.018	7.83	y	43	65.179	109.8	9.3	9.3	1.1...	H1-1...
20	CS10_L1	HSS4x4x4	.001	0	44	.000	6.505	z	44	114.564	139.518	16.181	16.181	1.6...	H1-1b
21	(2-B)_L1	HSS4x4x4	.596	9	28	.011	0	z	44	99.405	139.518	16.181	16.181	1.6...	H1-1a
22	(2-B)_L2	HSS4x4x4	.574	0	28	.029	14.054	y	43	54.475	139.518	16.181	16.181	1.0...	H1-1a

Shear Wall Utilization

Wood Wall Panel Axial Code Checks (AWC NDS-15: ASD)

	Wall Panel	Region	Stud Size	Stud Spaci...	Axial Check	Gov LC	Chord Size	Chord Axial Ch...	Gov LC
1	V1 WP1	R1	2X6	16	0	N/A	2-2X6	.678	73
2	V1 WP2	R1	2X6	16	0	N/A	2-2X6	.469	76

Wood Wall Panel In Plane Code Checks (AWC NDS-15: ASD)

	Wall Panel	Shear Panel Label	Region	Shear Check	Shear Forc...	Gov LC	Hold-Down ...	Tension Ch...	Tie-Dow...	Gov LC
1	V1 WP1	S1_15/32_8d@6	R1	.555	155.498	67	HDU2-SDS...	.859	2.642	77
2	V1 WP2	S1_15/32_8d@6	R1	.509	142.453	66	HDU2-SDS...	.532	1.635	80

Envelope Wall Panel Forces

	Wall Label	Elevation ...		Axial [k]	LC	x Shear [k]	LC	z Shear [k]	LC	x-x Mo...	LC	z-z Mo...	LC
1	V1 WP1	19	max	6.998	76	2.462	67	.048	76	0	78	67.193	73
2		19	min	.34	78	-2.441	77	-.029	78	0	76	-37.647	79
3	V1 WP1	33.362	max	6.465	76	2.462	67	.048	76	.413	78	40.995	73
4		33.362	min	.044	62	-2.441	77	-.029	78	-.686	76	-2.449	79
5	V1 WP2	19	max	15.261	76	1.638	80	0	79	0	79	26.083	78
6		19	min	.988	62	-1.638	78	0	65	0	65	-26.305	68
7	V1 WP2	33.362	max	14.874	74	1.638	80	0	71	0	58	2.572	78
8		33.362	min	.771	62	-1.638	66	0	77	0	77	-2.74	68

Tie Down Anchorage Note:

See note in the calculation package for volume 2, 3 and 4 in regards to the tie down force of V1 WP2.

Lateral Member Detailed Reports

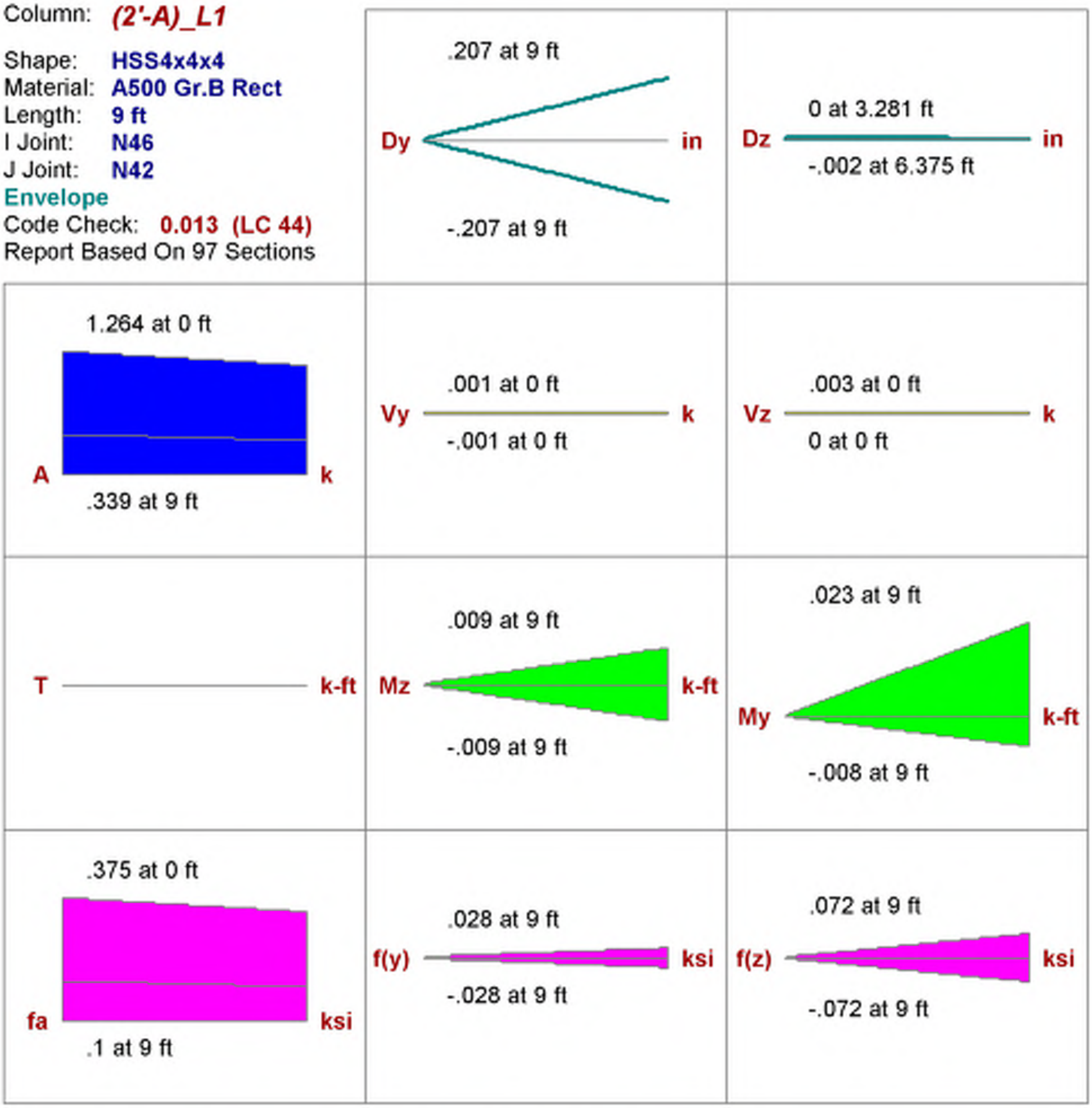
Column: ***(2'-A)_L1***

Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**9 ft**
I Joint:	**N46**
J Joint:	**N42**

Envelope

Code Check: **0.013 (LC 44)**

Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

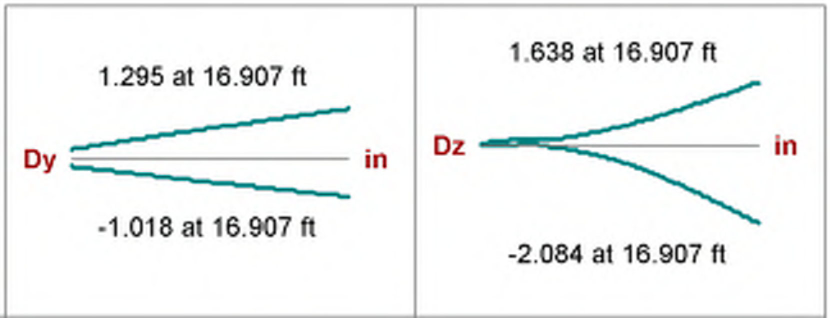
- Size from RISAFloor governed optimization -

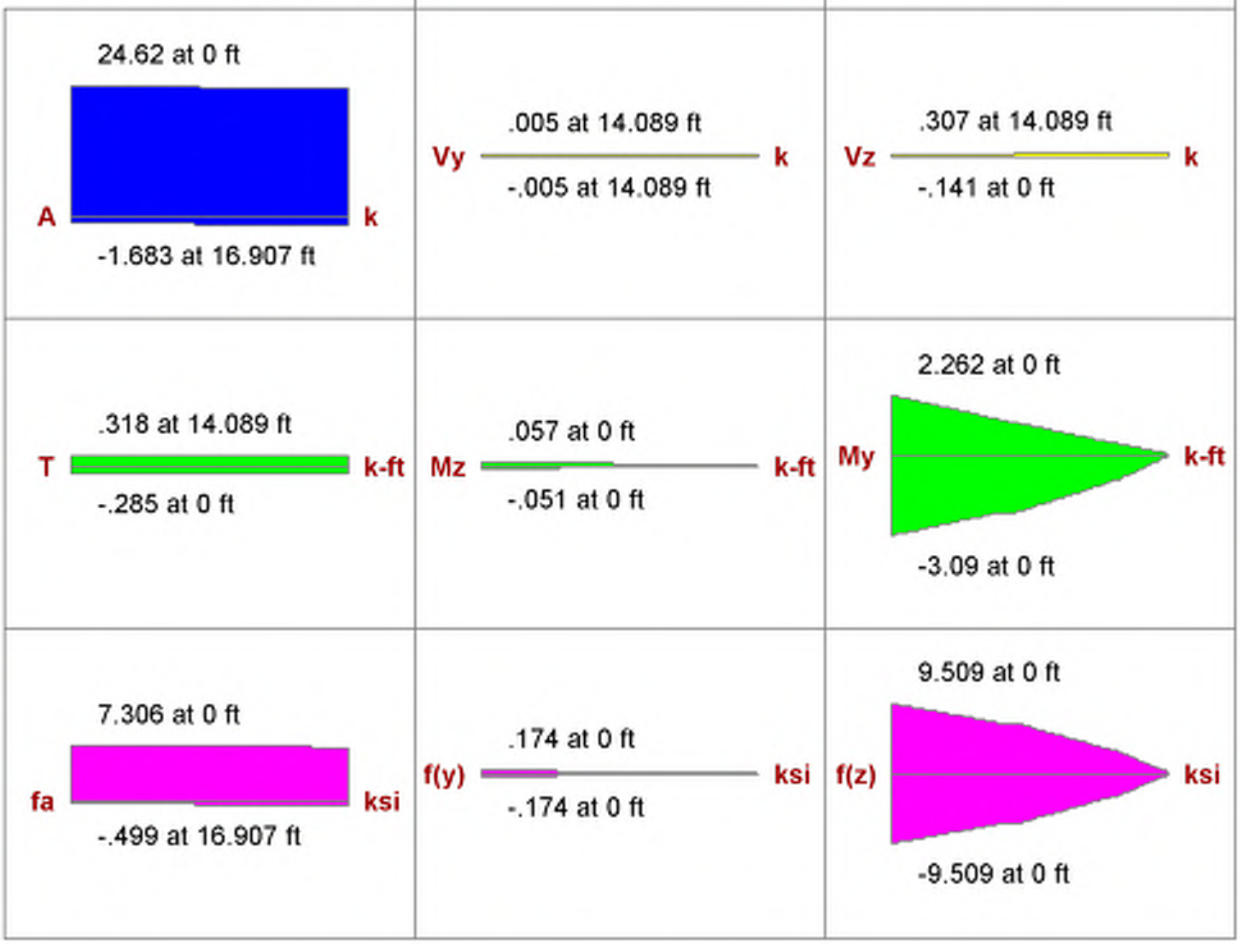
Max Bending Check	**0.013 (LC 44)**	Max Shear Check	**0.000 (z) (LC 28)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/522**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**9 ft**	**9 ft**
phi*Pnc	**99.405 k**	KL/r	**70.989**	**70.989**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**9 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**9 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.667**			

Column: ***(2-A)_L2***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **16.907 ft**
I Joint: **N23**
J Joint: **N9**
Envelope
Code Check: **0.695 (LC 28)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

- Size from RISAFloor governed optimization -

Max Bending Check	**0.695 (LC 28)**	Max Shear Check	**0.030 (z) (LC 27)**
Location	**7.397 ft**	Location	**14.089 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/97**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**7.5 ft**	**16.907 ft**
phi*Pnc	**42.809 k**	KL/r	**59.158**	**133.358**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**16.907 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**16.907 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.646**			

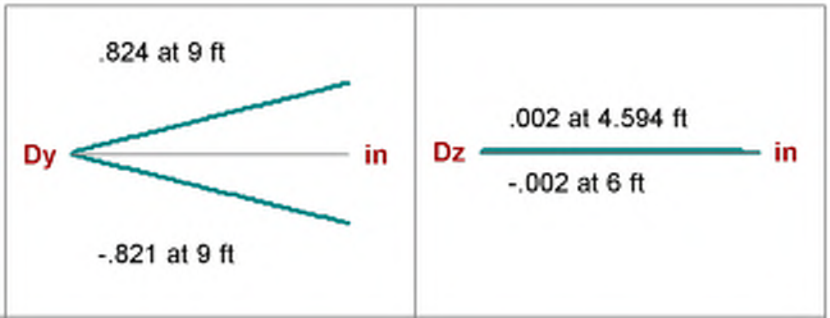
Column: ***(2'-B)_L1***

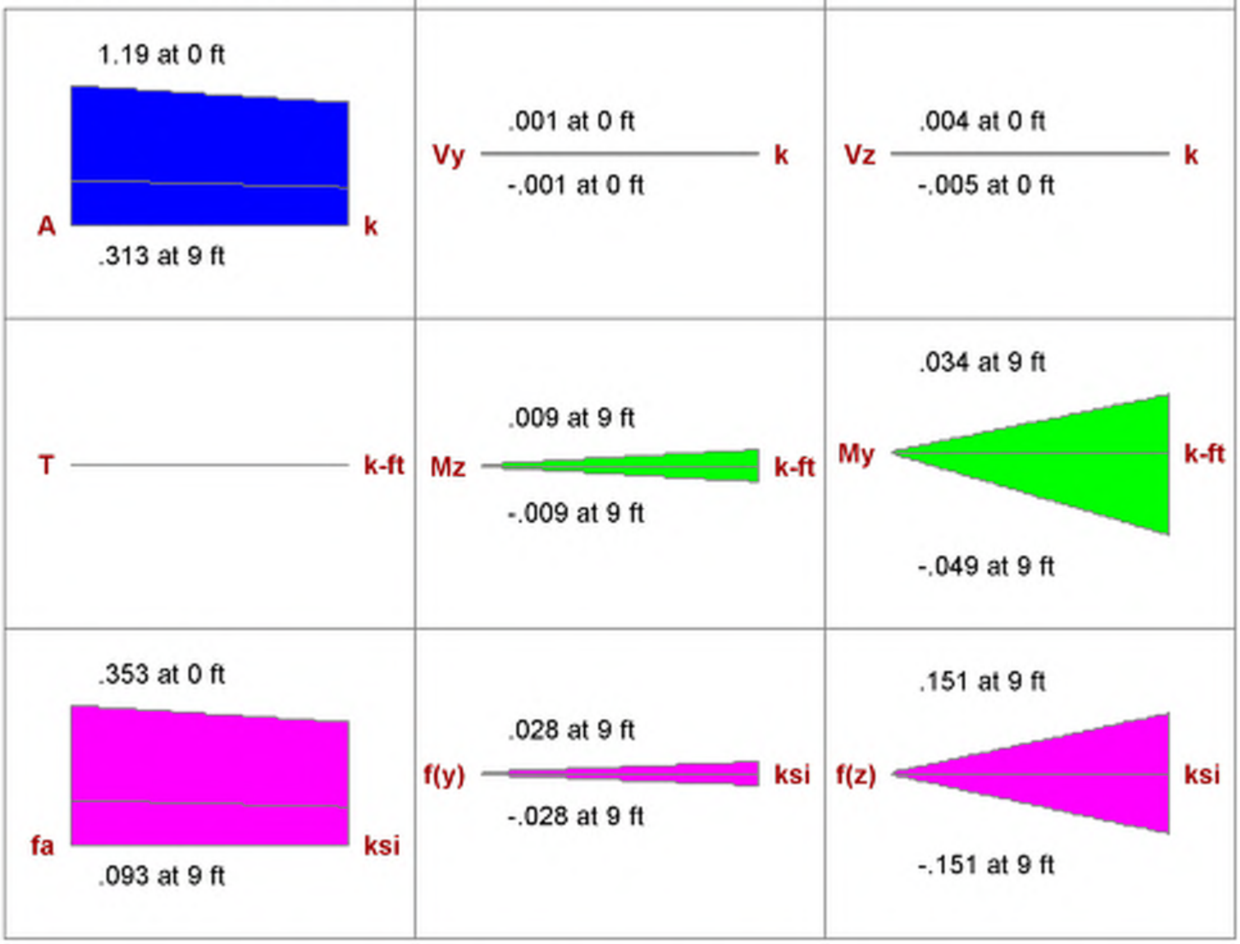
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**9 ft**
I Joint:	**N47**
J Joint:	**N43**

Envelope

Code Check: **0.012 (LC 41)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

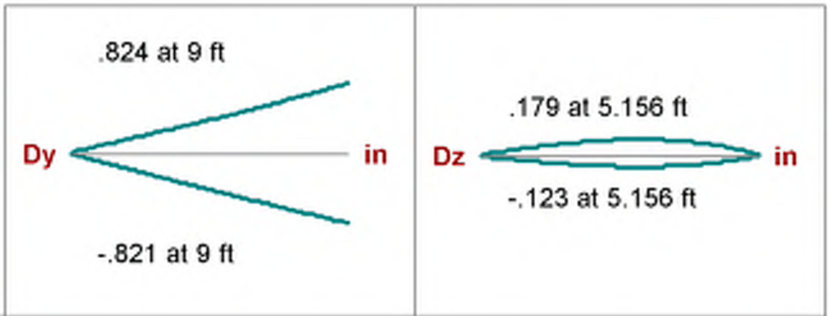
- Size from RISAFloor governed optimization -

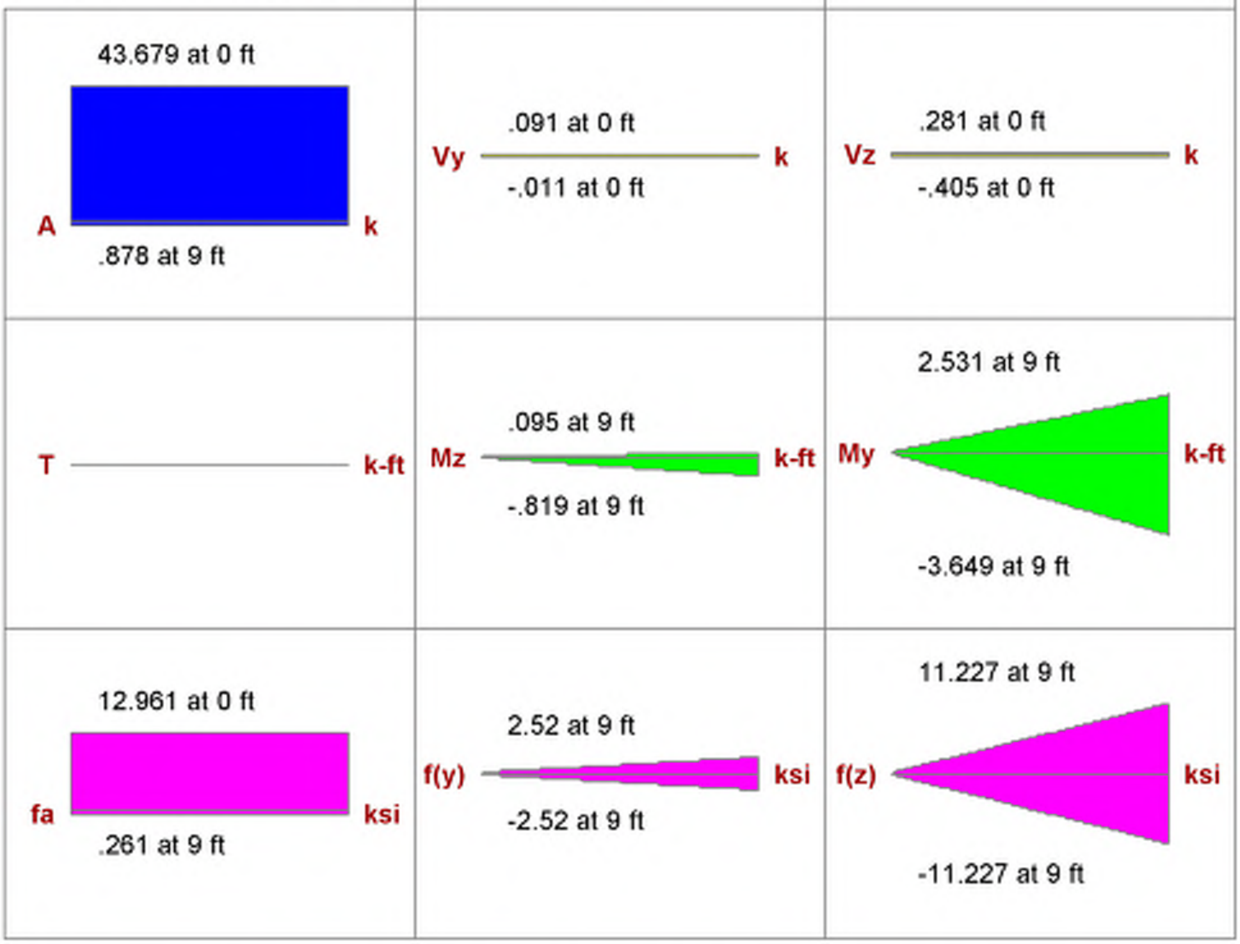
Max Bending Check	**0.012 (LC 41)**	Max Shear Check	**0.000 (z) (LC 44)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**9 ft**	**9 ft**
phi*Pnc	**99.405 k**	KL/r	**70.989**	**70.989**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**9 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**9 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.667**			

Column: ***(2-B)_L1***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **9 ft**
I Joint: **N44**
J Joint: **N22**
Envelope
Code Check: **0.596 (LC 28)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

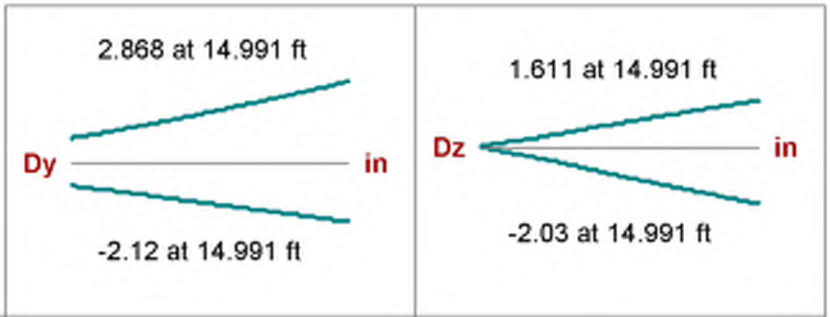
- Size from RISAFloor governed optimization -

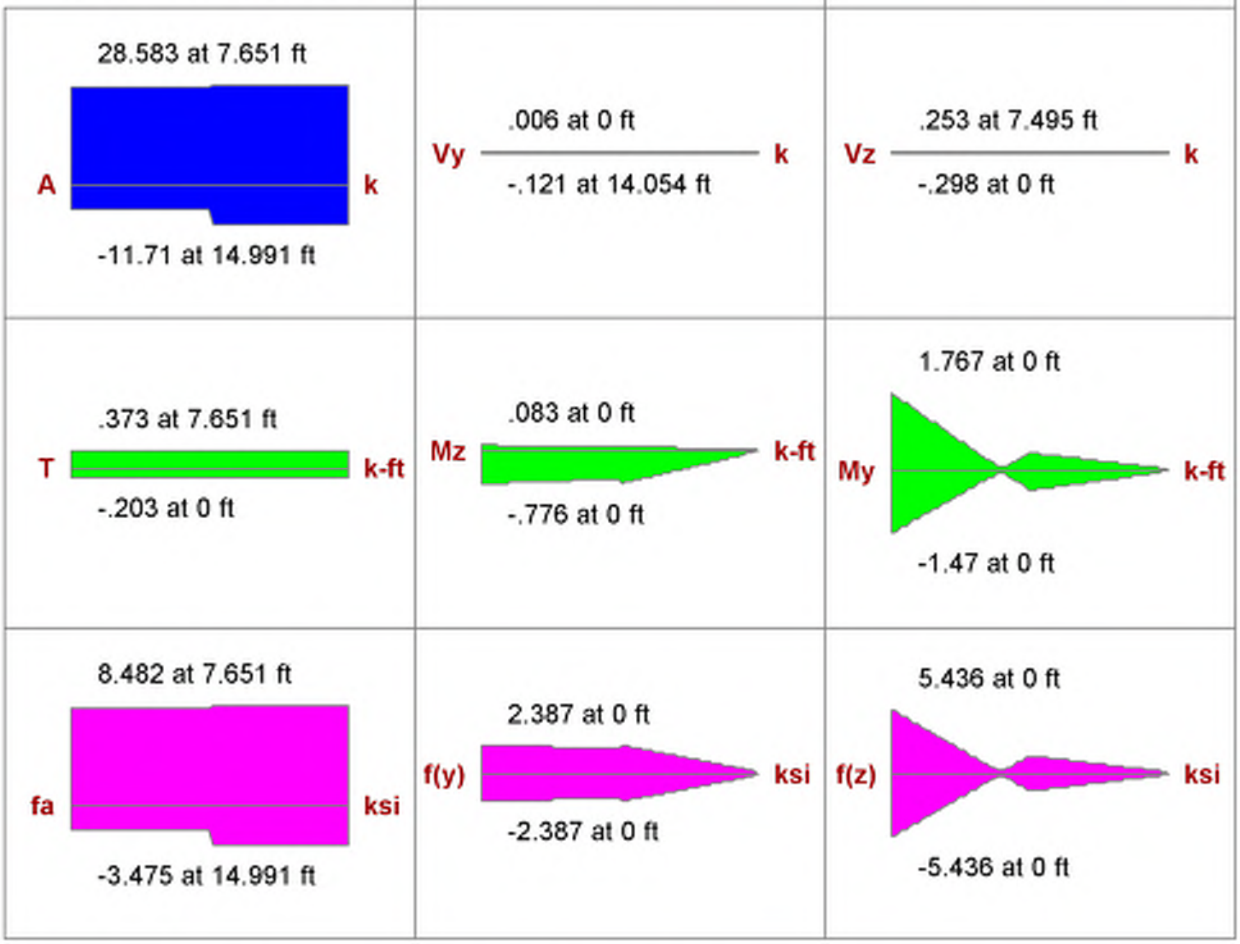
Max Bending Check	**0.596 (LC 28)**	Max Shear Check	**0.011 (z) (LC 44)**
Location	**9 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/131**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**9 ft**	**9 ft**
phi*Pnc	**99.405 k**	KL/r	**70.989**	**70.989**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**9 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**9 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.667**			

Column: ***(2-B)_L2***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **14.991 ft**
I Joint: **N22**
J Joint: **N6**
Envelope
Code Check: **0.574 (LC 28)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

- Size from RISAFloor governed optimization -

Max Bending Check	**0.574 (LC 28)**	Max Shear Check	**0.029 (y) (LC 43)**
Location	**0 ft**	Location	**14.054 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/88**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**7.5 ft**	**14.991 ft**
phi*Pnc	**54.475 k**	KL/r	**59.158**	**118.24**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**14.991 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**14.991 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.035**			

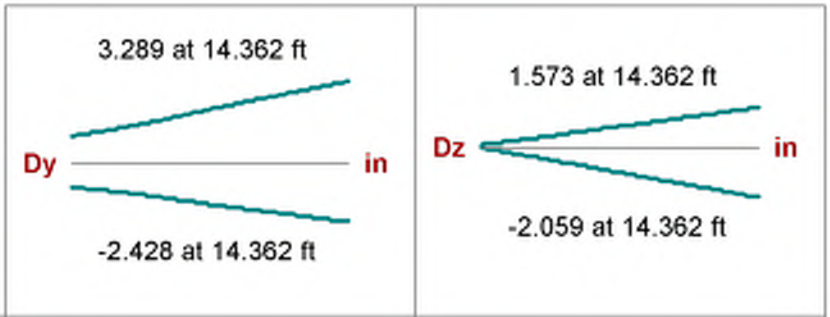
Column: ***CS6_L1***

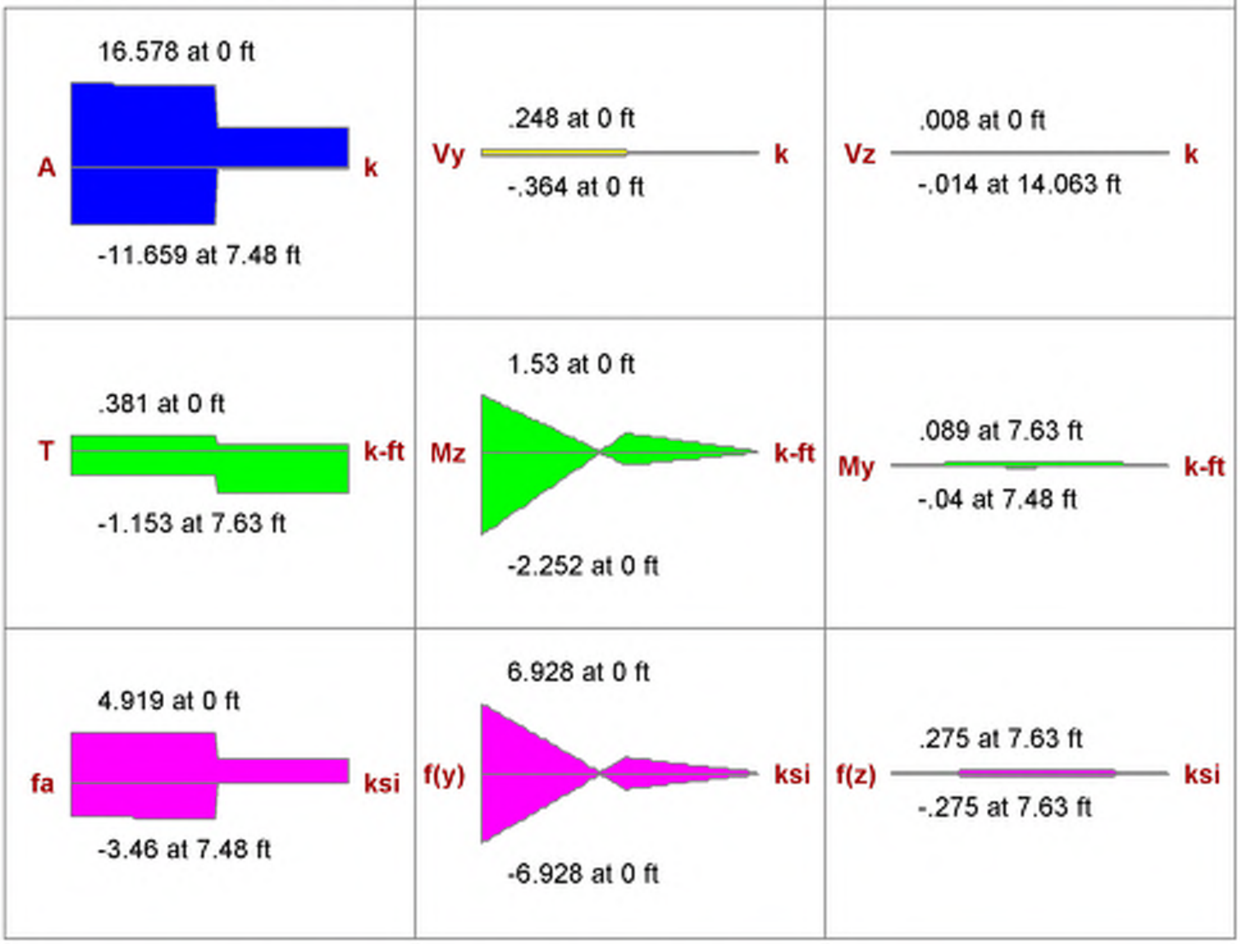
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**14.362 ft**
I Joint:	**N32**
J Joint:	**N8**

Envelope

Code Check: **0.406 (LC 43)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

- Size from RISAFloor governed optimization -

Max Bending Check	**0.406 (LC 43)**	Max Shear Check	**0.085 (y) (LC 34)**
Location	**0 ft**	Location	**14.063 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/76**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**14.362 ft**	**14.362 ft**
phi*Pnc	**58.847 k**	KL/r	**113.283**	**113.283**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**14.362 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**14.362 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.917**			

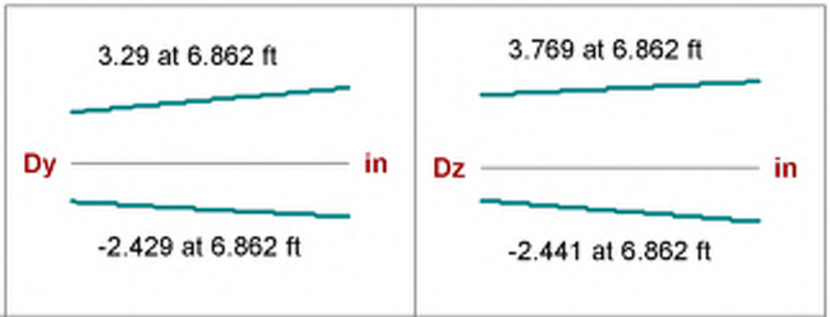
Column: ***CS10_L1***

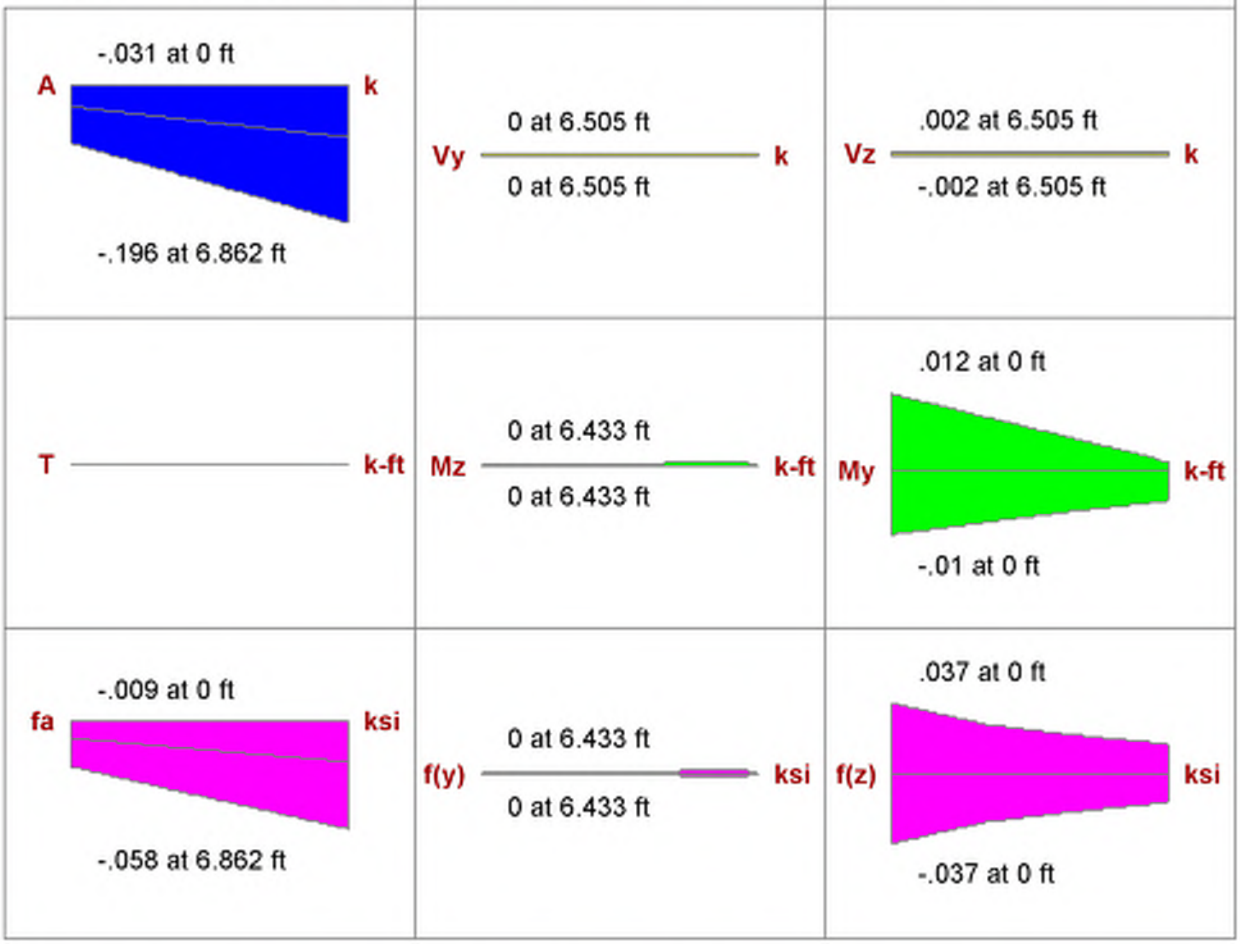
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**6.862 ft**
I Joint:	**N16**
J Joint:	**N1**

Envelope

Code Check: **0.001 (LC 44)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

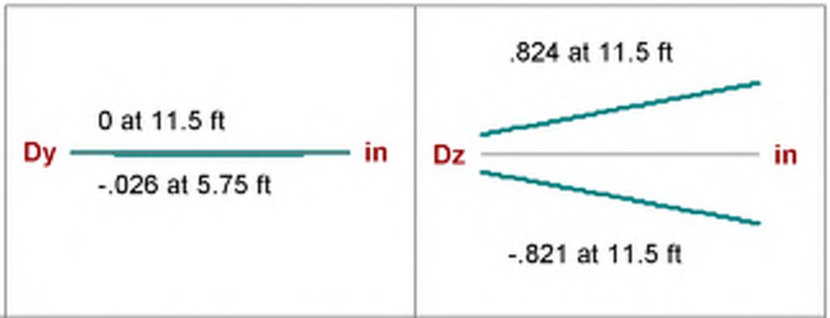
- Size from RISAFloor governed optimization -

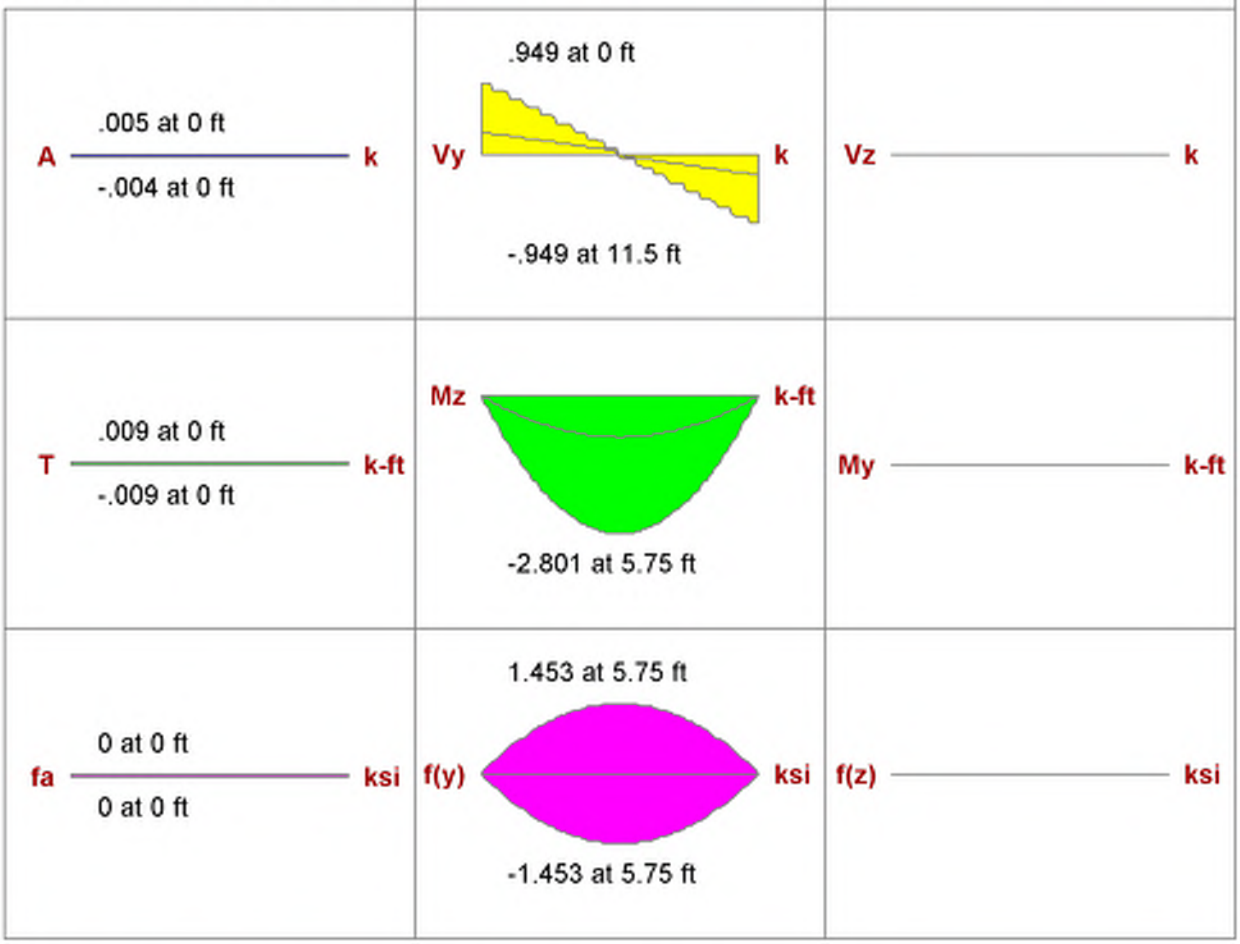
Max Bending Check	**0.001 (LC 44)**	Max Shear Check	**0.000 (z) (LC 44)**
Location	**0 ft**	Location	**6.505 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/230**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**6.862 ft**	**6.862 ft**
phi*Pnc	**114.564 k**	KL/r	**54.125**	**54.125**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**6.862 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**6.862 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.674**			

Beam: ***F4_M24***

Shape: **W10x22**
Material: **A992**
Length: **11.5 ft**
I Joint: **N42**
J Joint: **N43**
Envelope
Code Check: **0.029 (LC 44)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

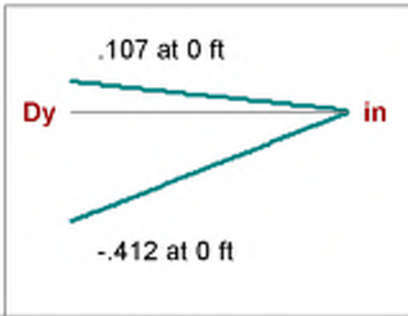
- Size from RISAFloor governed optimization -

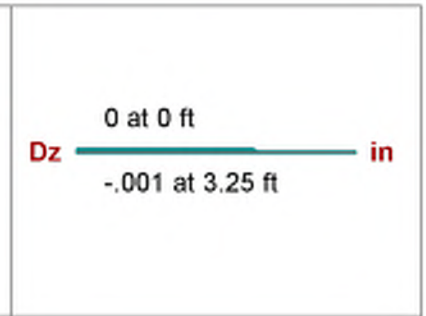
Max Bending Check	**0.029 (LC 44)**	Max Shear Check	**0.018 (y) (LC 43)**
Location	**5.75 ft**	Location	**11.5 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/5678**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

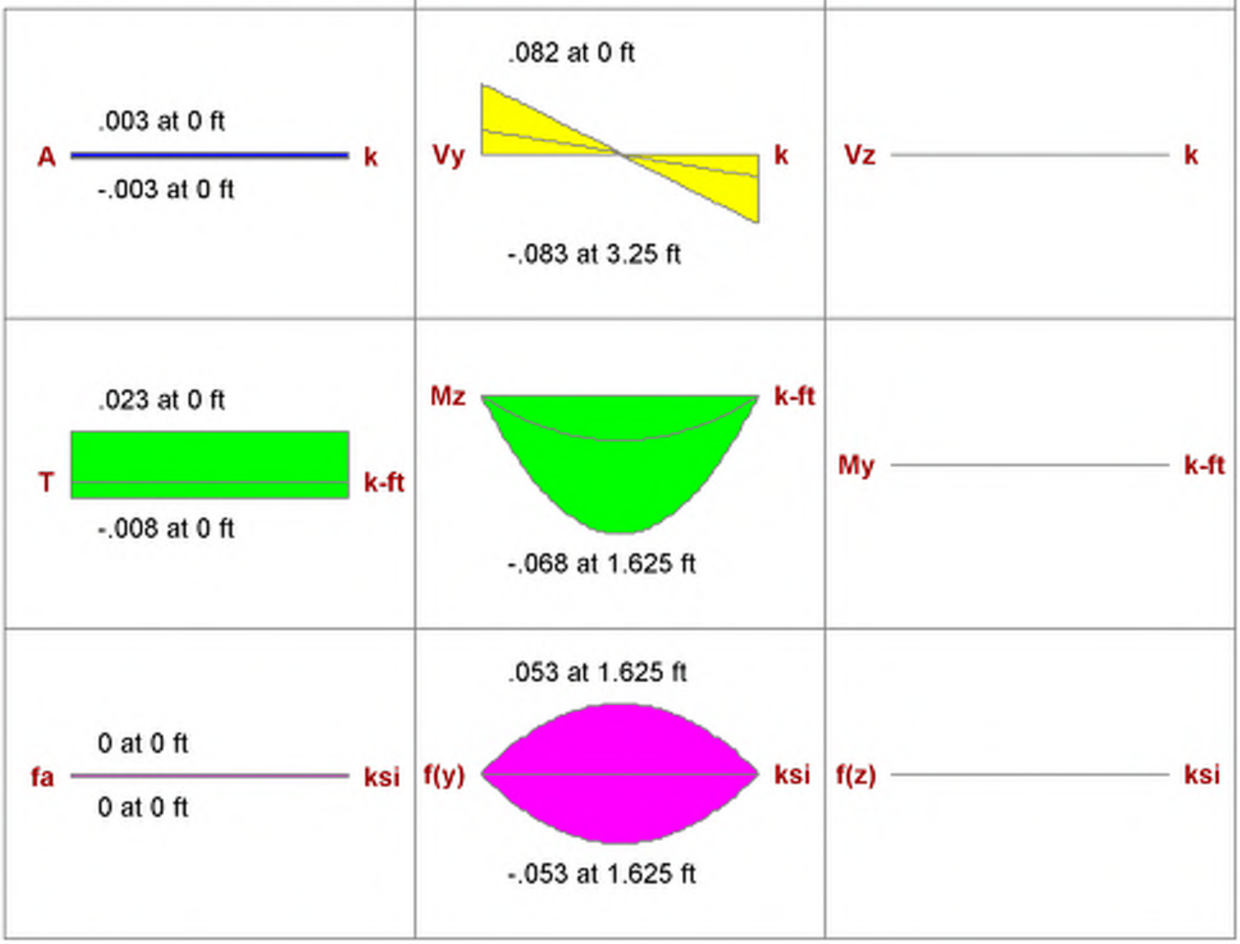
			y-y	z-z
Fy	**50 ksi**	Lb	**11.5 ft**	**11.5 ft**
phi*Pnc	**132.186 k**	KL/r	**104.124**	**32.364**
phi*Pnt	**292.05 k**			
phi*Mny	**22.875 k-ft**	L Comp Flange	**.667 ft**	
phi*Mnz	**97.5 k-ft**	L-torque	**11.5 ft**	
phi*Vny	**73.44 k**	Tau_b	**1**	
phi*Vnz	**111.78 k**			
Cb	**1.005**			

Beam: *F4_M25*

Shape: **W8x18**
Material: **A992**
Length: **3.25 ft**
I Joint: **N23**
J Joint: **N42**
Envelope
Code Check: **0.020 (LC 28)**
Report Based On 97 Sections







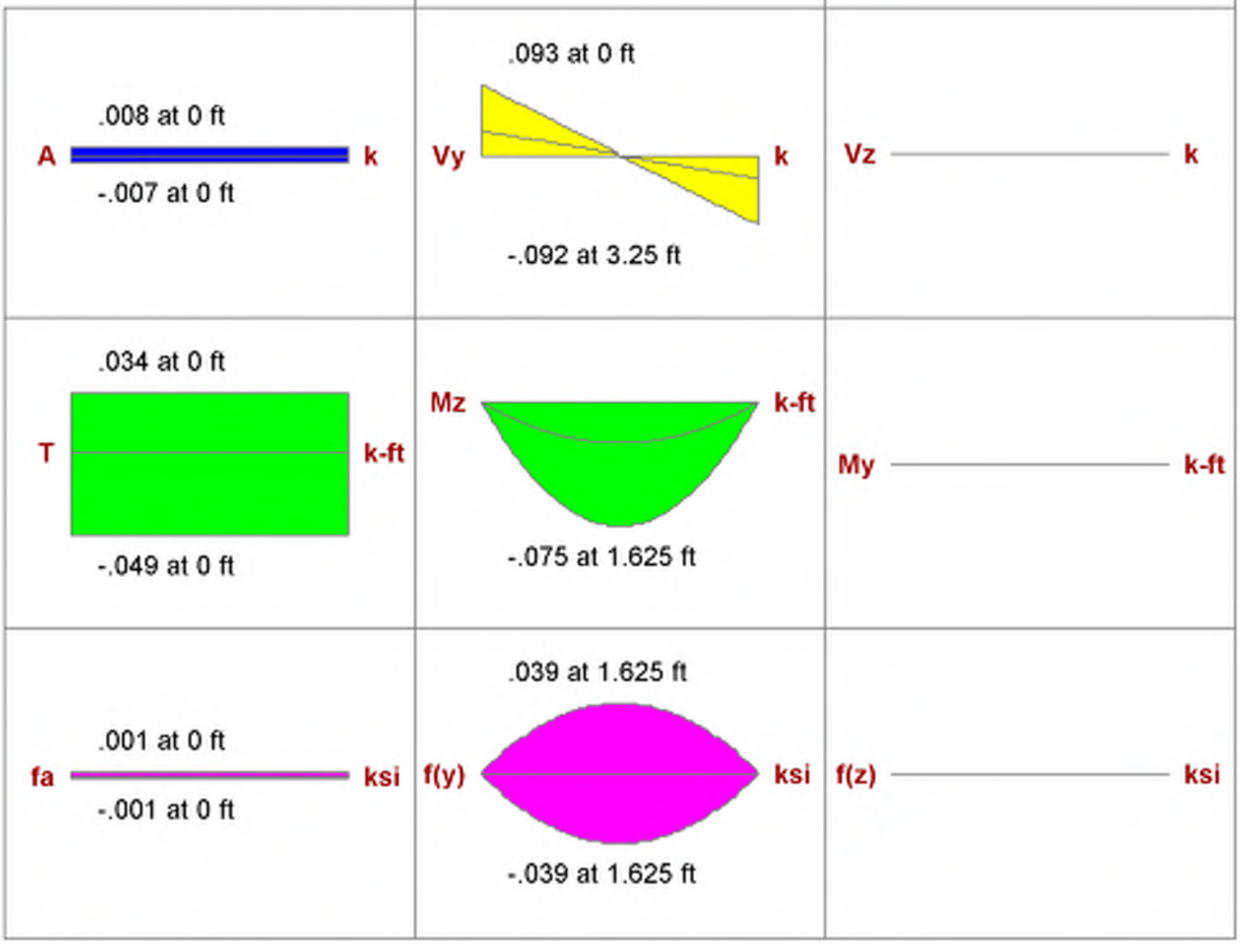
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method
- Size from RISAFloor governed optimization -

Max Bending Check	**0.001 (LC 43)**	Max Shear Check	**0.020 (z) (LC 28)**
Location	**1.625 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/361**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**3.25 ft**	**3.25 ft**
phi*Pnc	**219.949 k**	KL/r	**31.683**	**11.369**
phi*Pnt	**236.7 k**			
phi*Mny	**17.475 k-ft**	L Comp Flange	**1 ft**	
phi*Mnz	**63.75 k-ft**	L-torque	**3.25 ft**	
phi*Vny	**56.166 k**	Tau_b	**1**	
phi*Vnz	**93.555 k**			
Cb	**1.016**			

Beam: ***F4_M26***

Shape: **W10x22**
Material: **A992**
Length: **3.25 ft**
I Joint: **N43**
J Joint: **N22**
Envelope
Code Check: **0.033 (LC 44)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

- Size from RISAFloor governed optimization -

Max Bending Check	**0.001 (LC 43)**	Max Shear Check	**0.033 (z) (LC 44)**
Location	**1.625 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=.982**

			y-y	z-z
Fy	**50 ksi**	Lb	**3.25 ft**	**3.25 ft**
phi*Pnc	**269.604 k**	KL/r	**29.426**	**9.146**
phi*Pnt	**292.05 k**			
phi*Mny	**22.875 k-ft**	L Comp Flange	**1 ft**	
phi*Mnz	**97.5 k-ft**	L-torque	**3.25 ft**	
phi*Vny	**73.44 k**	Tau_b	**1**	
phi*Vnz	**111.78 k**			
Cb	**1.016**			

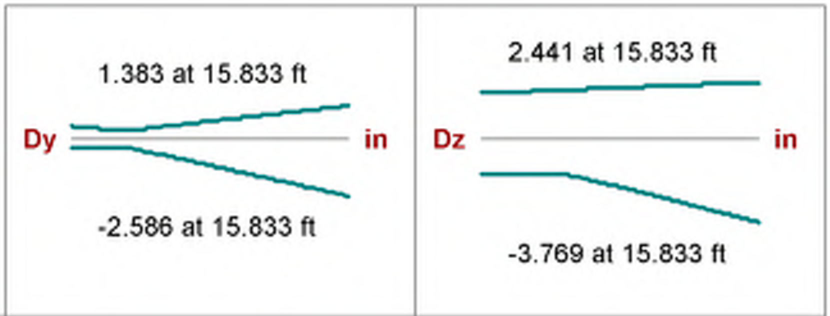
Beam: *M3*

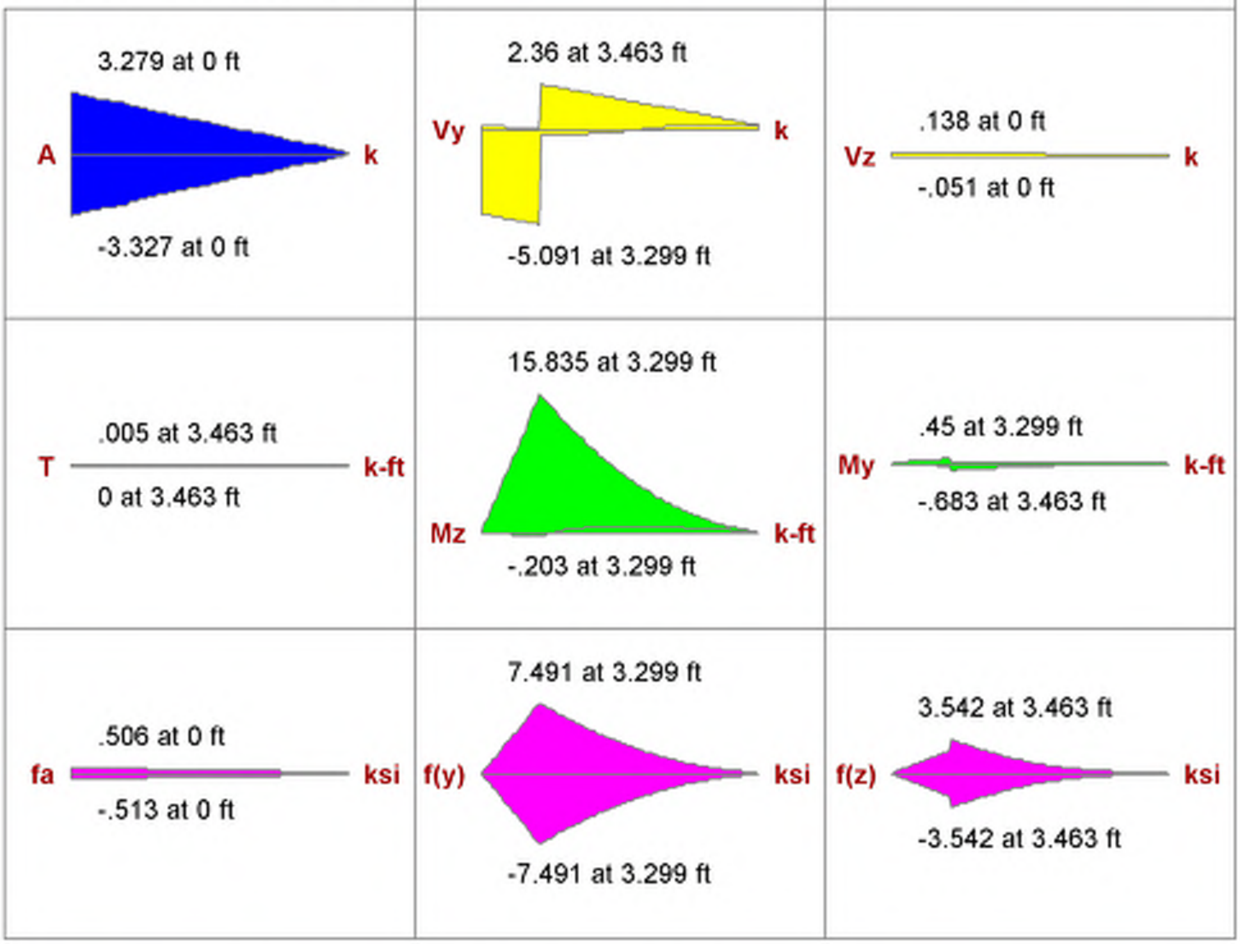
Shape:	**W12x22**
Material:	**A992**
Length:	**15.833 ft**
I Joint:	**N10**
J Joint:	**N1**

Envelope

Code Check: **0.316 (LC 25)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

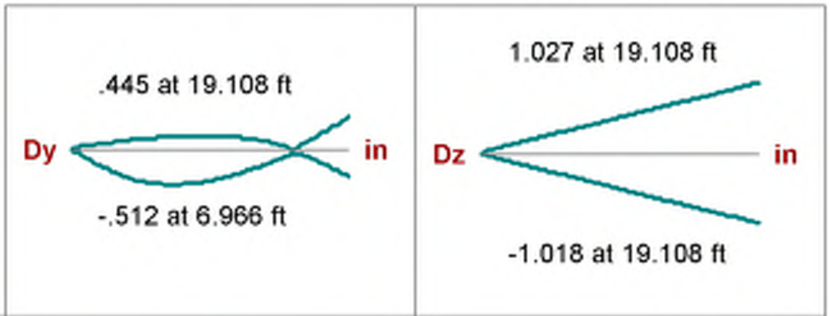
- Size from RISAFloor governed optimization -

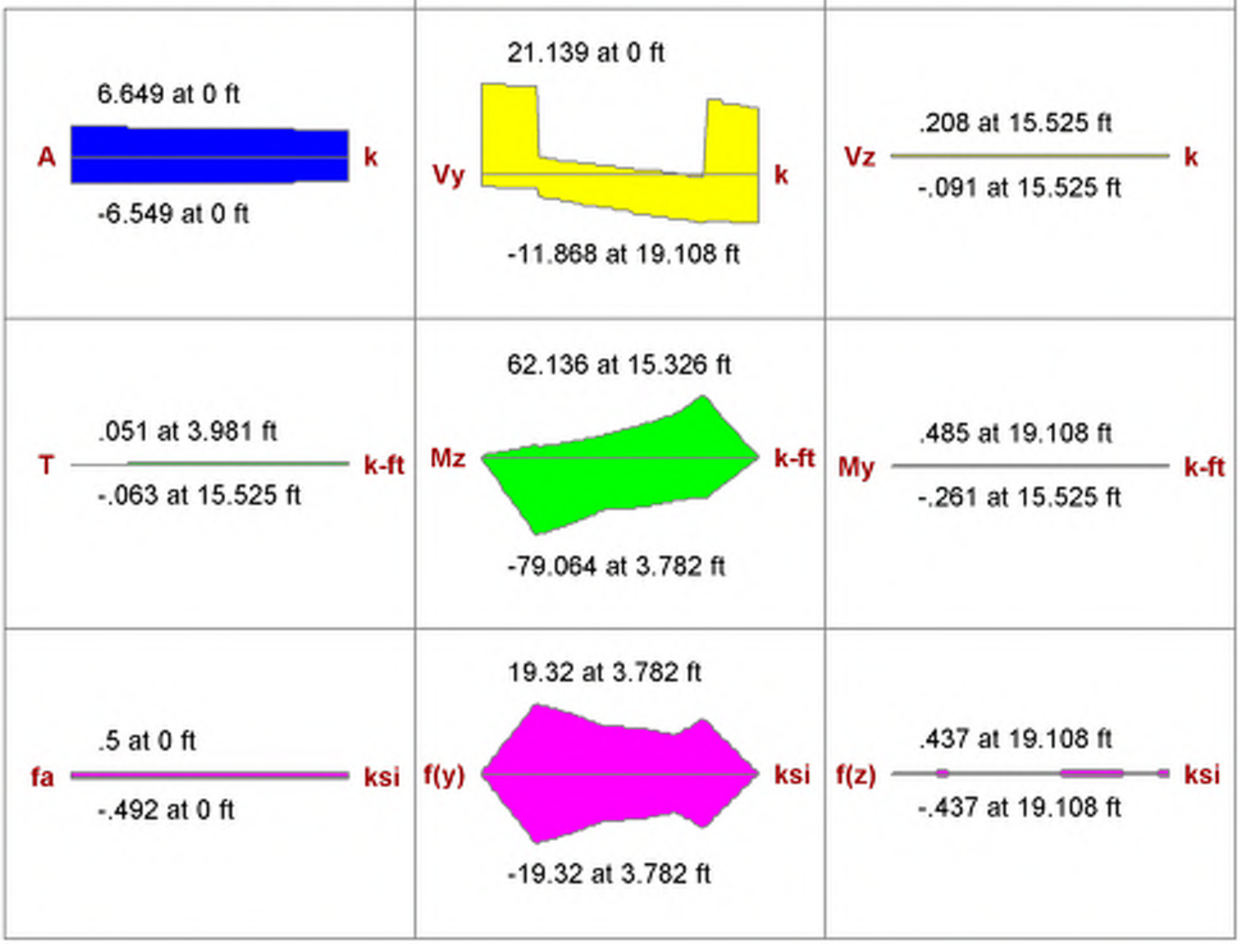
Max Bending Check	**0.316 (LC 25)**	Max Shear Check	**0.053 (y) (LC 25)**	
Location	**3.299 ft**	Location	**3.299 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/63**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=.949**

			y-y	z-z
Fy	**50 ksi**	Lb	**2.667 ft**	**1.33 ft**
phi*Pnc	**250.738 k**	KL/r	**37.74**	**3.253**
phi*Pnt	**291.6 k**			
phi*Mny	**13.725 k-ft**	L Comp Flange	**15.833 ft**	
phi*Mnz	**52.003 k-ft**	L-torque	**15.833 ft**	
phi*Vny	**95.94 k**	Tau_b	**1**	
phi*Vnz	**92.489 k**			
Cb	**1.688**			

Beam: ***M6***

Shape: **W10x45**
Material: **A992**
Length: **19.108 ft**
I Joint: **F4_N42**
J Joint: **N24**
Envelope
Code Check: **0.389 (LC 28)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

- Size from RISAFloor governed optimization -

Max Bending Check	**0.389 (LC 28)**	Max Shear Check	**0.199 (y) (LC 28)**
Location	**3.782 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/229**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

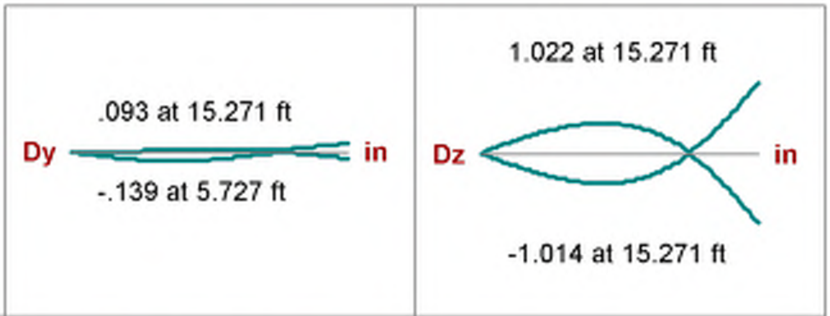
			y-y	z-z
Fy	**50 ksi**	Lb	**1.333 ft**	**19.108 ft**
phi*Pnc	**486.999 k**	KL/r	**7.983**	**53.1**
phi*Pnt	**598.5 k**			
phi*Mny	**76.125 k-ft**	L Comp Flange	**.5 ft**	
phi*Mnz	**205.875 k-ft**	L-torque	**19.108 ft**	
phi*Vny	**106.05 k**	Tau_b	**1**	
phi*Vnz	**268.51 k**			
Cb	**1**			

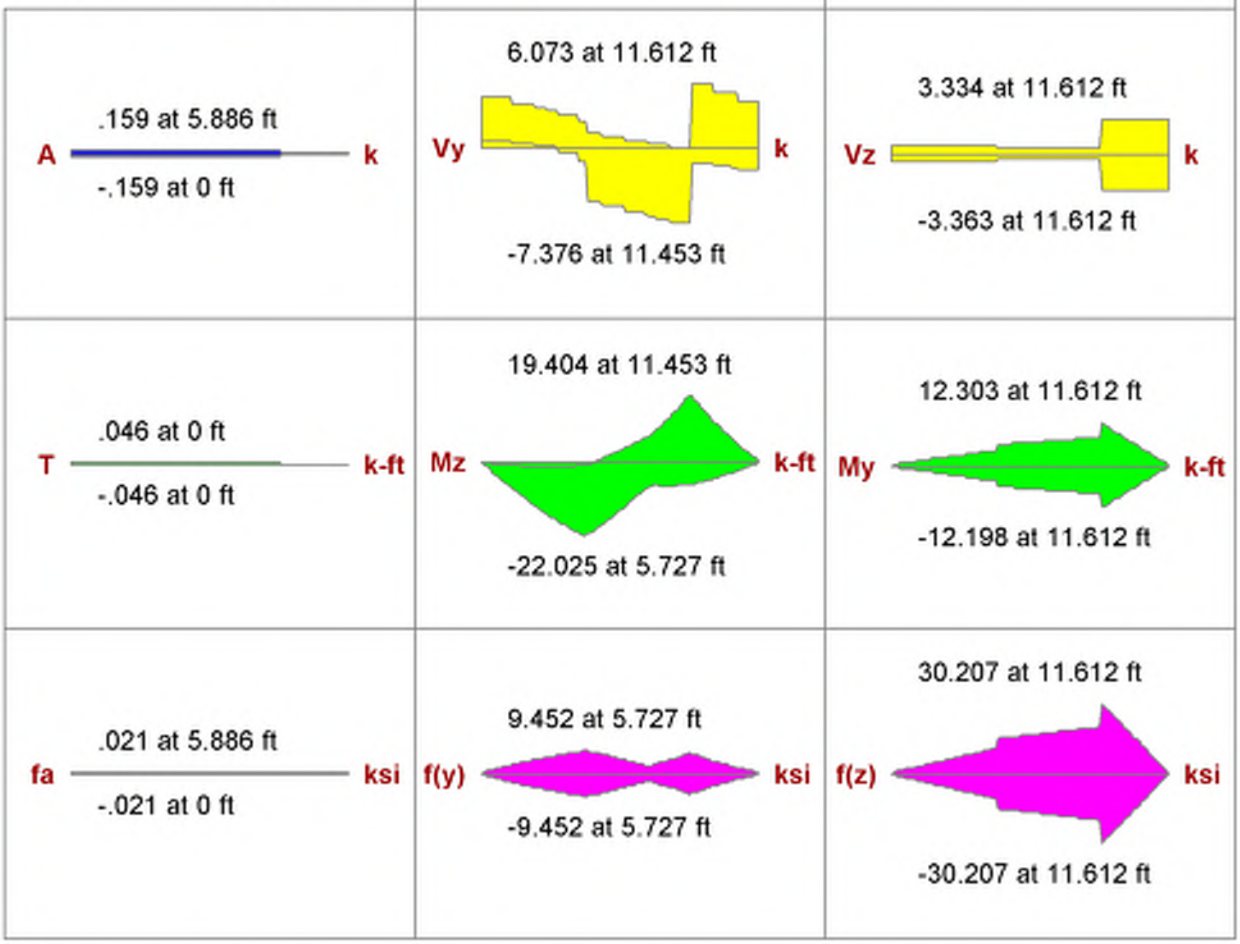
Beam:	*M7*
Shape:	**W10x26**
Material:	**A992**
Length:	**15.271 ft**
I Joint:	**N25**
J Joint:	**N26**

Envelope

Code Check: **0.599 (LC 43)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

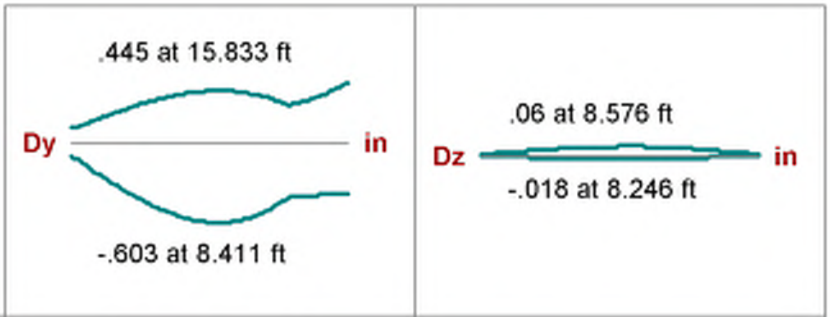
- Size from RISAFloor governed optimization -

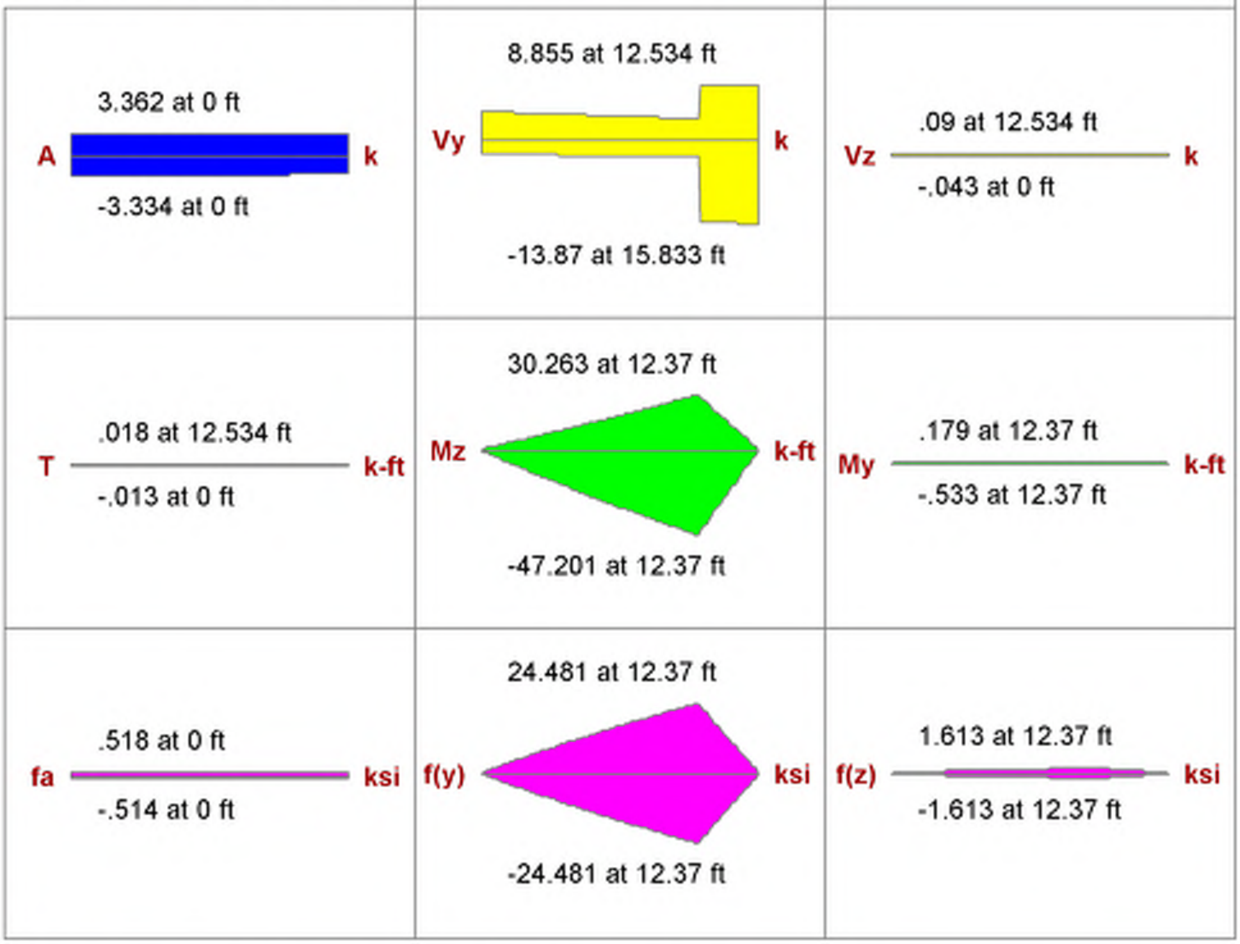
Max Bending Check	**0.599 (LC 43)**	Max Shear Check	**0.100 (y) (LC 27)**	
Location	**11.612 ft**	Location	**11.453 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/179**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**1.333 ft**	**15.271 ft**
phi*Pnc	**300.776 k**	KL/r	**11.752**	**42.127**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**15.271 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**15.271 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.918**			

Beam: *M9*

Shape: **W10x22**
Material: **A992**
Length: **15.833 ft**
I Joint: **N26**
J Joint: **N24**
Envelope
Code Check: **0.497 (LC 43)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

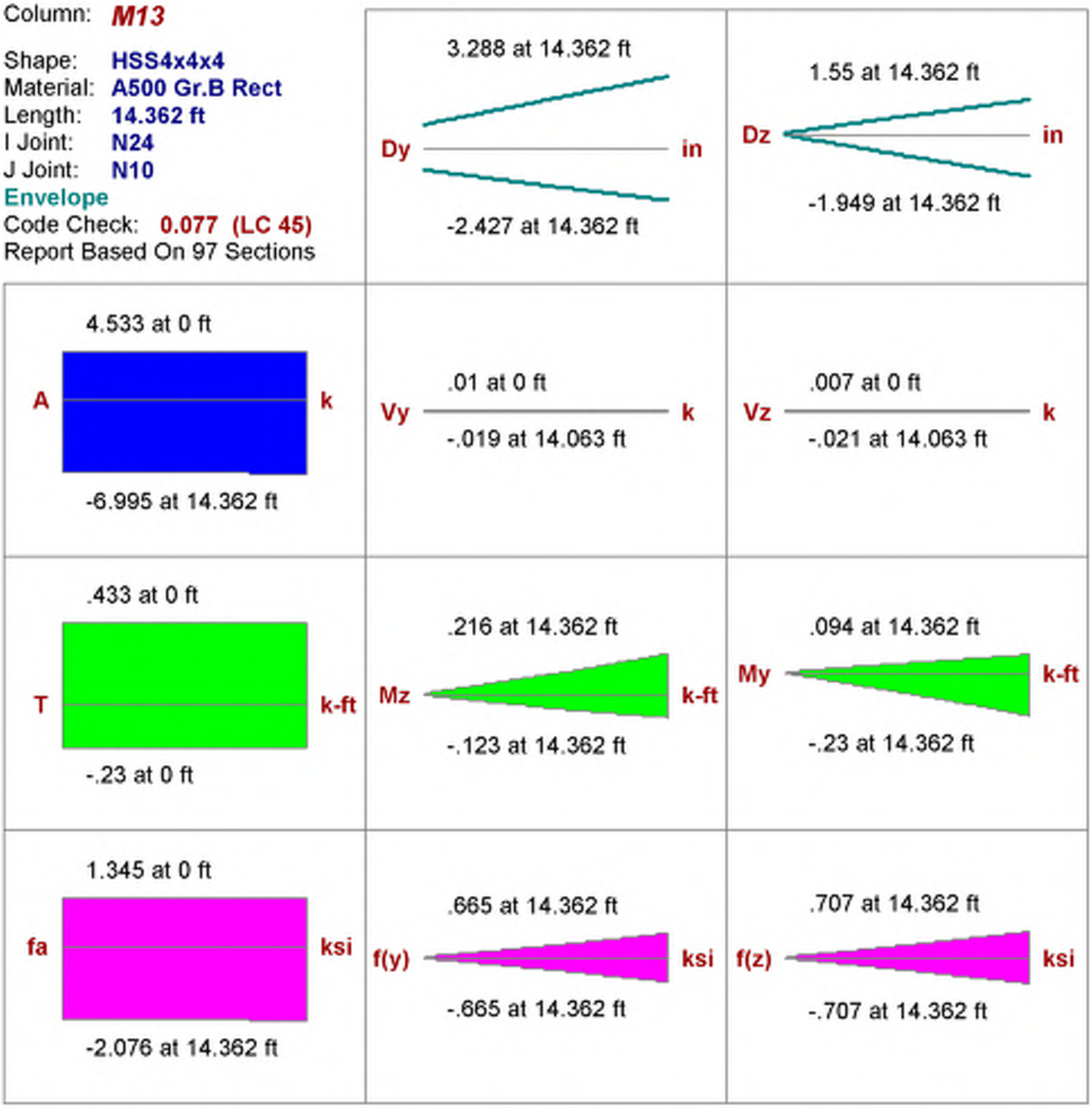
- Size from RISAFloor governed optimization -

Max Bending Check	**0.497 (LC 43)**	Max Shear Check	**0.192 (y) (LC 43)**
Location	**12.37 ft**	Location	**15.833 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/313**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=.992**

			y-y	z-z
Fy	**50 ksi**	Lb	**2.667 ft**	**15.833 ft**
phi*Pnc	**250.933 k**	KL/r	**24.148**	**44.558**
phi*Pnt	**292.05 k**			
phi*Mny	**22.875 k-ft**	L Comp Flange	**.5 ft**	
phi*Mnz	**97.5 k-ft**	L-torque	**15.833 ft**	
phi*Vny	**73.44 k**	Tau_b	**1**	
phi*Vnz	**111.78 k**			
Cb	**1**			

Column: ***M13***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **14.362 ft**
I Joint: **N24**
J Joint: **N10**
Envelope
Code Check: **0.077 (LC 45)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

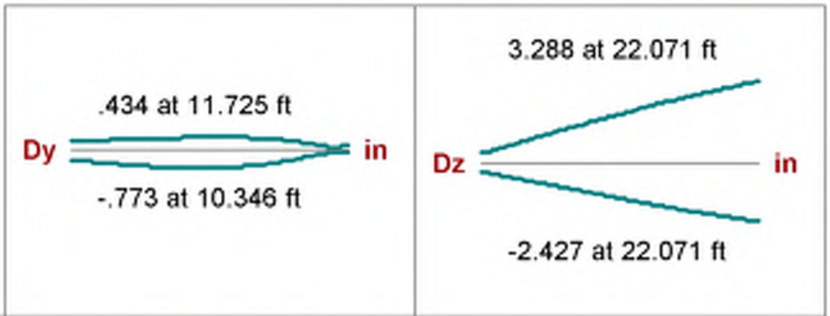
- Size from RISAFloor governed optimization -

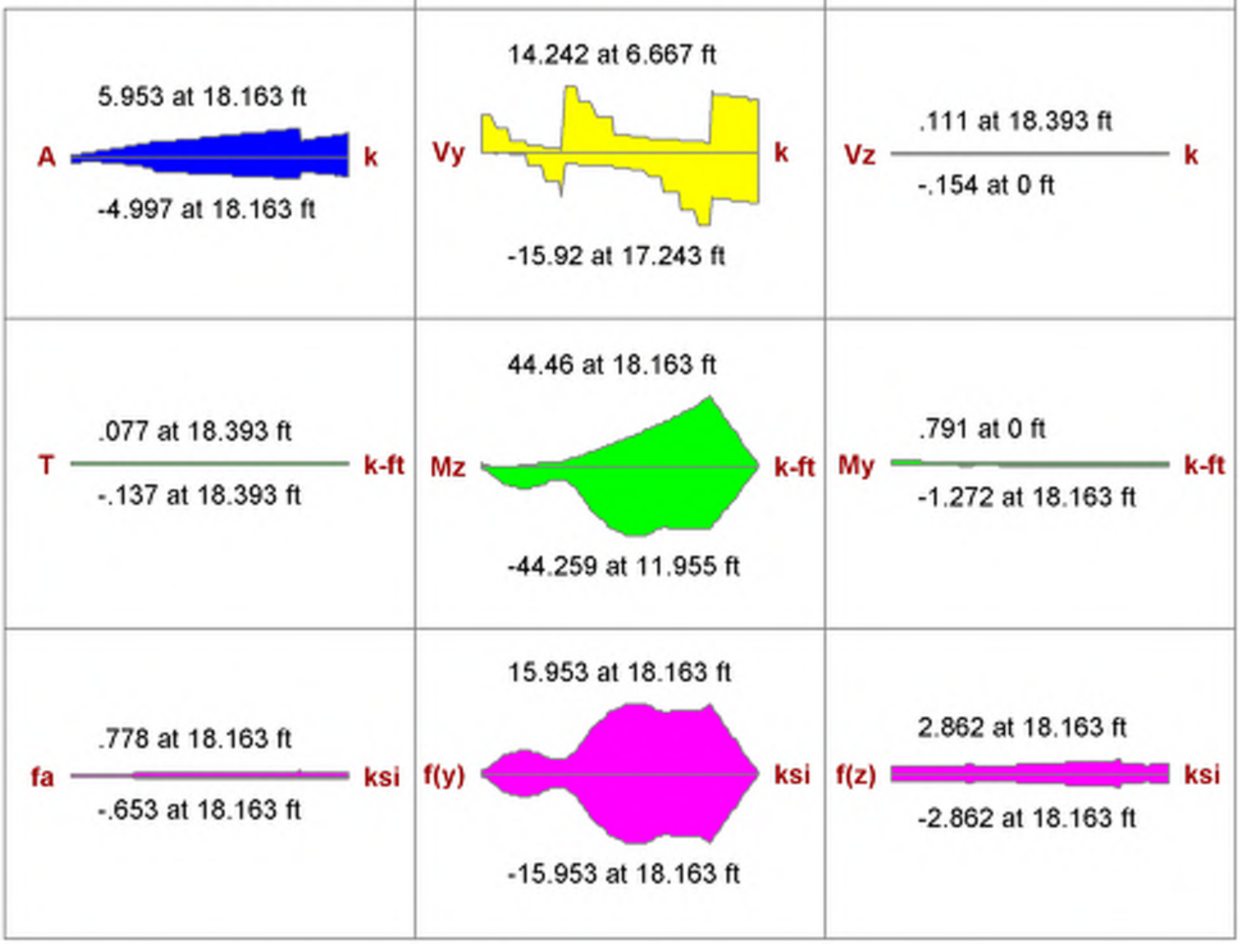
Max Bending Check	**0.077 (LC 45)**	Max Shear Check	**0.032 (y) (LC 43)**
Location	**0 ft**	Location	**14.063 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/122**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**14.362 ft**	**14.362 ft**
phi*Pnc	**58.847 k**	KL/r	**113.283**	**113.283**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**14.362 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**14.362 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.648**			

Beam: *M18*

Shape: **W12x26**
Material: **A992**
Length: **22.071 ft**
I Joint: **N5**
J Joint: **N10**
Envelope
Code Check: **0.469 (LC 46)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

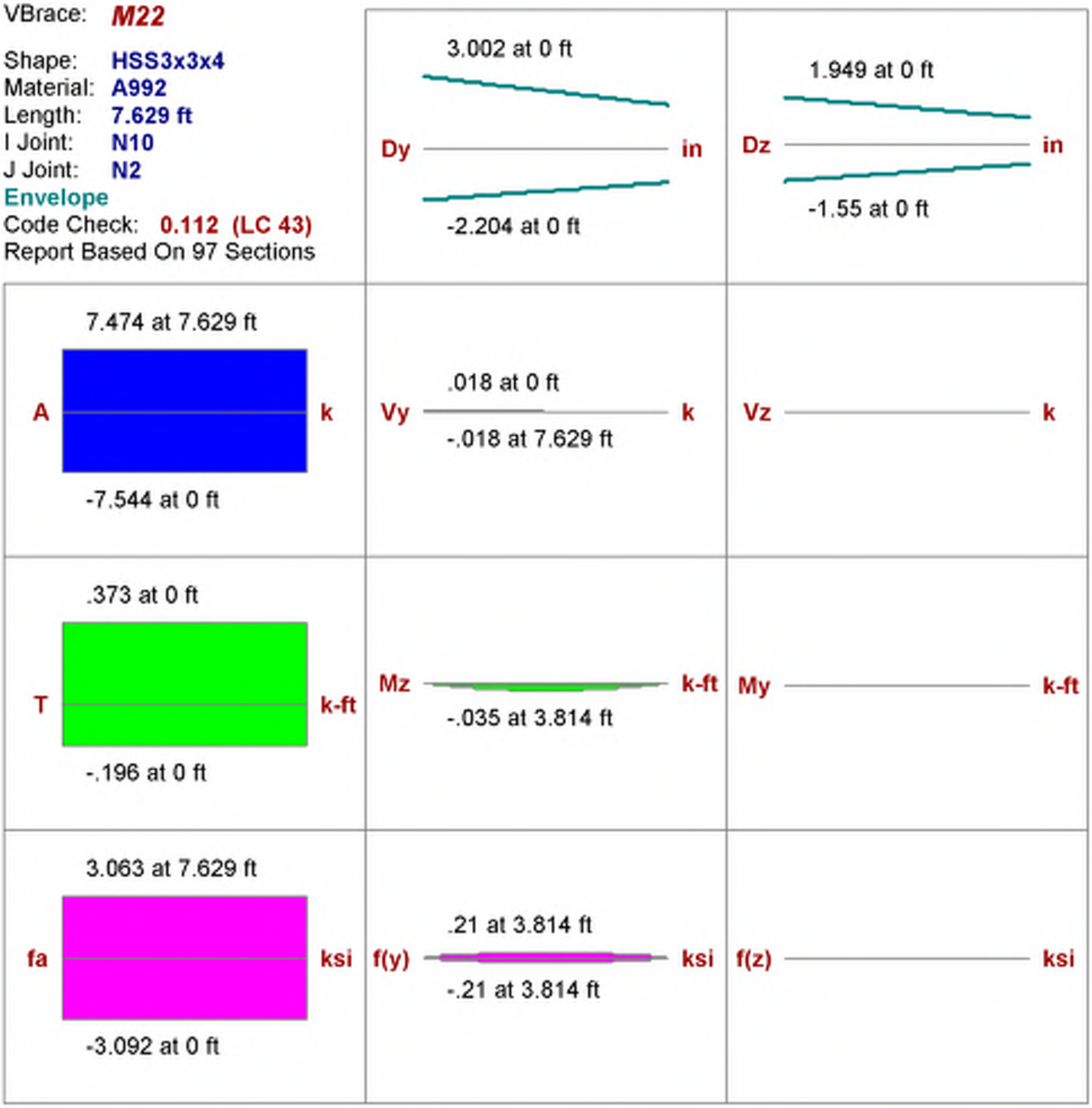
- Size from RISAFloor governed optimization -

Max Bending Check	**0.469 (LC 46)**	Max Shear Check	**0.209 (y) (LC 26)**
Location	**18.163 ft**	Location	**17.243 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/435**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=.924**

			y-y	z-z
Fy	**50 ksi**	Lb	**1.33 ft**	**1.33 ft**
phi*Pnc	**315.692 k**	KL/r	**10.613**	**3.091**
phi*Pnt	**344.25 k**			
phi*Mny	**30.637 k-ft**	L Comp Flange	**22.071 ft**	
phi*Mnz	**91.942 k-ft**	L-torque	**22.071 ft**	
phi*Vny	**84.18 k**	Tau_b	**1**	
phi*Vnz	**133.175 k**			
Cb	**1.91**			

VBrace: ***M22***

Shape: **HSS3x3x4**
Material: **A992**
Length: **7.629 ft**
I Joint: **N10**
J Joint: **N2**
Envelope
Code Check: **0.112 (LC 43)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.112 (LC 43)**	Max Shear Check	**0.047 (y) (LC 34)**
Location	**7.629 ft**	Location	**7.629 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/75**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

Fy	**50 ksi**		y-y	z-z
phi*Pnc	**66.927 k**	Lb	**7.629 ft**	**7.629 ft**
phi*Pnt	**109.8 k**	KL/r	**82.285**	**82.285**
phi*Mny	**9.3 k-ft**	L Comp Flange	**7.629 ft**	
phi*Mnz	**9.3 k-ft**	L-torque	**7.629 ft**	
phi*Vny	**28.951 k**	Tau_b	**1**	
phi*Vnz	**28.951 k**			
phi*Tn	**7.918 k-ft**			
Cb	**1.136**			

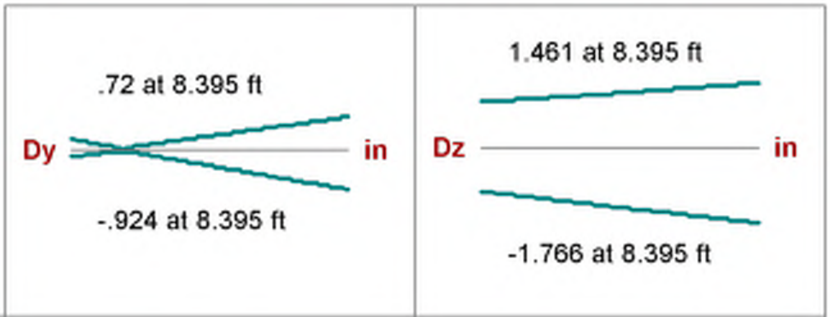
VBrace: ***M22A***

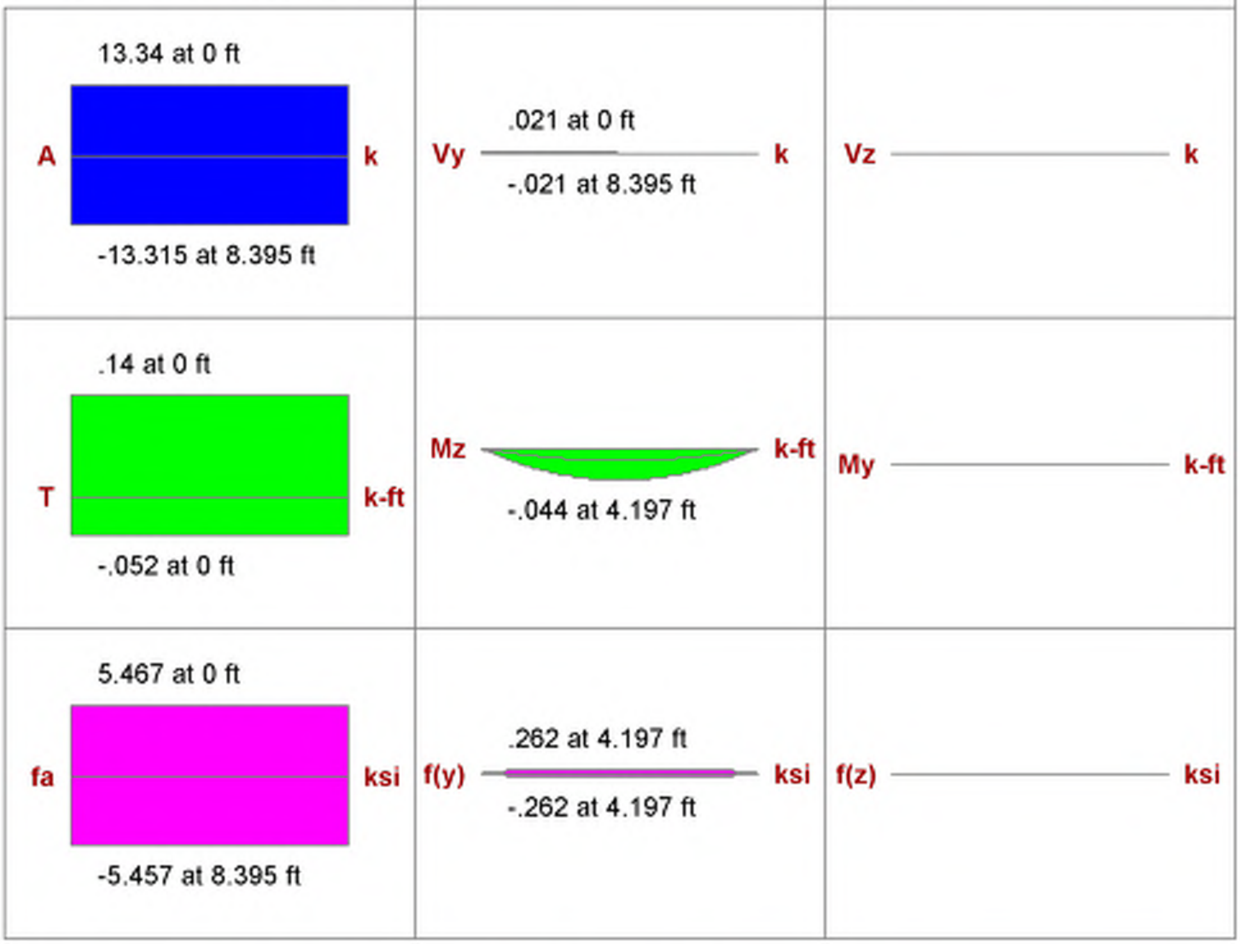
Shape:	**HSS3x3x4**
Material:	**A992**
Length:	**8.395 ft**
I Joint:	**N24**
J Joint:	**N12**

Envelope

Code Check: **0.225 (LC 42)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.225 (LC 42)**	Max Shear Check	**0.018 (y) (LC 43)**
Location	**3.848 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/113**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**8.395 ft**	**8.395 ft**
phi*Pnc	**60.291 k**	KL/r	**90.547**	**90.547**
phi*Pnt	**109.8 k**			
phi*Mny	**9.3 k-ft**	L Comp Flange	**8.395 ft**	
phi*Mnz	**9.3 k-ft**	L-torque	**8.395 ft**	
phi*Vny	**28.951 k**	Tau_b	**1**	
phi*Vnz	**28.951 k**			
phi*Tn	**7.918 k-ft**			
Cb	**1.136**			

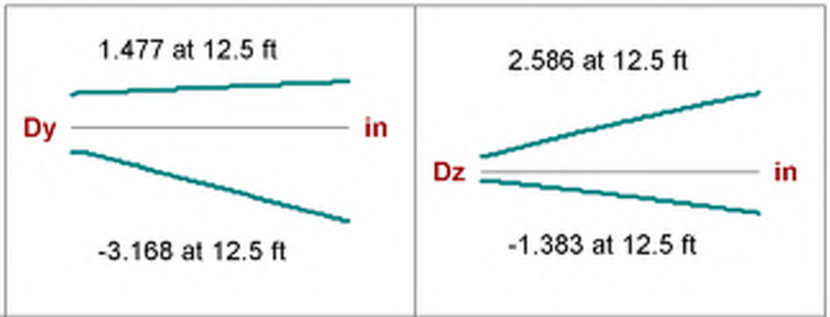
Beam: *M23*

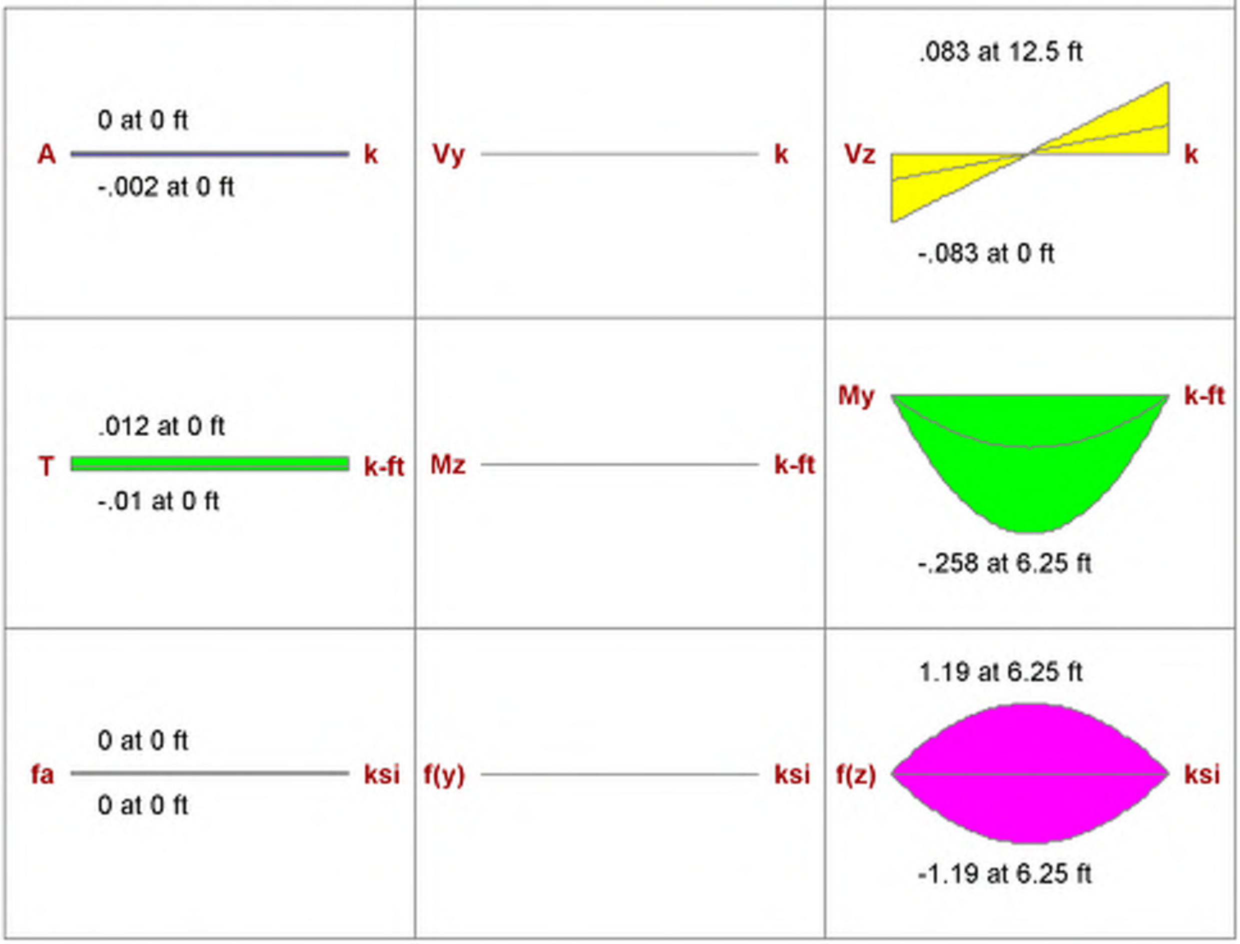
Shape:	**HSS4x3x4**
Material:	**A992**
Length:	**12.5 ft**
I Joint:	**N2**
J Joint:	**N16**

Envelope

Code Check: **0.022 (LC 41)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.022 (LC 41)**	Max Shear Check	**0.004 (z) (LC 44)**
Location	**6.25 ft**	Location	**12.5 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/135**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**12.5 ft**	**12.5 ft**
phi*Pnc	**39.259 k**	KL/r	**129.404**	**103.181**
phi*Pnt	**130.95 k**			
phi*Mny	**11.7 k-ft**	L Comp Flange	**12.5 ft**	
phi*Mnz	**14.287 k-ft**	L-torque	**12.5 ft**	
phi*Vny	**41.533 k**	Tau_b	**1**	
phi*Vnz	**28.951 k**			
phi*Tn	**10.819 k-ft**			
Cb	**1**			

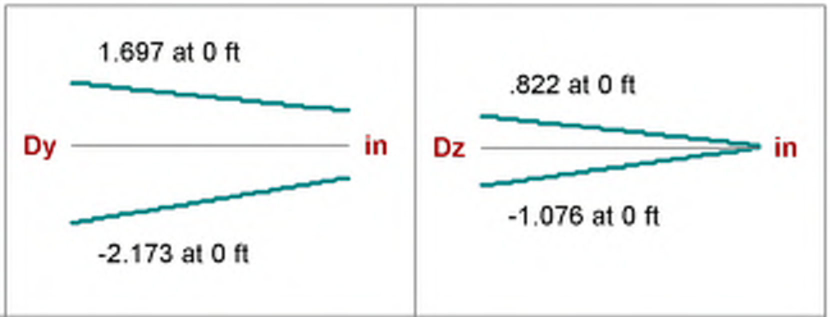
VBrace: ***M23A***

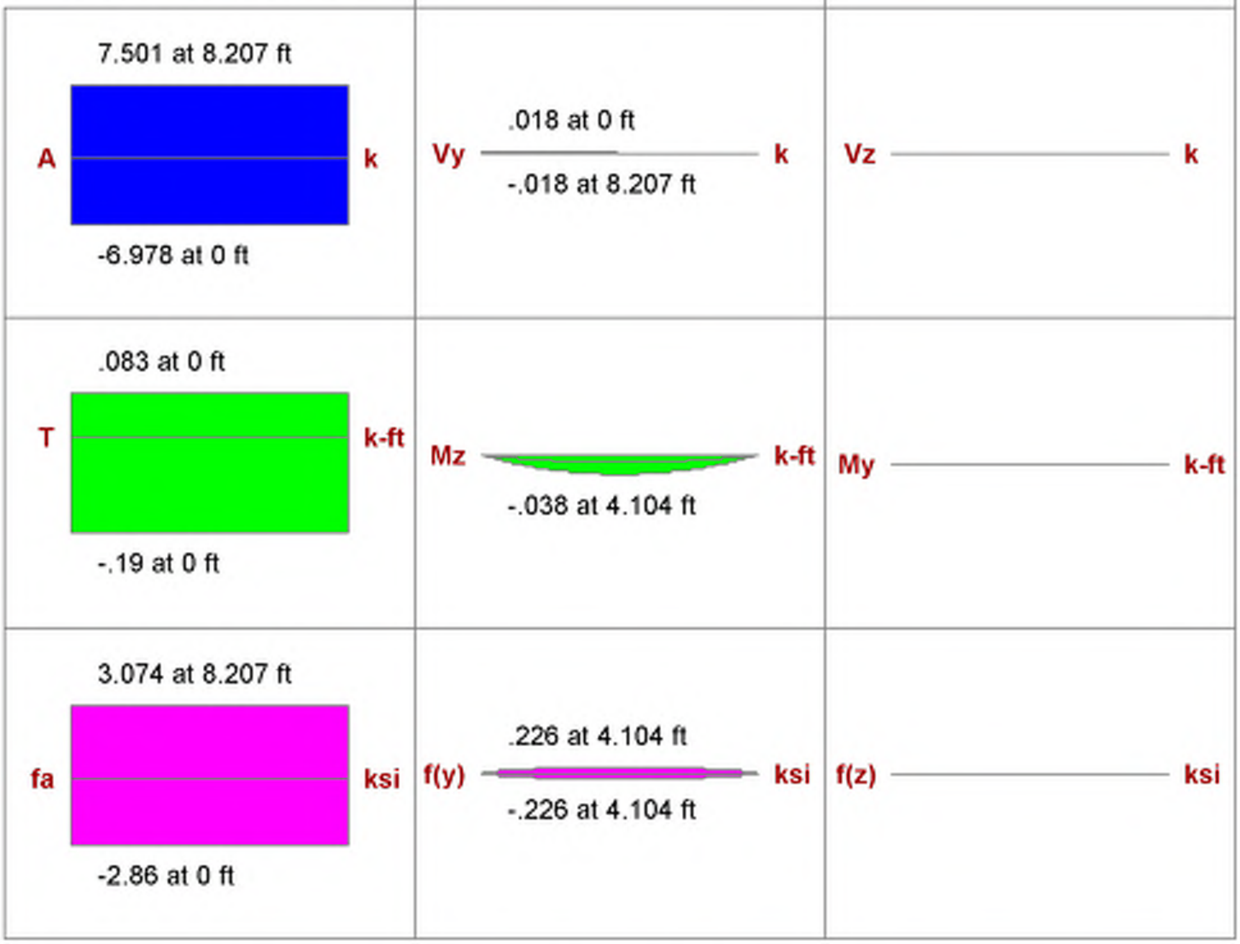
Shape:	**HSS3x3x4**
Material:	**A992**
Length:	**8.207 ft**
I Joint:	**N2**
J Joint:	**N24**

Envelope

Code Check: **0.121 (LC 41)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

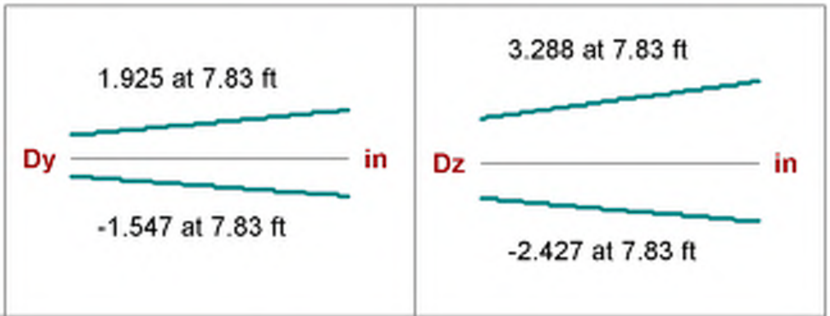
Direct Analysis Method

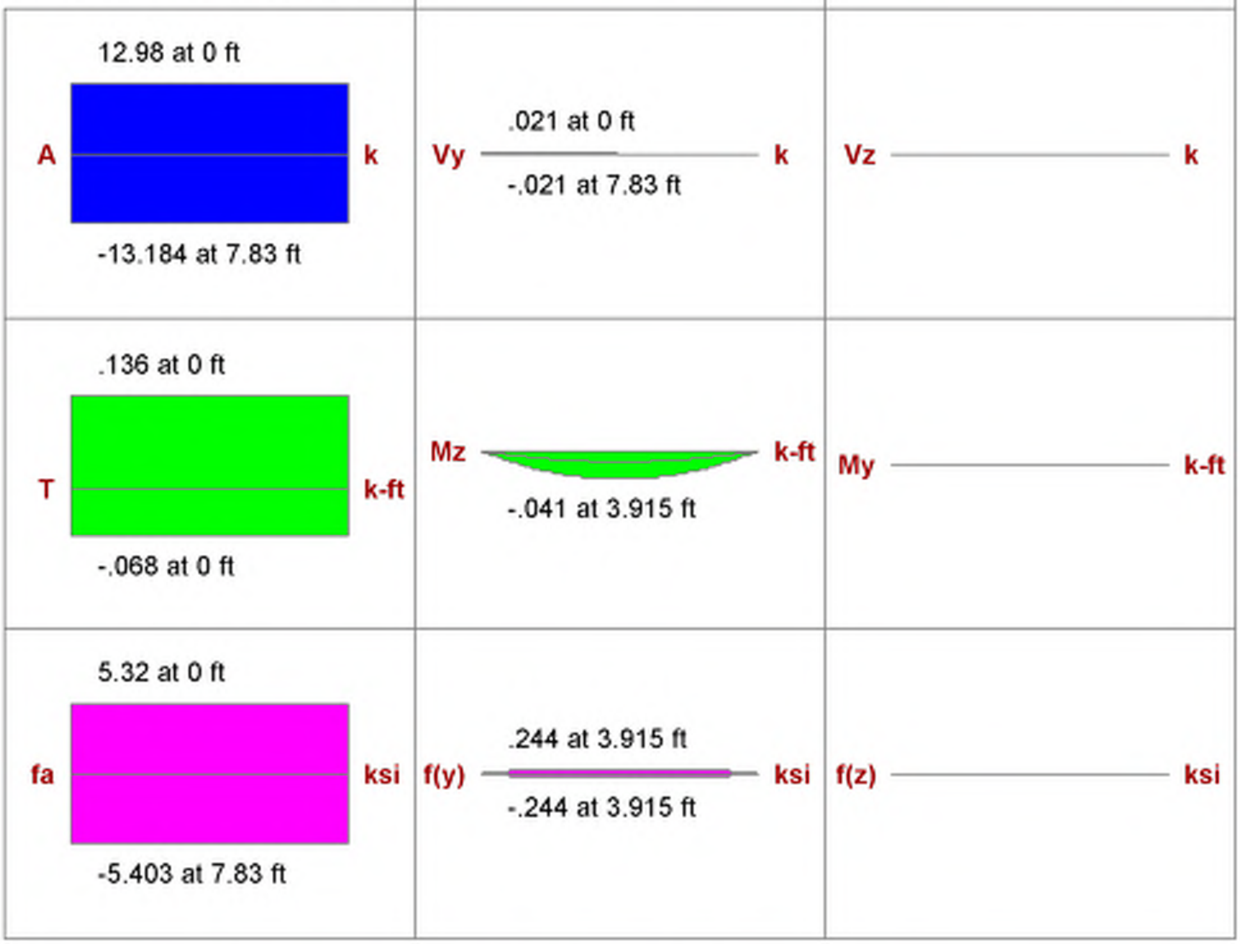
Max Bending Check	**0.121 (LC 41)**	Max Shear Check	**0.024 (y) (LC 34)**
Location	**8.207 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/123**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**8.207 ft**	**8.207 ft**
phi*Pnc	**61.908 k**	KL/r	**88.526**	**88.526**
phi*Pnt	**109.8 k**			
phi*Mny	**9.3 k-ft**	L Comp Flange	**8.207 ft**	
phi*Mnz	**9.3 k-ft**	L-torque	**8.207 ft**	
phi*Vny	**28.951 k**	Tau_b	**1**	
phi*Vnz	**28.951 k**			
phi*Tn	**7.918 k-ft**			
Cb	**1.136**			

VBrace: ***M23B***

Shape: **HSS3x3x4**
Material: **A992**
Length: **7.83 ft**
I Joint: **N12**
J Joint: **N10**
Envelope
Code Check: **0.199 (LC 44)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

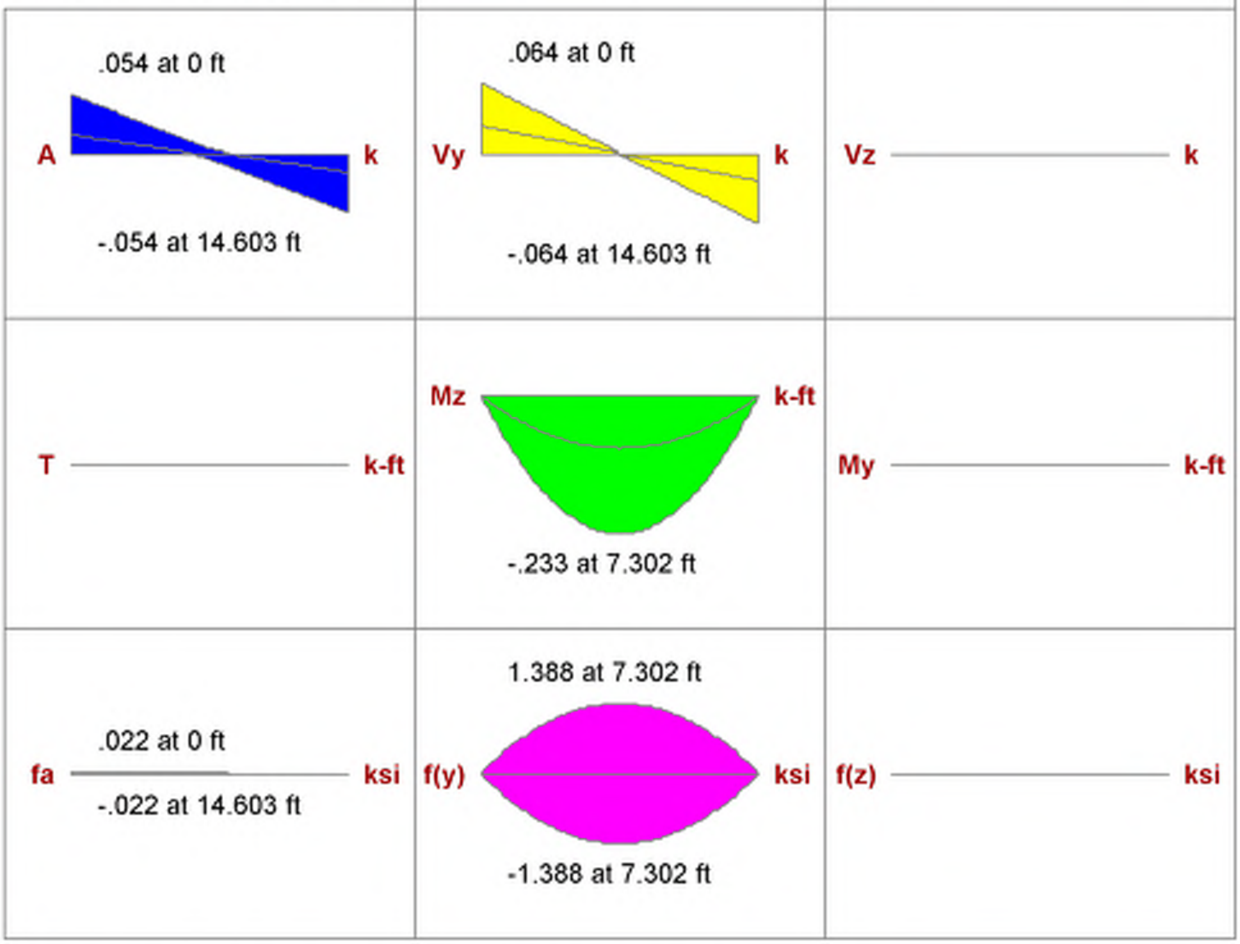
Direct Analysis Method

Max Bending Check	**0.199 (LC 44)**	Max Shear Check	**0.018 (y) (LC 43)**
Location	**0 ft**	Location	**7.83 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/89**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**7.83 ft**	**7.83 ft**
phi*Pnc	**65.179 k**	KL/r	**84.456**	**84.456**
phi*Pnt	**109.8 k**			
phi*Mny	**9.3 k-ft**	L Comp Flange	**7.83 ft**	
phi*Mnz	**9.3 k-ft**	L-torque	**7.83 ft**	
phi*Vny	**28.951 k**	Tau_b	**1**	
phi*Vnz	**28.951 k**			
phi*Tn	**7.918 k-ft**			
Cb	**1.136**			

VBrace: ***M24***

Shape: **HSS3x3x4**
Material: **A992**
Length: **14.603 ft**
I Joint: **N47**
J Joint: **N42**
Envelope
Code Check: **0.025 (LC 42)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

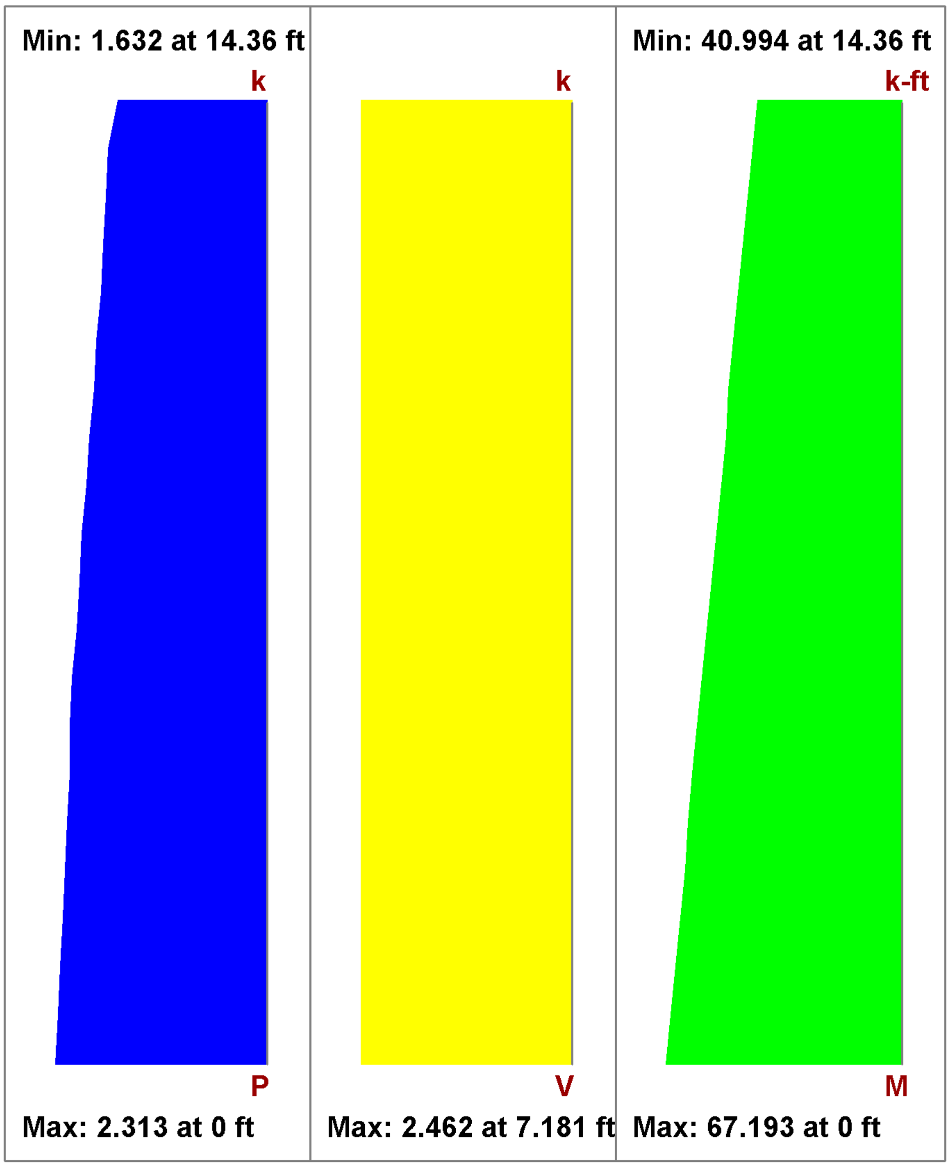
Max Bending Check	**0.025 (LC 42)**	Max Shear Check	**0.002 (y) (LC 41)**
Location	**7.149 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/1716**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**14.603 ft**	**14.603 ft**
phi*Pnc	**22.218 k**	KL/r	**157.513**	**157.513**
phi*Pnt	**109.8 k**			
phi*Mny	**9.3 k-ft**	L Comp Flange	**14.603 ft**	
phi*Mnz	**9.3 k-ft**	L-torque	**14.603 ft**	
phi*Vny	**28.951 k**	Tau_b	**1**	
phi*Vnz	**28.951 k**			
phi*Tn	**7.918 k-ft**			
Cb	**1.136**			

Lateral Shear Wall Detailed Reports

CRITERIA		MATERIALS		GEOMETRY	
Code	: AWC NDS-15:ASD	Wall Studs	: Spruce-Pin...	Total Height	: 14.362 ft
		Stud Size	: 2X6	Total Length	: 15.833 ft
Wall Material	: Spruce-Pine-Fir	Chord Material	: Spruce-Pin...	Region H/W	: 0.91
Panel Schedule	: 0.469 (8d) Panel G...	Chord Size	: 2-2X6	Cap. Adj. (2w/h)	: 1.00
Optimize HD	: Yes	Top Pl & Sill	: Spruce-Pin...	Stud Spacing	: 16 in
HD Manufacturer	: SIMPSON	Top Pl Size	: 2-2X6	K	: 1.00
		Sill Pl Size	: 2X6	HD Eccentricity	: 4.313in

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL
Required Cap : .155 k/ft
Provided Cap : .28 k/ft
Ratio : .555
Governing LC : 67 (Seismic)

CHORDS
Max Comp Force: 4.795 k
Comp Capacity : 7.069 k
Comp Ratio : .678
Gov Comp LC : 73
Max Tens Force : 2.603 k
Tens Capacity : 15.444 k
Tens Ratio : .169
Gov Tens LC : 77

STUDS
No gravity-only LC solved.

HOLD-DOWNS
Required Cap : 2.642 k
Provided Cap : 3.075 k
Ratio : .859
Governing LC : 77

DEFLECTIONS
Flexure Comp : .01 in
Shear Comp : .16 in
HD Elong : .022 in
Tot Deflection : .191 in
Governing LC : 67

DESIGN DETAILS

SELECTED SHEAR PANEL : S1_15/32_8d@6

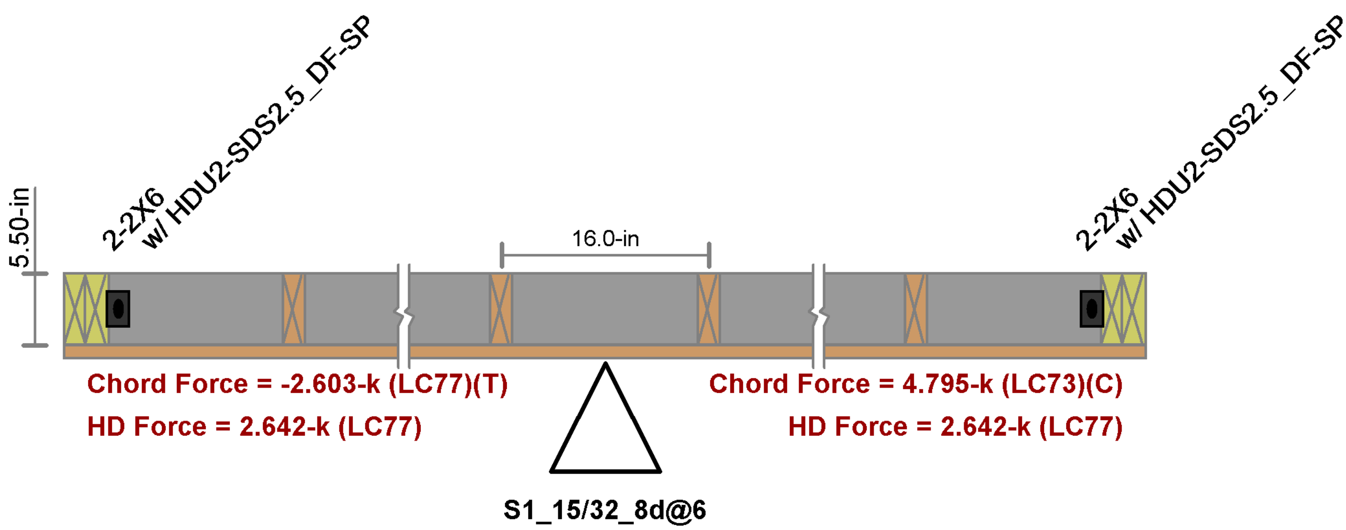
Panel Grade	: St-I		Nail Size	: 8d		Num Sides	: One	
Panel Thick	: 0.469	in	Reqd Pen	: 1.250	in	Over Gyp Brd.	: No	
			Reqd. Spacing	: 6	in	Shear Capacity	: 0.280	k/ft
						Adjusted Cap	: 0.280	k/ft

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

SELECTED HOLD-DOWN : HDU2-SDS2.5_DF-SP

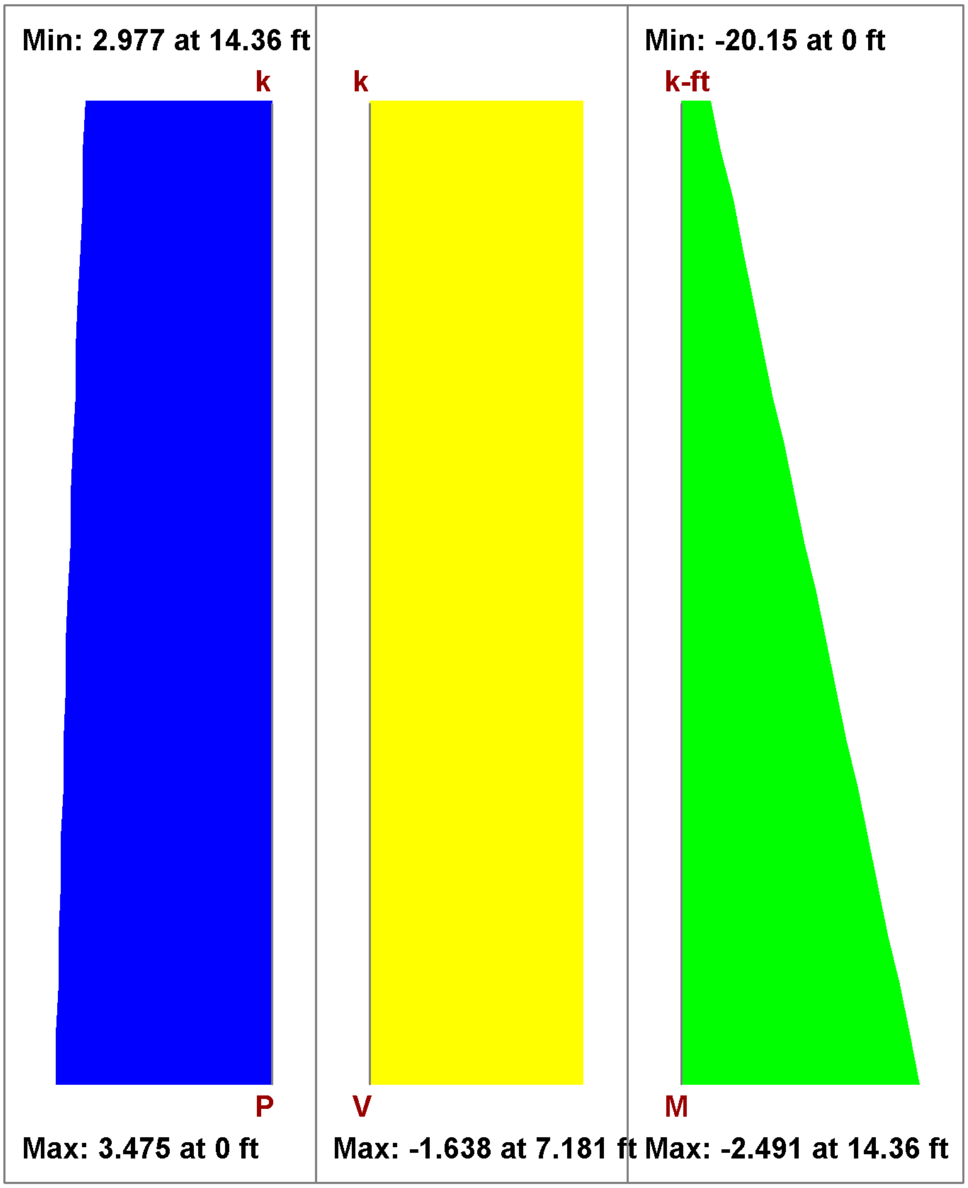
Min Chord Thk	: 3.00	in	Bolt Size:	: n/a	Base Cap(CD=1)	: 1.922	k
Reqd Chord Mat	: Douglas Fir				CD factor	: 1.6	
					Adjusted Cap	: 3.075	k

CROSS SECTION DETAILING



CRITERIA		MATERIALS		GEOMETRY	
Code	: AWC NDS-15:ASD	Wall Studs	: Spruce-Pin...	Total Height	: 14.362 ft
		Stud Size	: 2X6	Total Length	: 11.5 ft
Wall Material	: Spruce-Pine-Fir	Chord Material	: Spruce-Pin...	Region H/W	: 1.25
Panel Schedule	: 0.469 (8d) Panel G...	Chord Size	: 2-2X6	Cap. Adj. (2w/h)	: 1.00
Optimize HD	: Yes	Top Pl & Sill	: Spruce-Pin...	Stud Spacing	: 16 in
HD Manufacturer:	SIMPSON	Top Pl Size	: 2-2X6	K	: 1.00
		Sill Pl Size	: 2X6	HD Eccentricity	: 4.313in

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL

Required Cap	: .142 k/ft
Provided Cap	: .28 k/ft
Ratio	: .509
Governing LC	: 66 (Seismic)

CHORDS

Max Comp Force:	3.317 k
Comp Capacity	: 7.069 k
Comp Ratio	: .469
Gov Comp LC	: 76
Max Tens Force	: 1.601 k
Tens Capacity	: 15.444 k
Tens Ratio	: .104
Gov Tens LC	: 80

STUDS

No gravity-only LC solved.

HOLD-DOWNS

Required Cap	: 1.635 k
Provided Cap	: 3.075 k
Ratio	: .532
Governing LC	: 80

DEFLECTIONS

Flexure Comp	: .013 in
Shear Comp	: .146 in
HD Elong	: .025 in
Tot Deflection	: .184 in
Governing LC	: 66

DESIGN DETAILS

SELECTED SHEAR PANEL : S1_15/32_8d@6

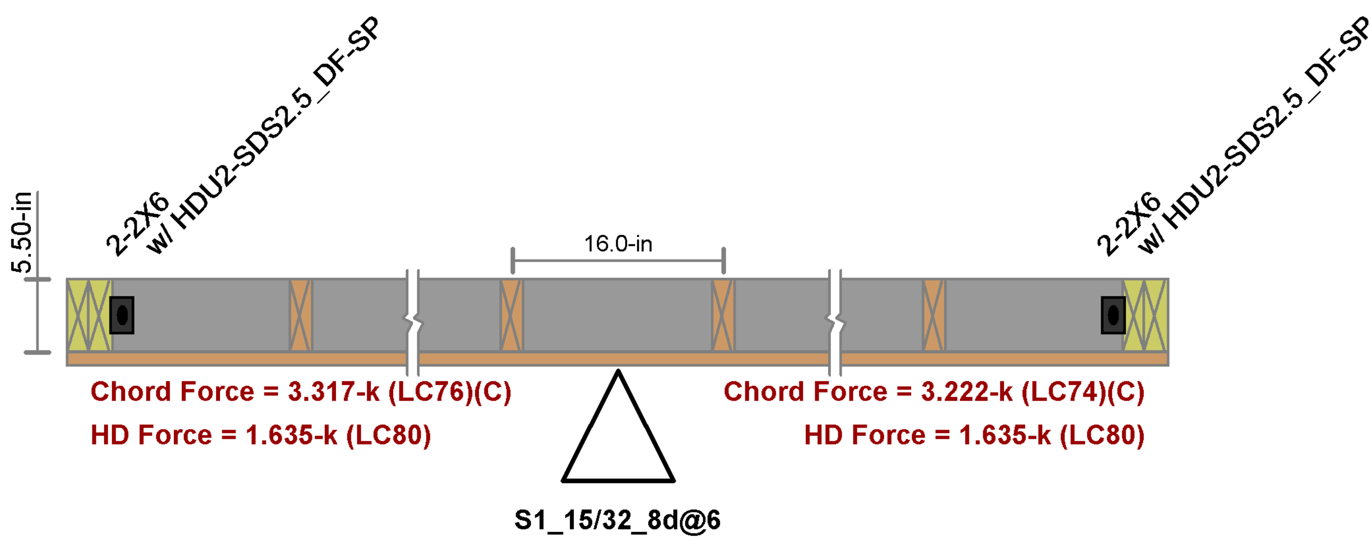
Panel Grade	: **St-I**		
Panel Thick	: **0.469**	**in**	
Nail Size	: **8d**		
Reqd Pen	: **1.250**	**in**	
Reqd. Spacing	: **6**	**in**	
Num Sides	: **One**		
Over Gyp Brd.	: **No**		
Shear Capacity	: **0.280**	**k/ft**	
Adjusted Cap	: **0.280**	**k/ft**	

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

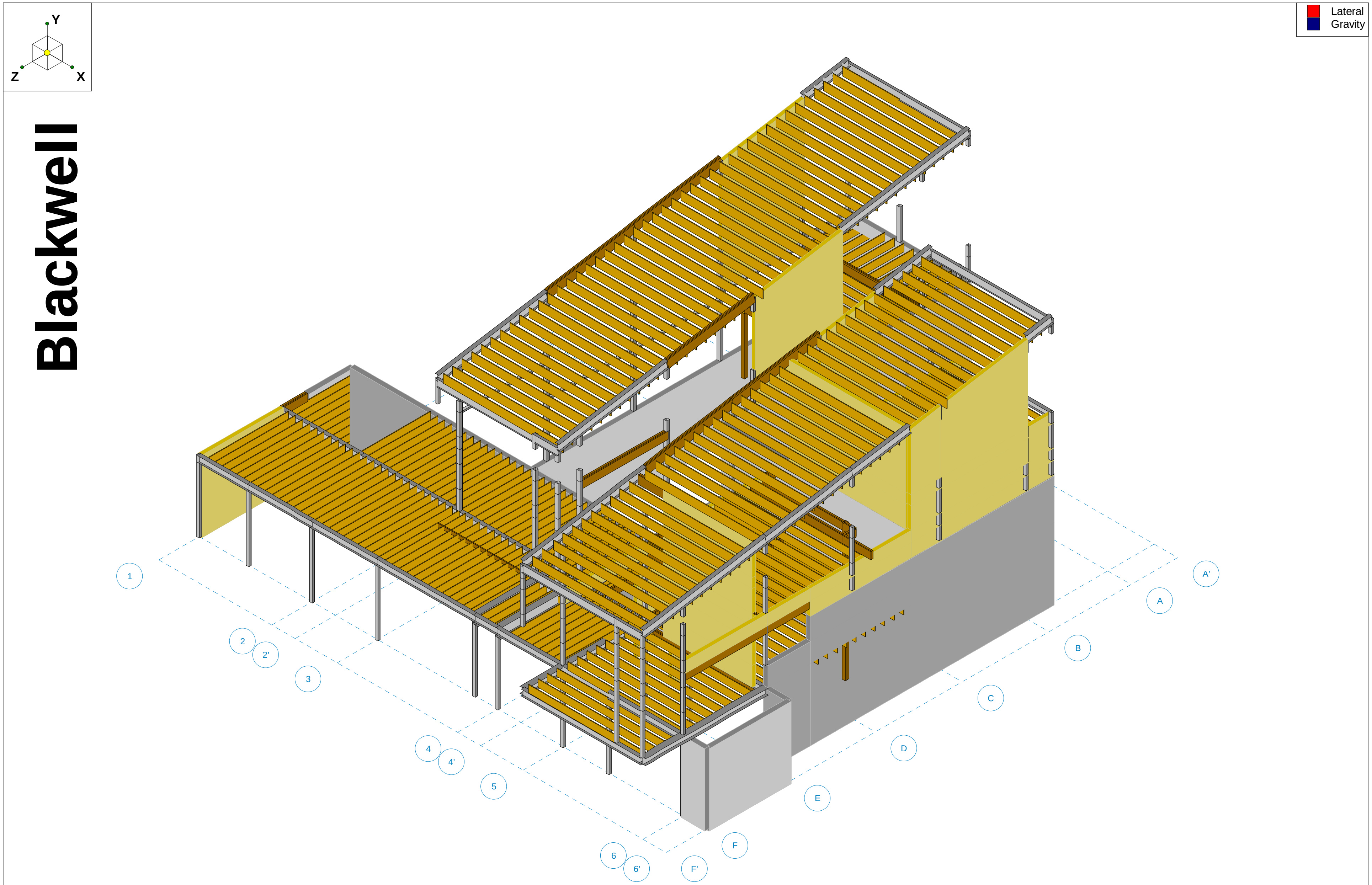
SELECTED HOLD-DOWN : HDU2-SDS2.5_DF-SP

Min Chord Thk	: **3.00**	**in**
Reqd Chord Mat	: **Douglas Fir**	
Bolt Size:	: **n/a**	
Base Cap(CD=1)	: **1.922**	**k**
CD factor	: **1.6**	
Adjusted Cap	: **3.075**	**k**

CROSS SECTION DETAILING



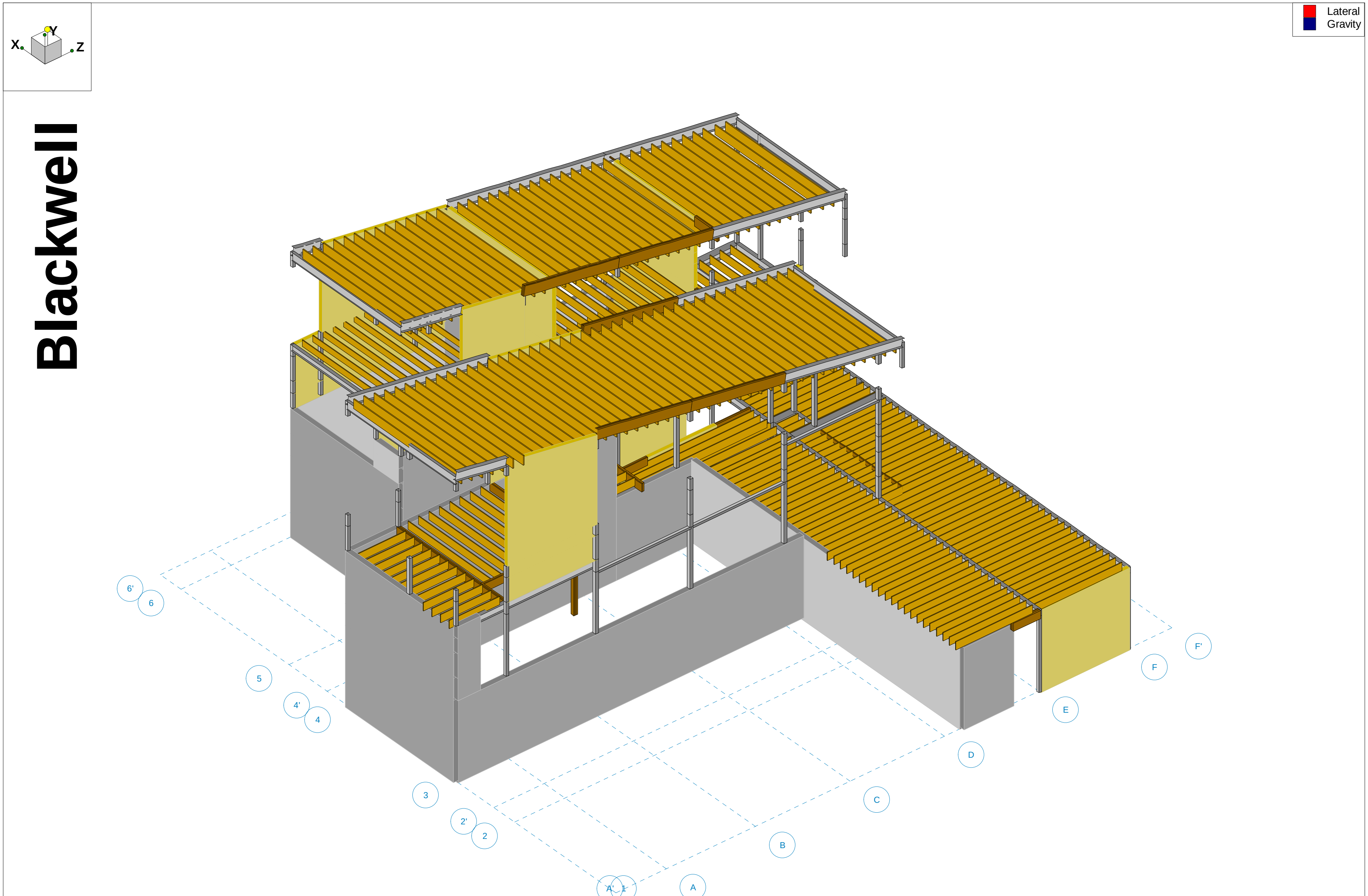
VOLUME 2, 3 & 4
(Dining, Master, Basement)



Blackwell

*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	Full Model	GENERAL RENDER 1
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:12 PM
170266		KMR Volume 2 3 4.rfl



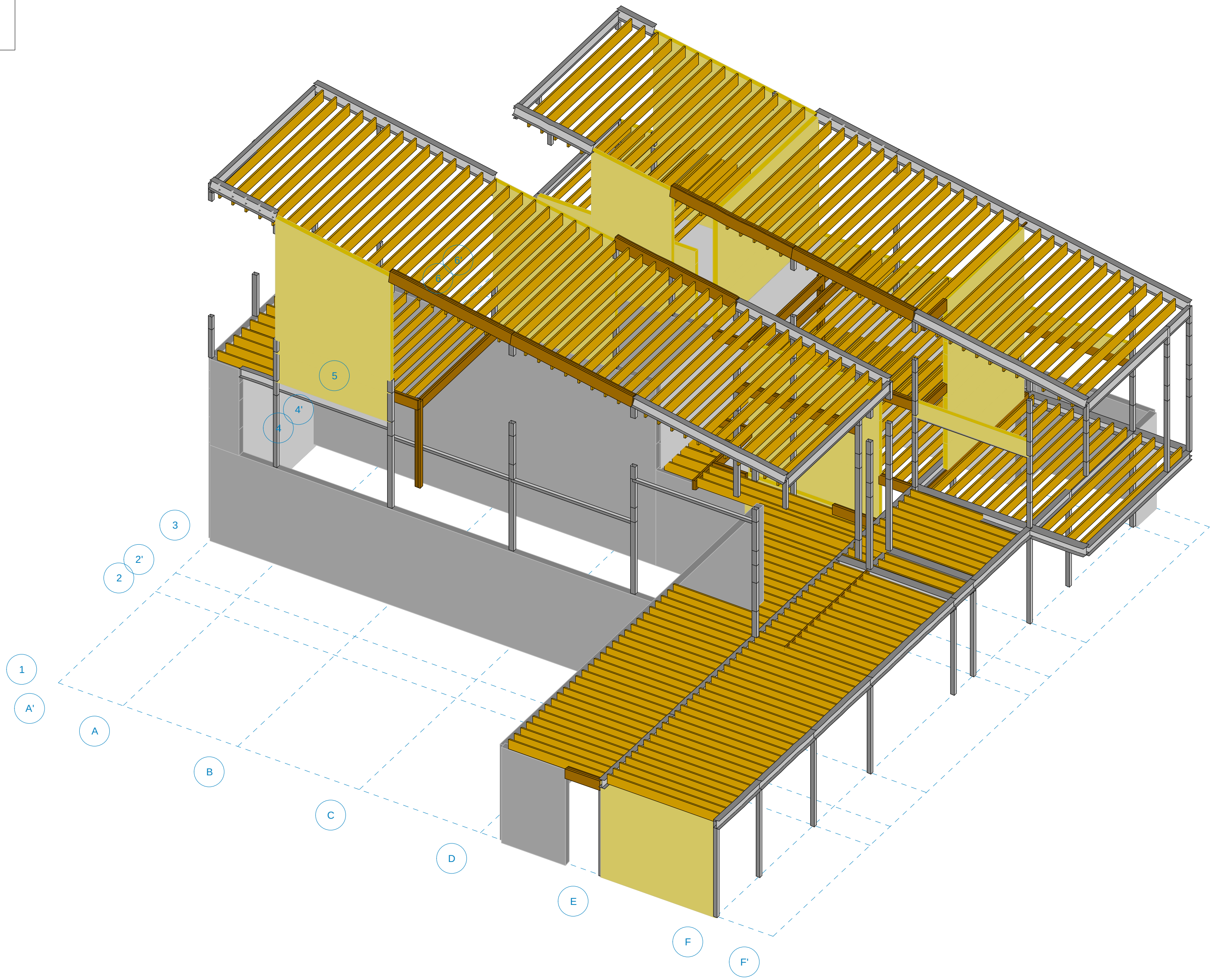
Blackwell

*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	Full Model	GENERAL RENDER 2
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:12 PM
170266		KMR Volume 2 3 4.rfl

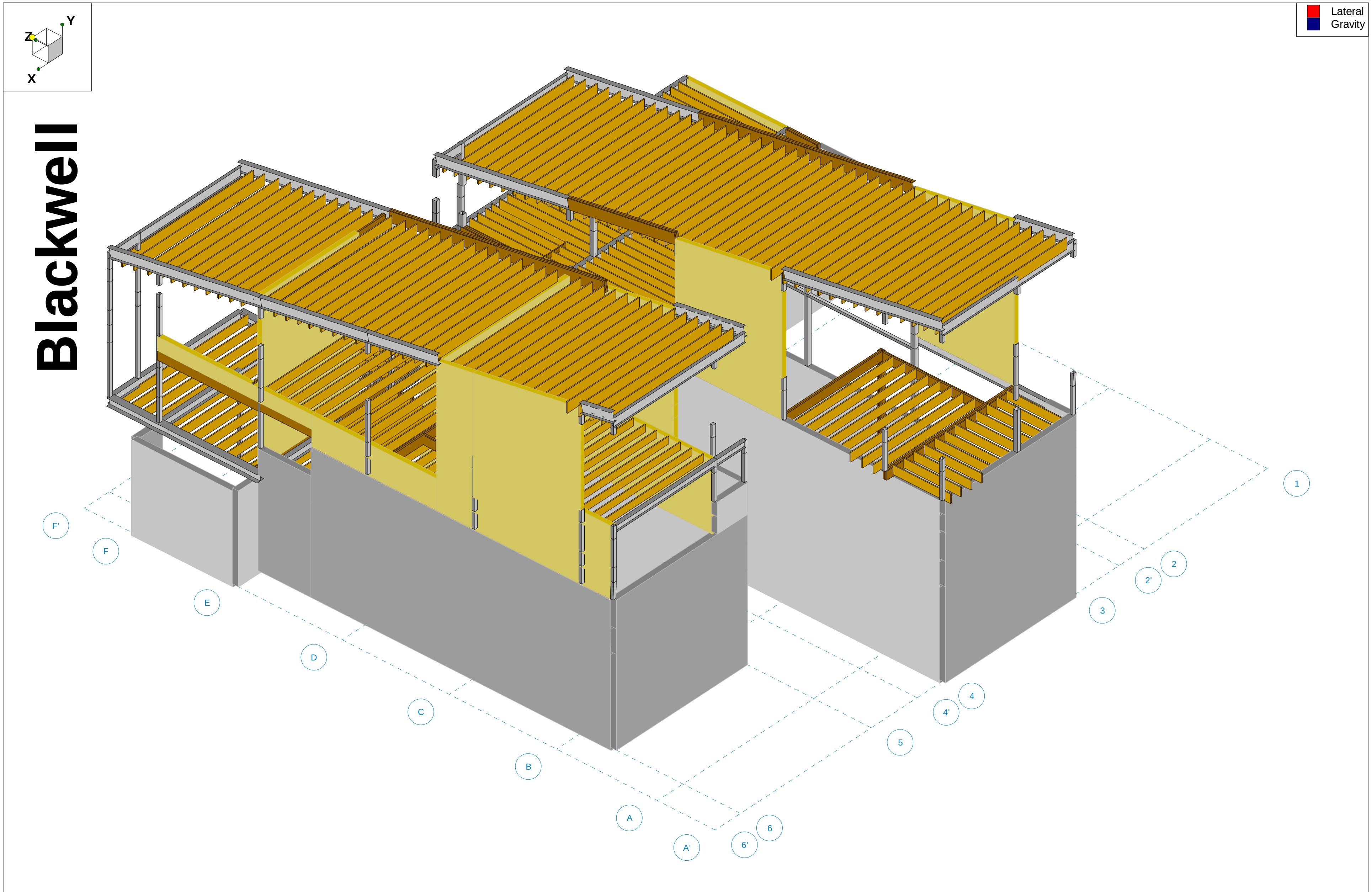
Lateral
Gravity

Blackwell



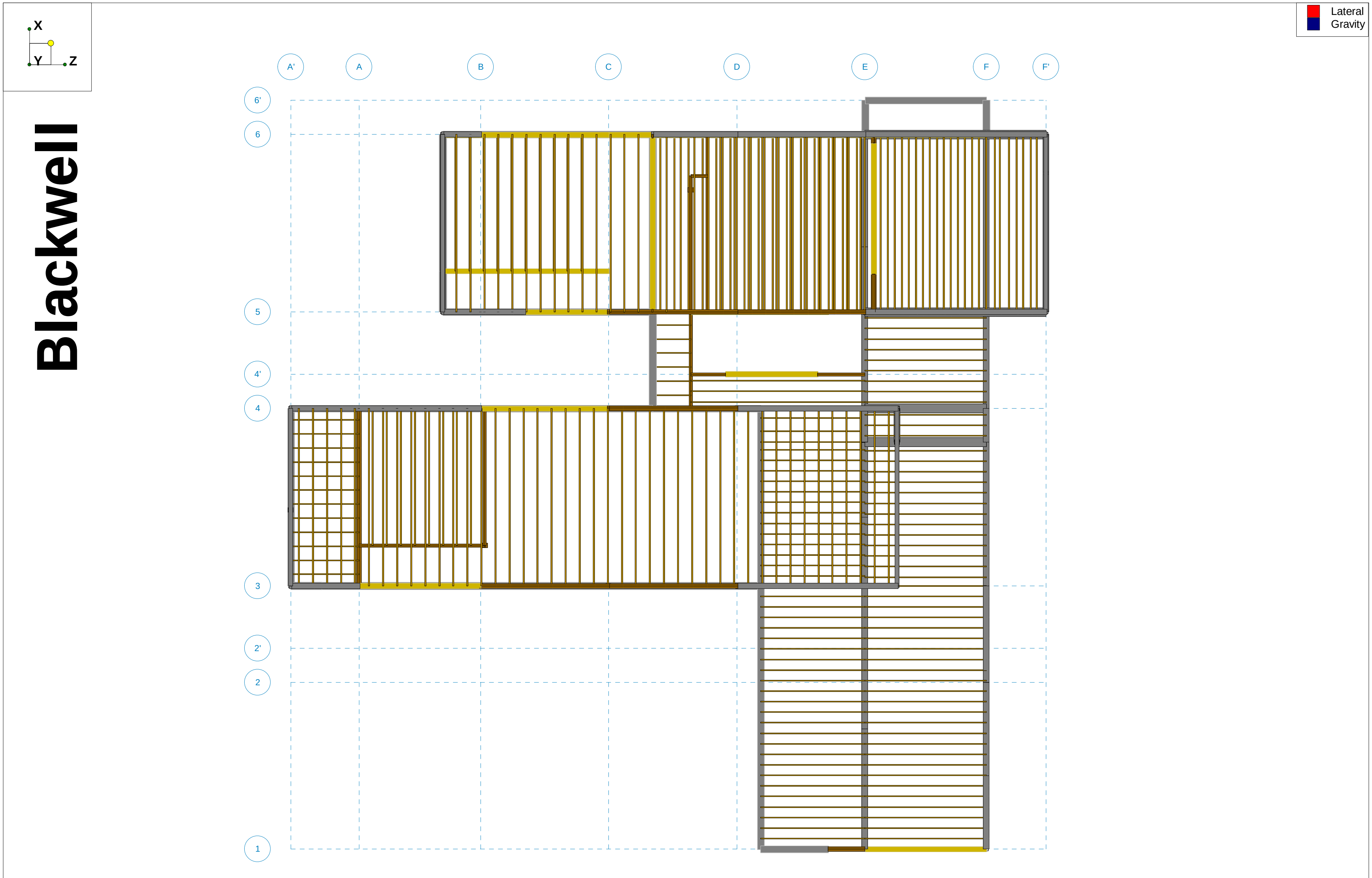
*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	Full Model	GENERAL RENDER 3
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:13 PM
170266		KMR Volume 2 3 4.rfl



*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	Full Model	GENERAL RENDER 4
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:14 PM
170266		KMR Volume 2 3 4.rfl



Blackwell

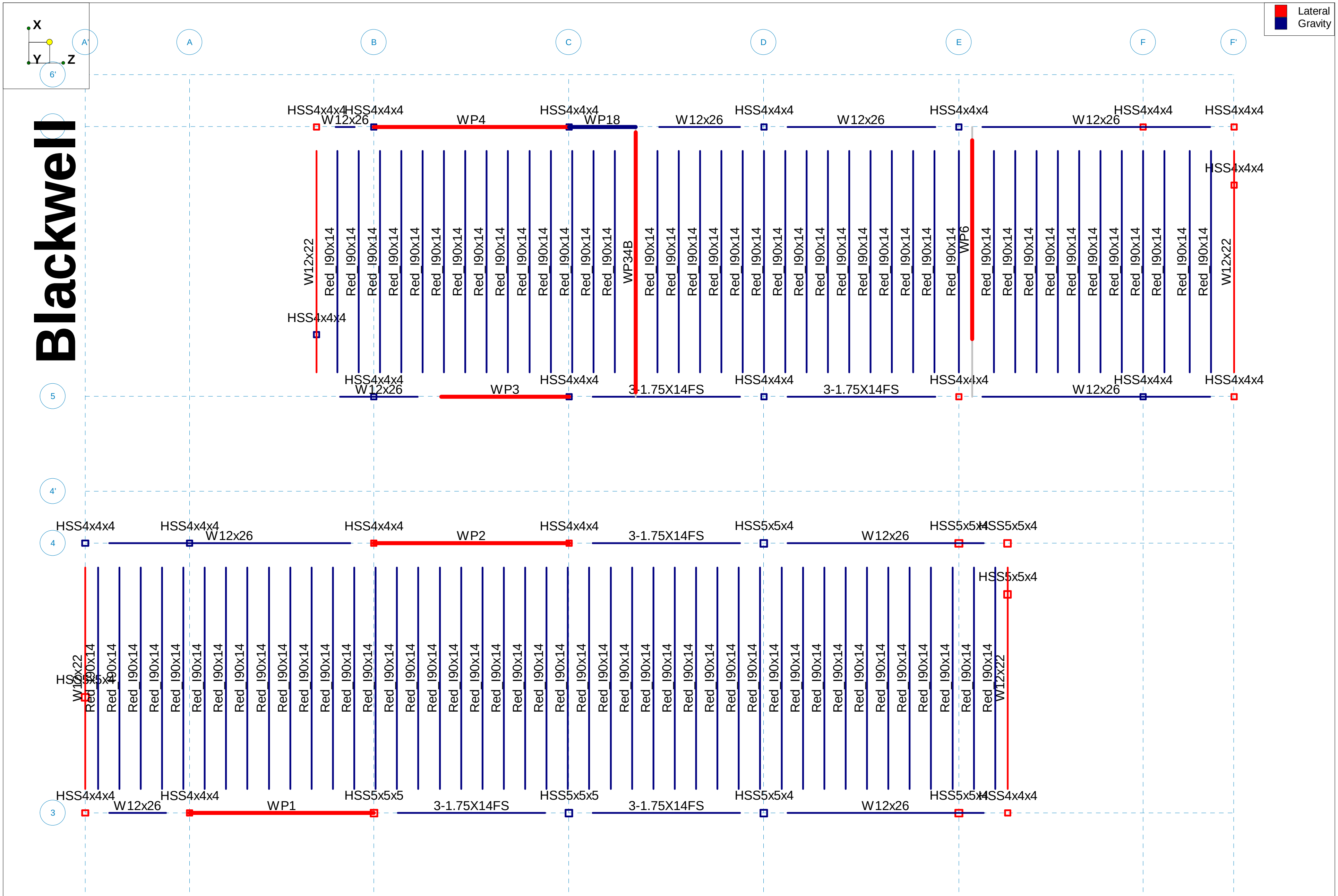
*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	Full Model	GENERAL RENDER 5 - PLAN
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:15 PM
170266		KMR Volume 2 3 4.rfl

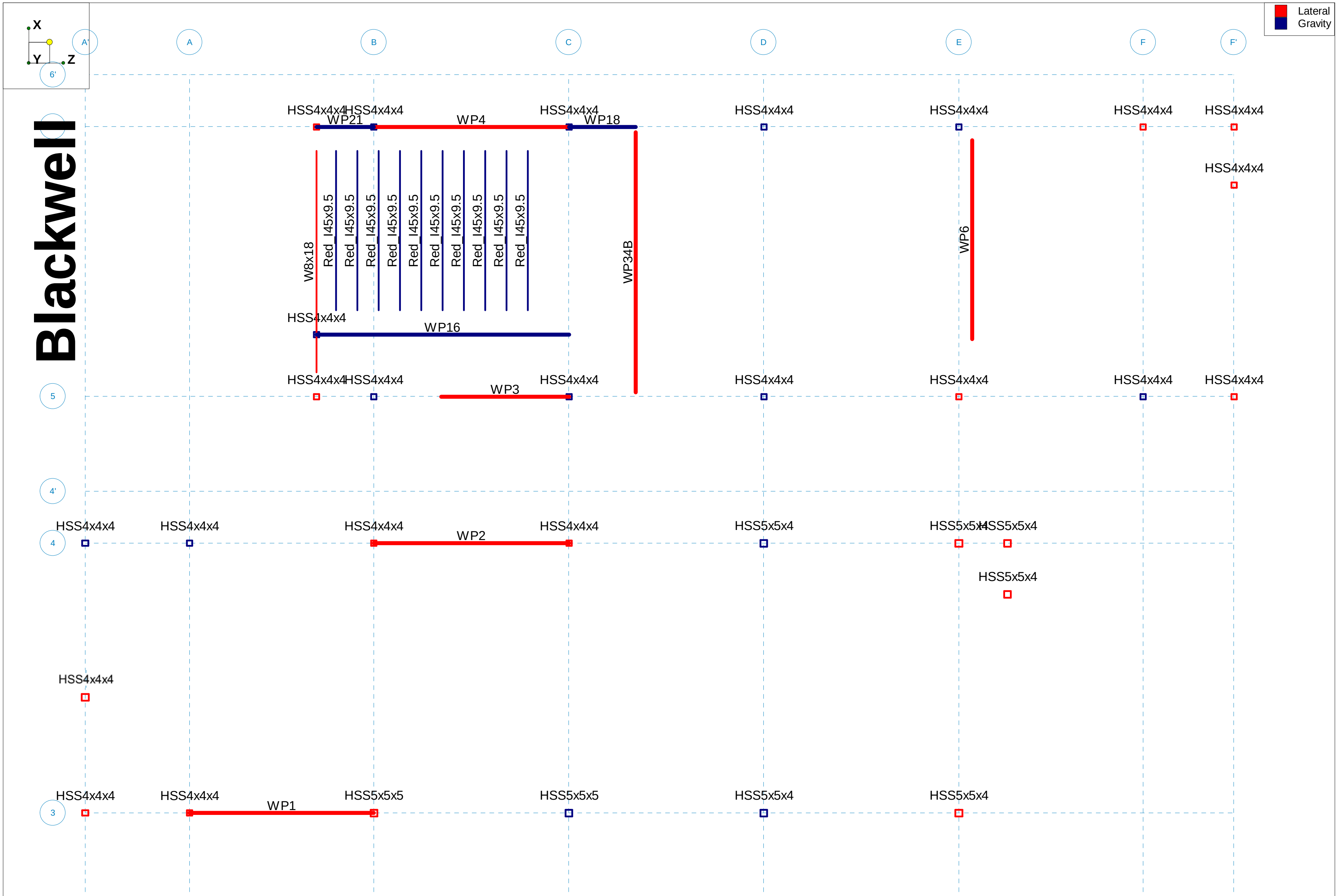
Blackwell
Structural Engineers

GRAVITY SYSTEM
Designed using RISAFloor

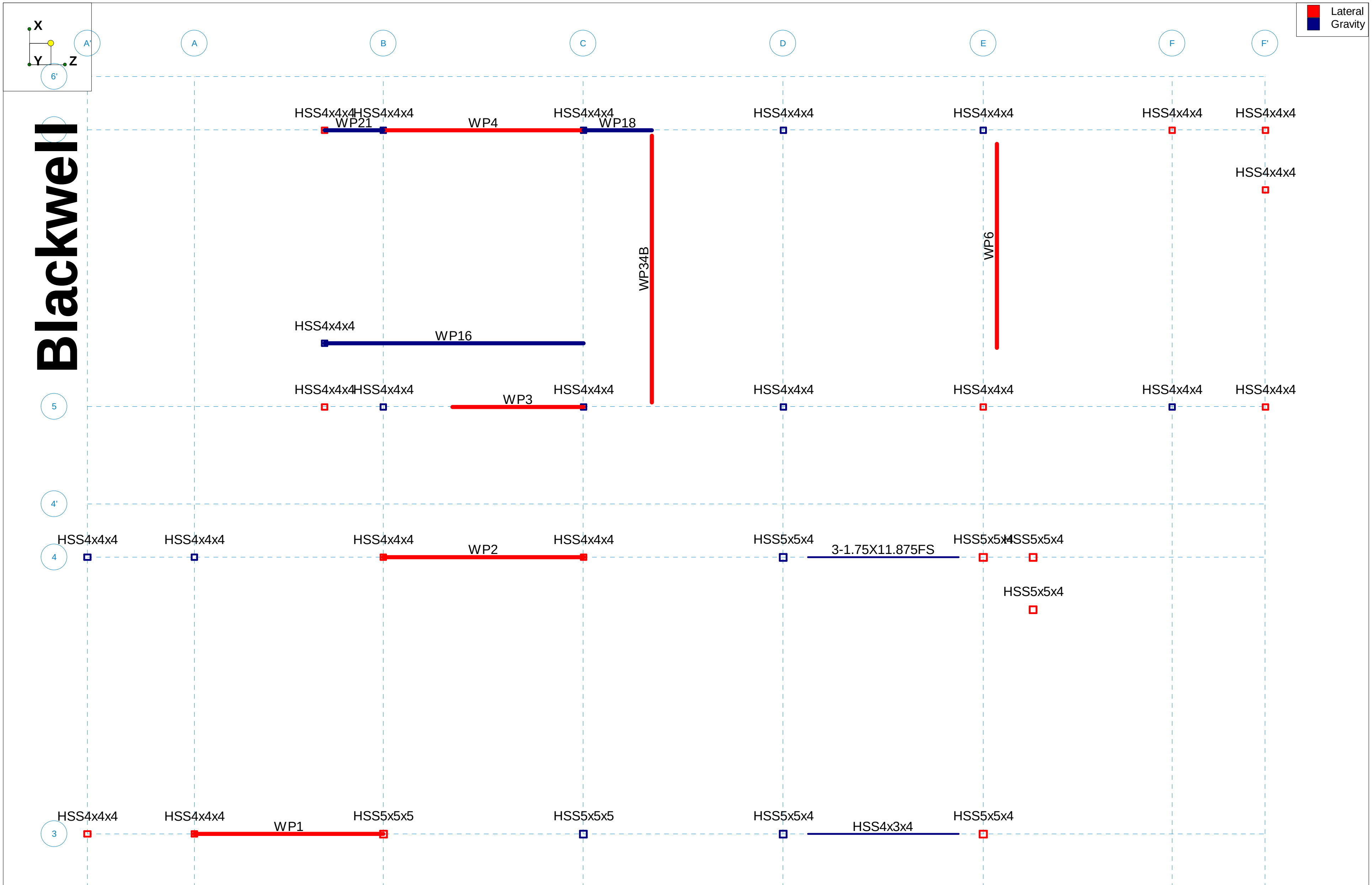
Gravity Geometry and Shapes Definition



Blackwell Structural Engineers	25' 1/4" Roof	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:41 PM
170266		KMR Volume 2 3 4.rfl

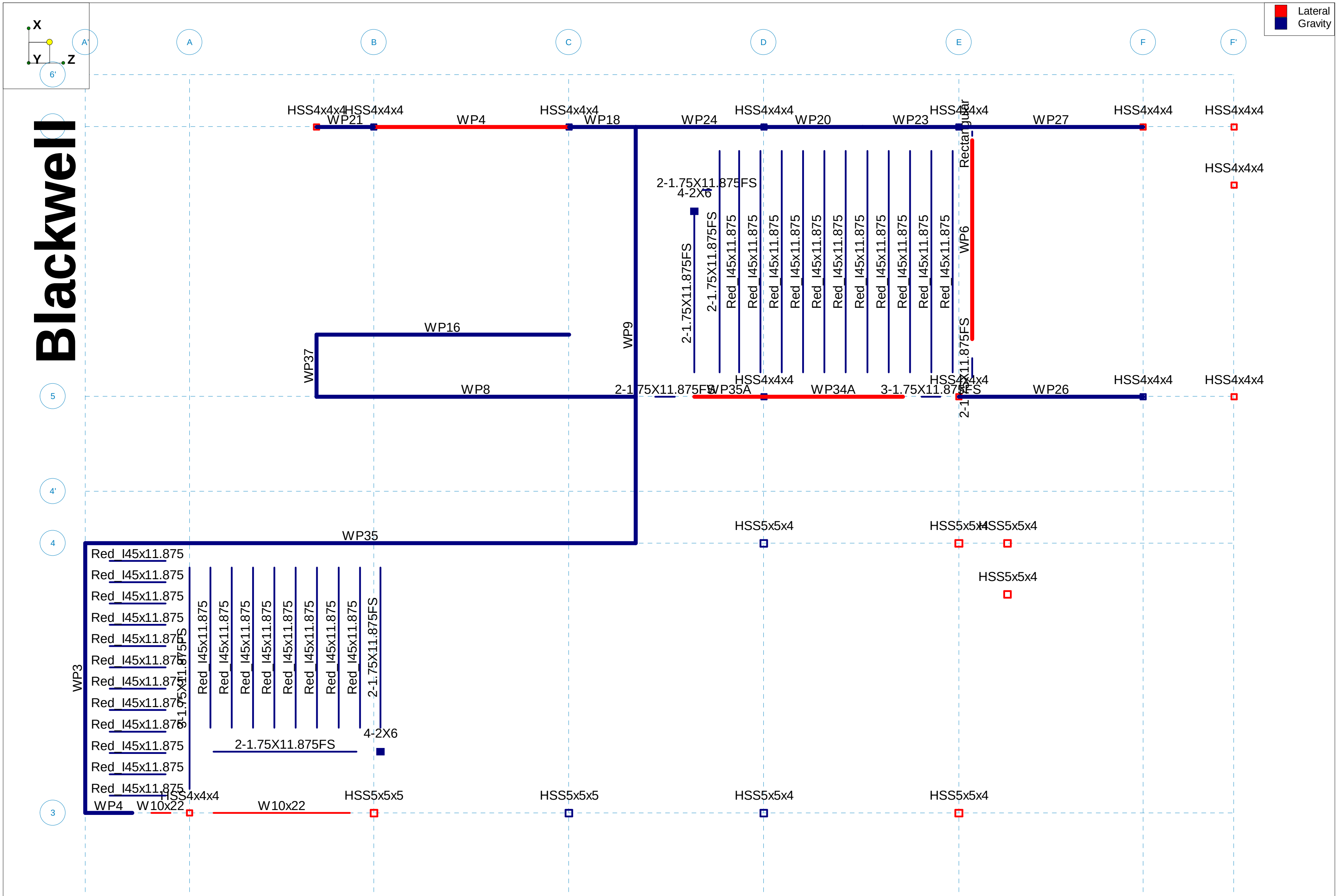


Blackwell Structural Engineers	23'-4" V3 Nanny	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:42 PM
170266		KMR Volume 2 3 4.rfl

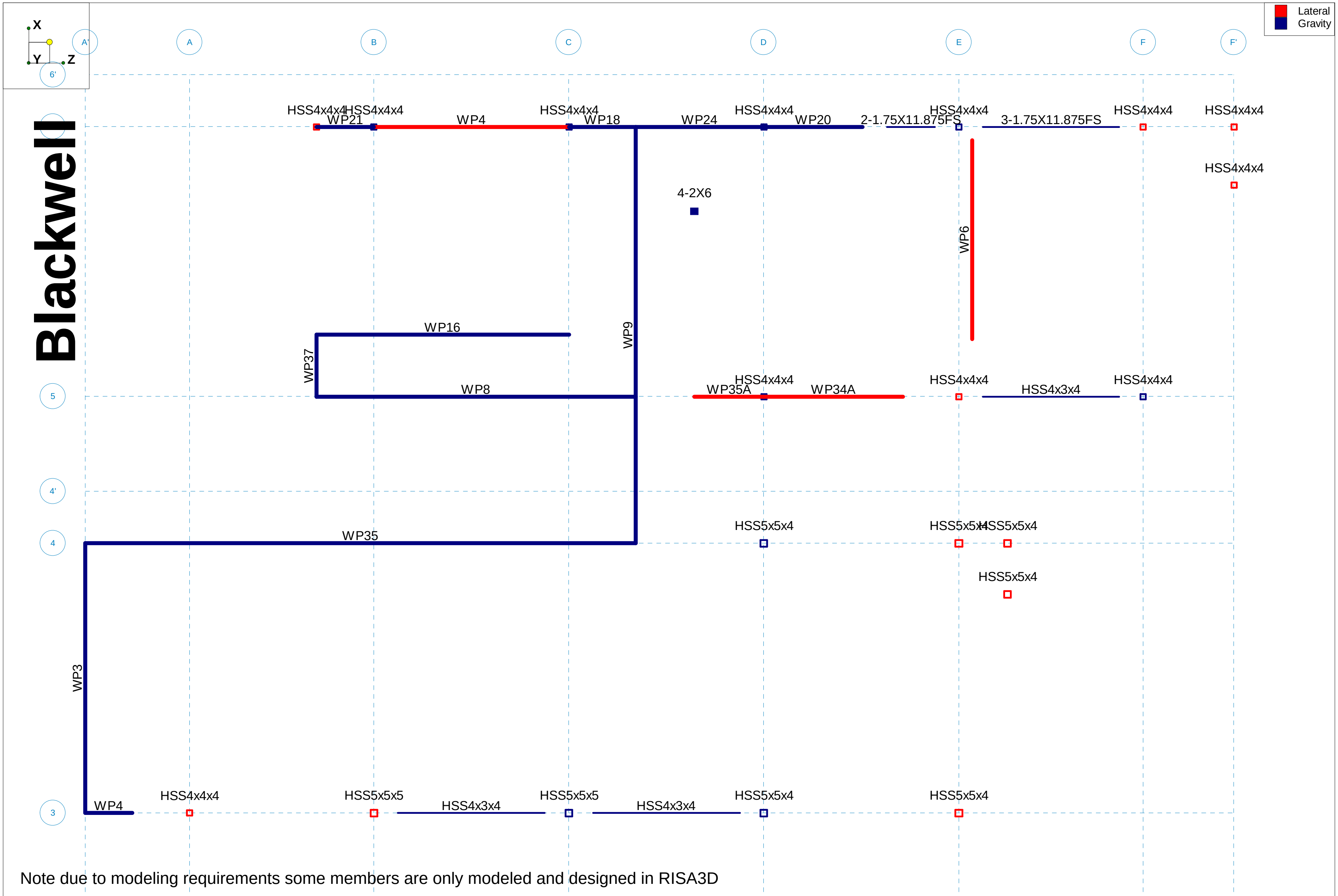


Note due to modeling requirements some members are only modeled and designed in RISA3D

Blackwell Structural Engineers	22' V2 Top of Window	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:42 PM
170266		KMR Volume 2 3 4.rfl

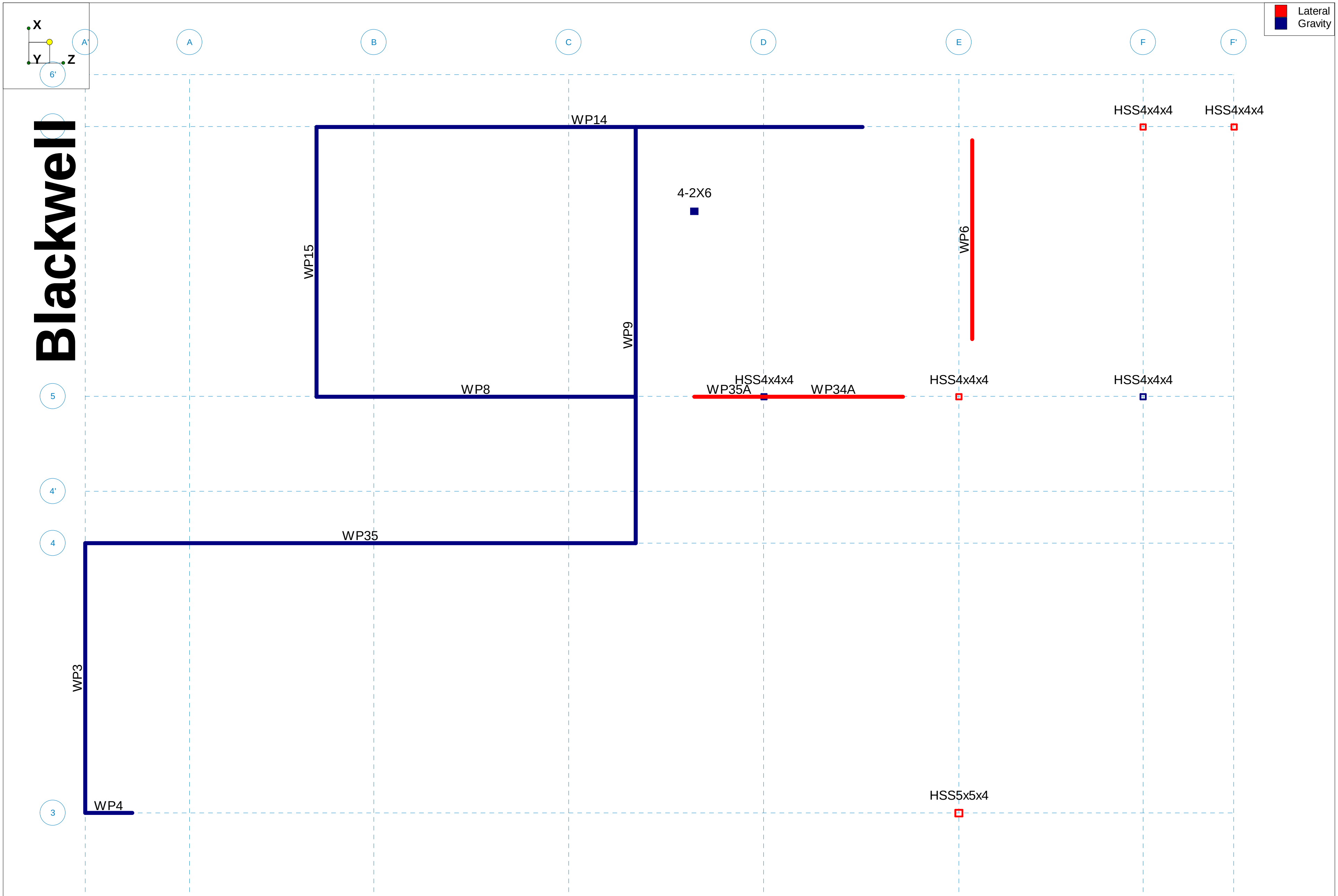


Blackwell Structural Engineers	19' V1 Mezz V3 Study	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:42 PM
170266		KMR Volume 2 3 4.rfl

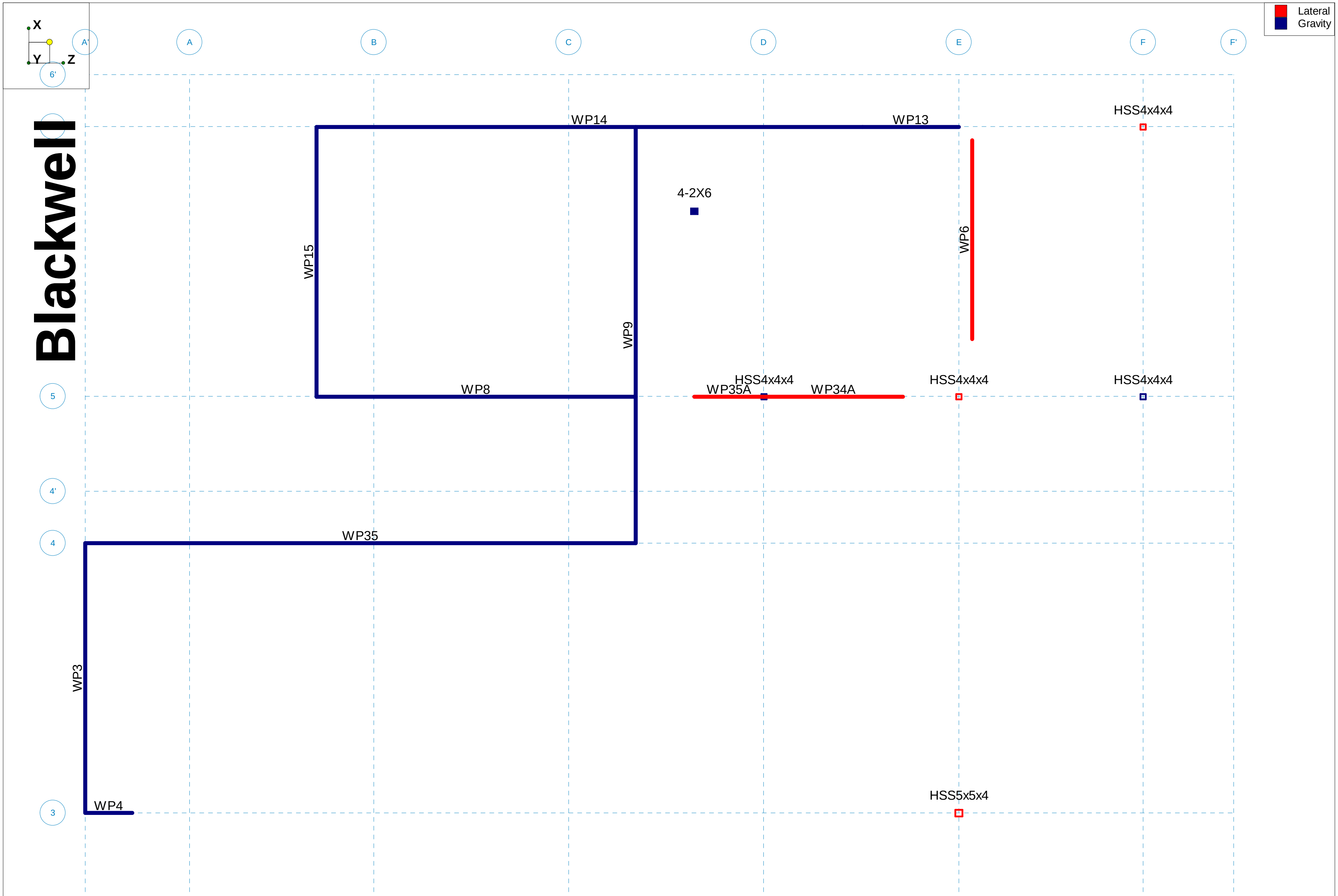


Note due to modeling requirements some members are only modeled and designed in RISA3D

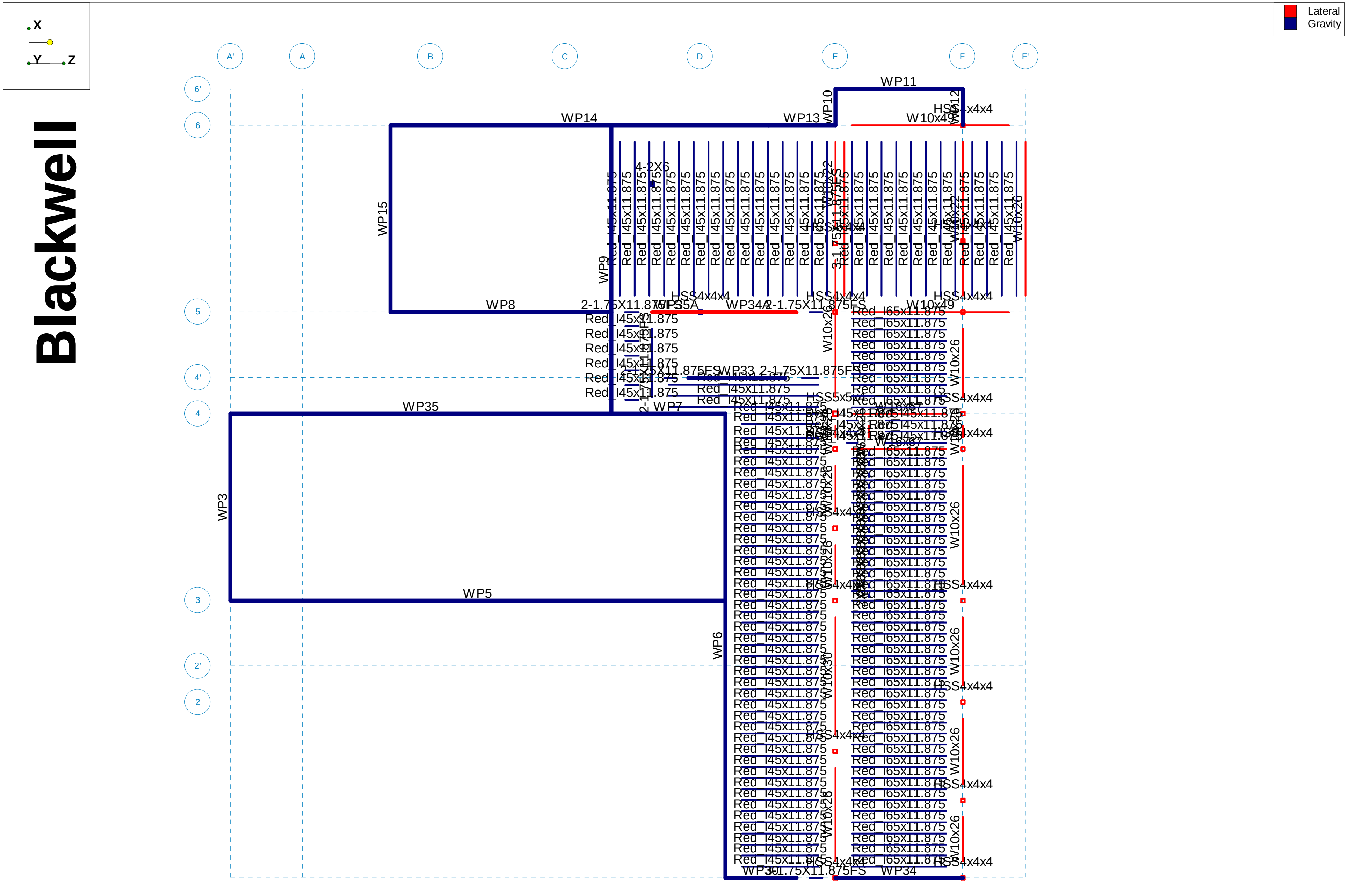
Blackwell Structural Engineers	17.5' V2 V3 Top of (low) windows	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:43 PM
170266		KMR Volume 2 3 4.rfl



Blackwell Structural Engineers	15'-8"	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:44 PM
170266		KMR Volume 2 3 4.rfl



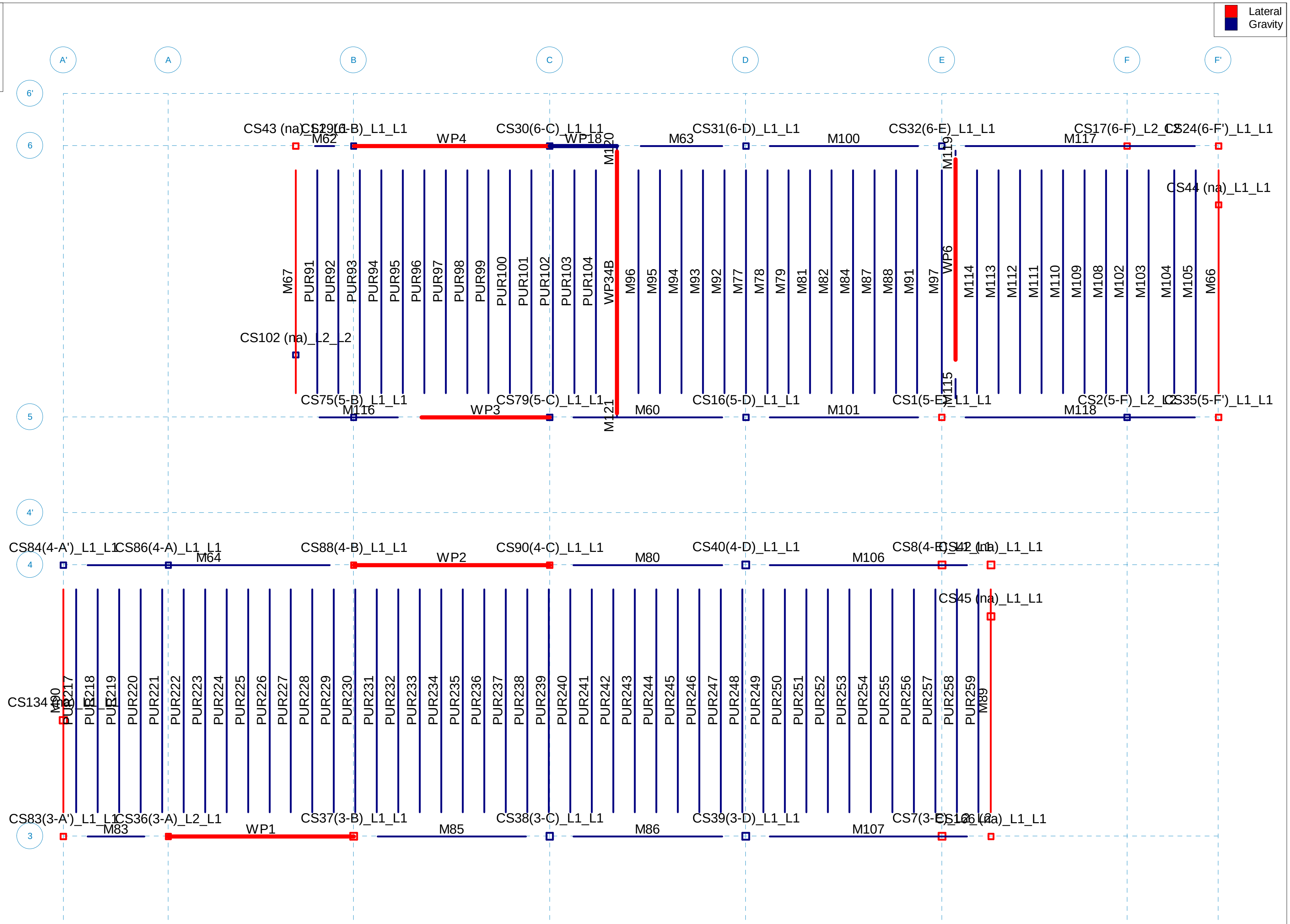
Blackwell Structural Engineers	12'-8"	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:43 PM
170266		KMR Volume 2 3 4.rfl



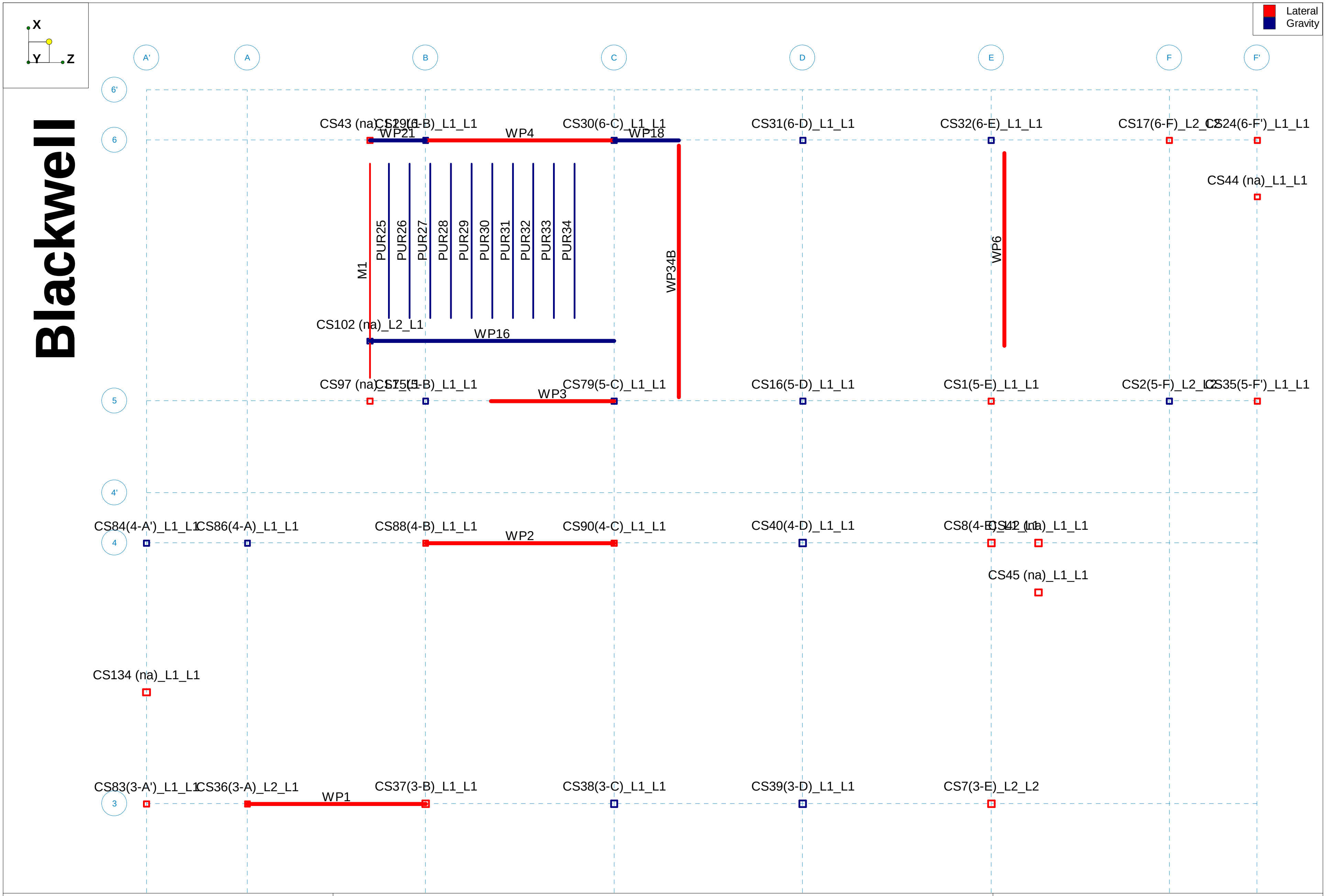
Blackwell Structural Engineers	10' Plaza Level	SHAPES
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:45 PM
170266		KMR Volume 2 3 4.rfl

Gravity Wall and Member Designation

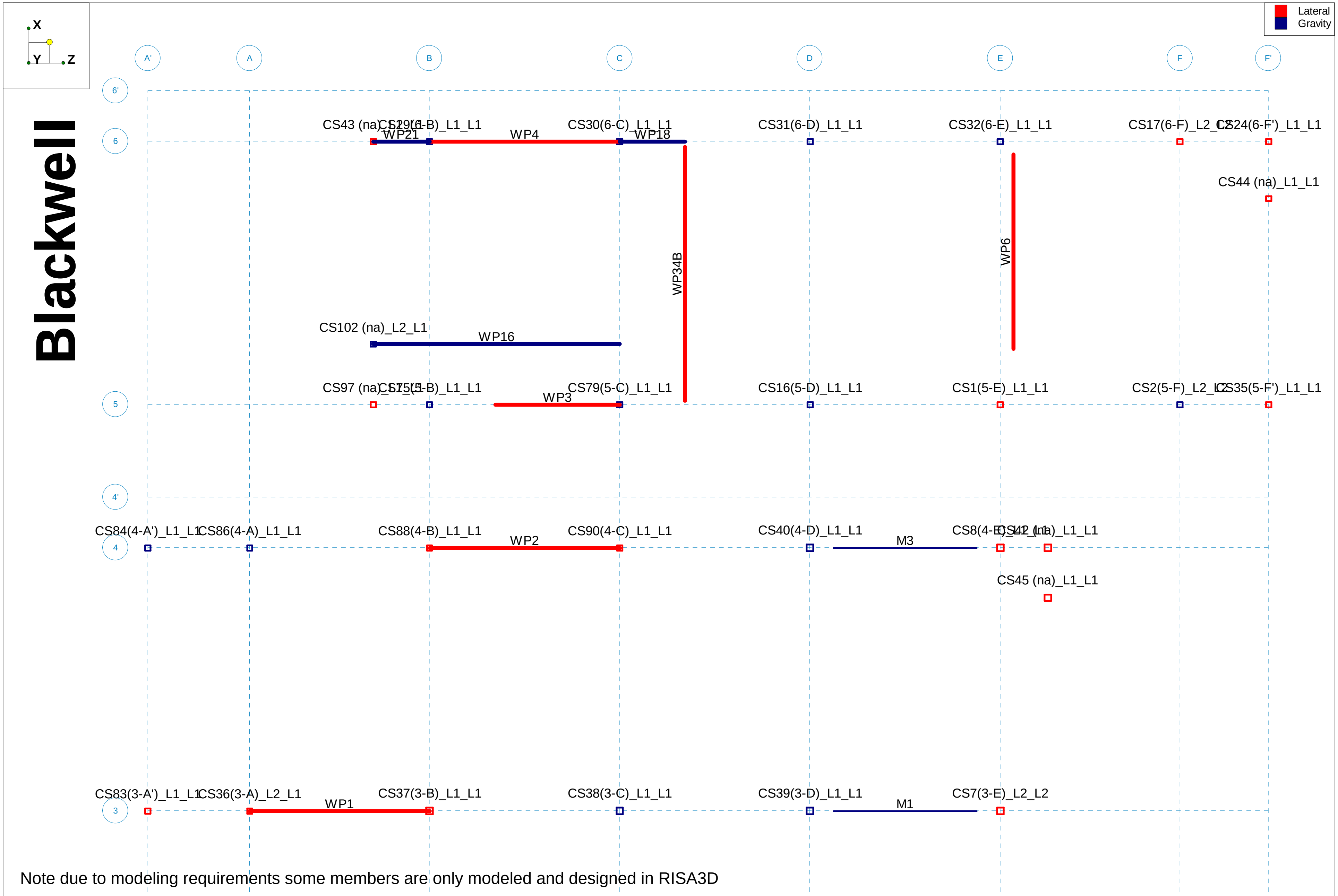
Blackwell



Blackwell Structural Engineers	25' 1/4" Roof	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:55 PM
170266		KMR Volume 2 3 4.rfl

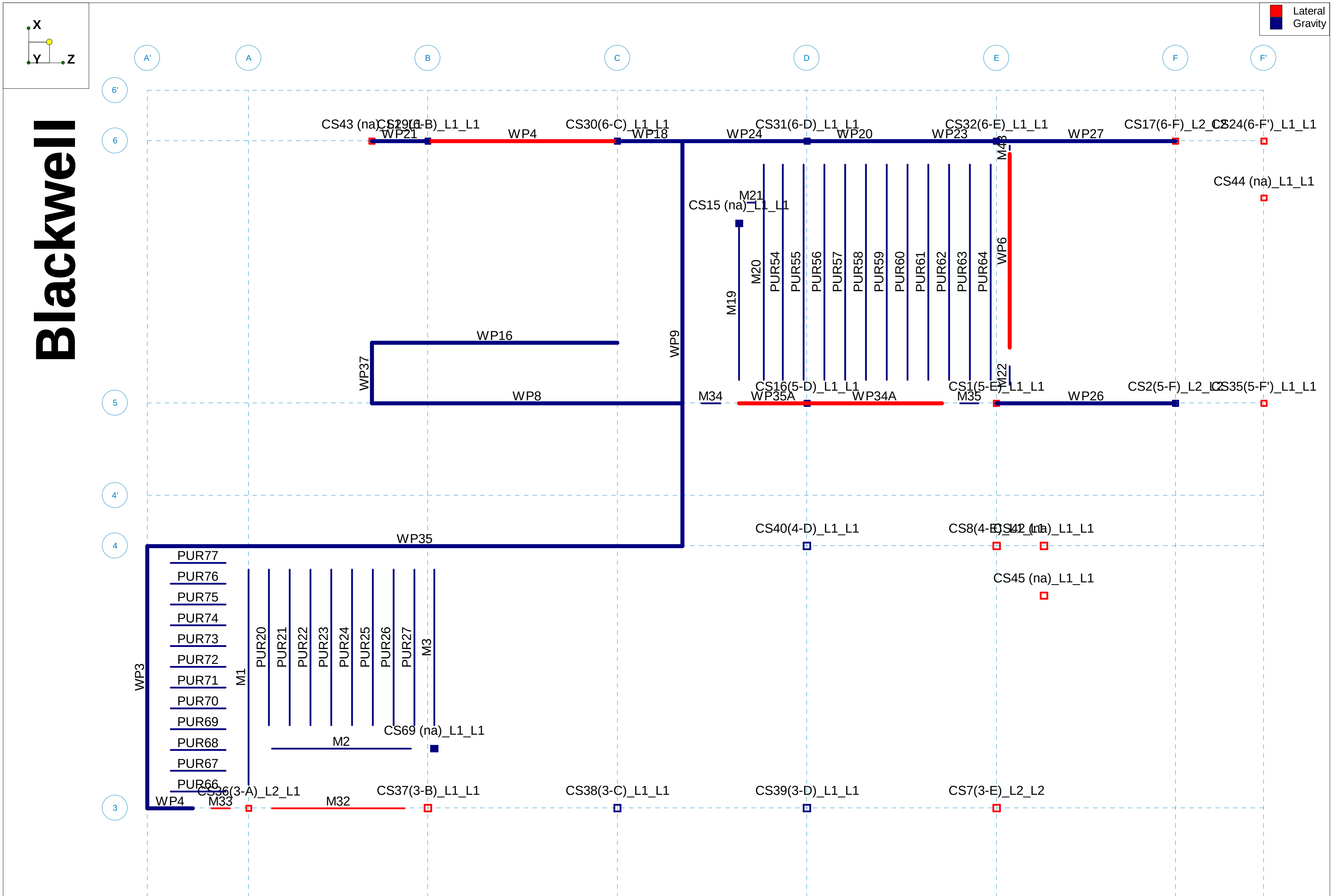


Blackwell Structural Engineers	23'-4" V3 Nanny	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:55 PM
170266		KMR Volume 2 3 4.rfl

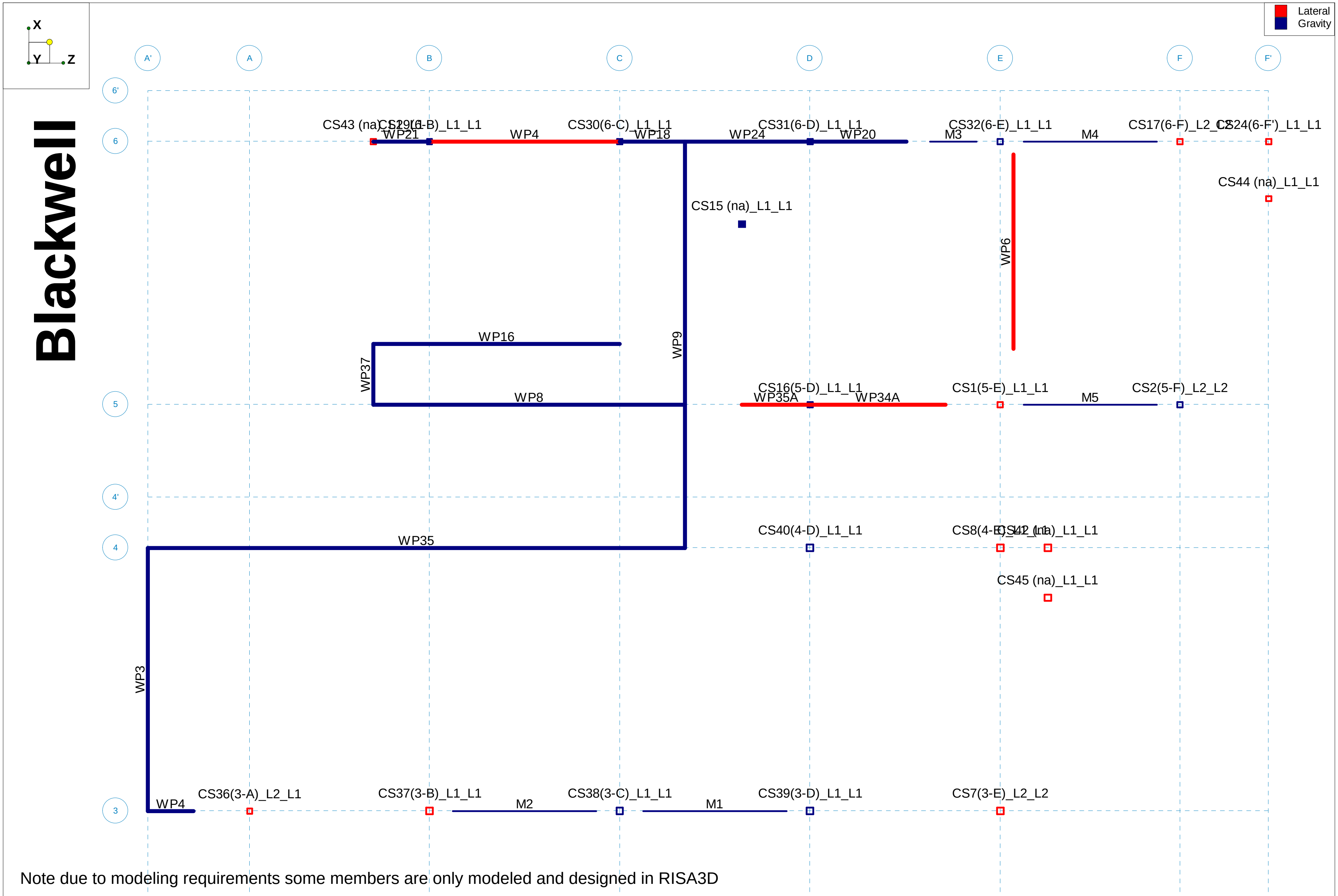


Note due to modeling requirements some members are only modeled and designed in RISA3D

Blackwell Structural Engineers	22' V2 Top of Window	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:56 PM
170266		KMR Volume 2 3 4.rfl



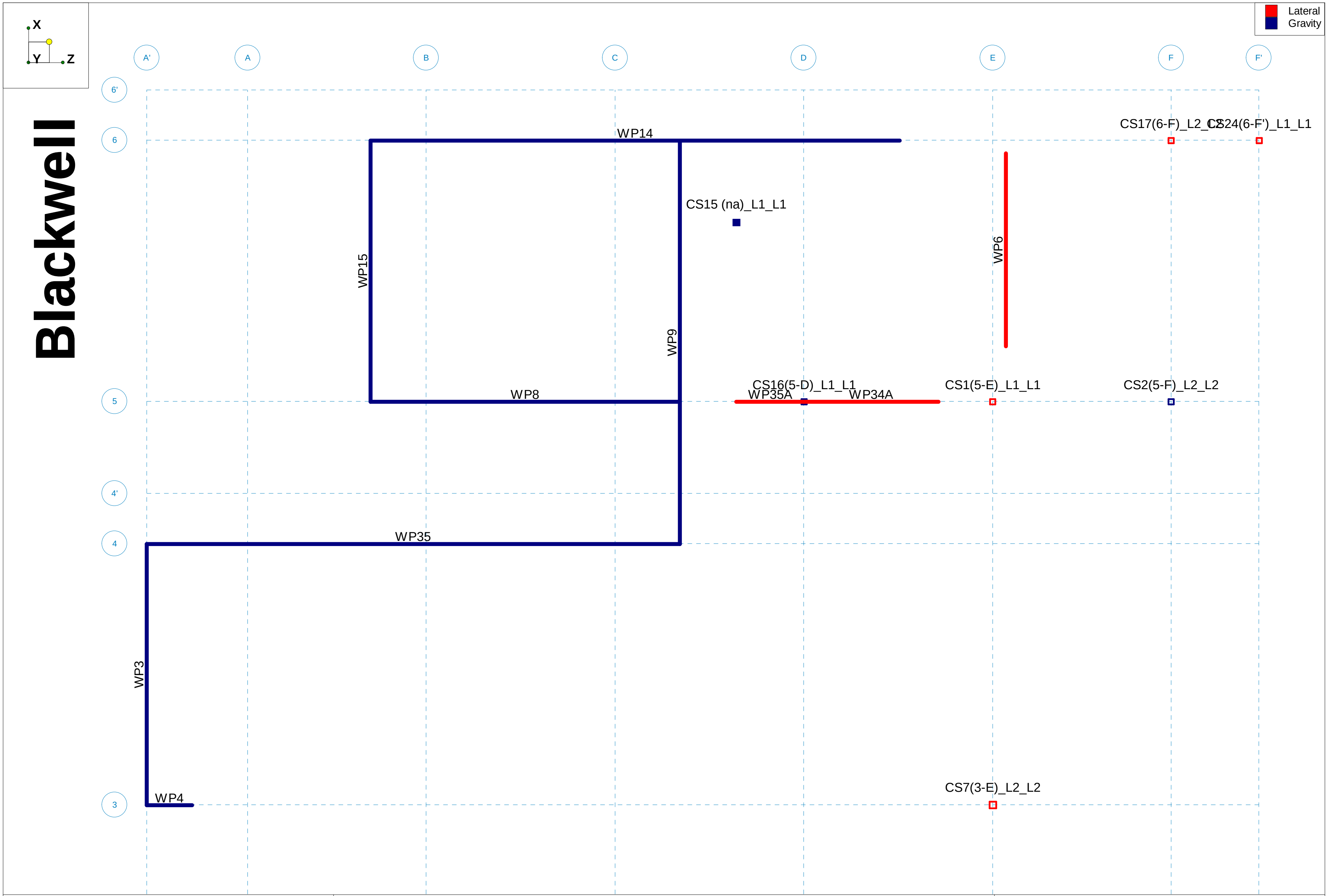
Blackwell Structural Engineers	19' V1 Mezz V3 Study	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:56 PM
170266		KMR Volume 2 3 4.rfl



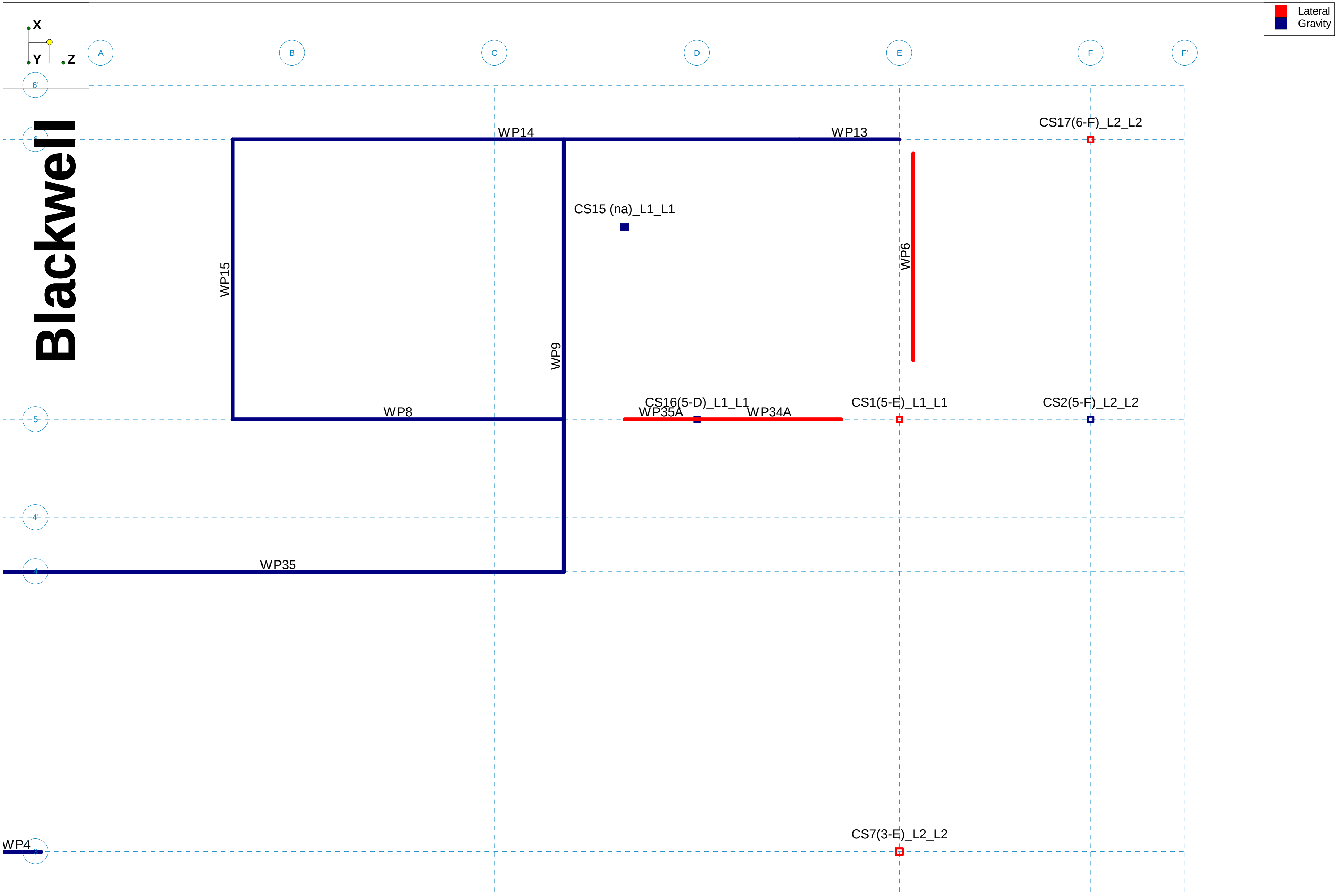
Blackwell

Note due to modeling requirements some members are only modeled and designed in RISA3D

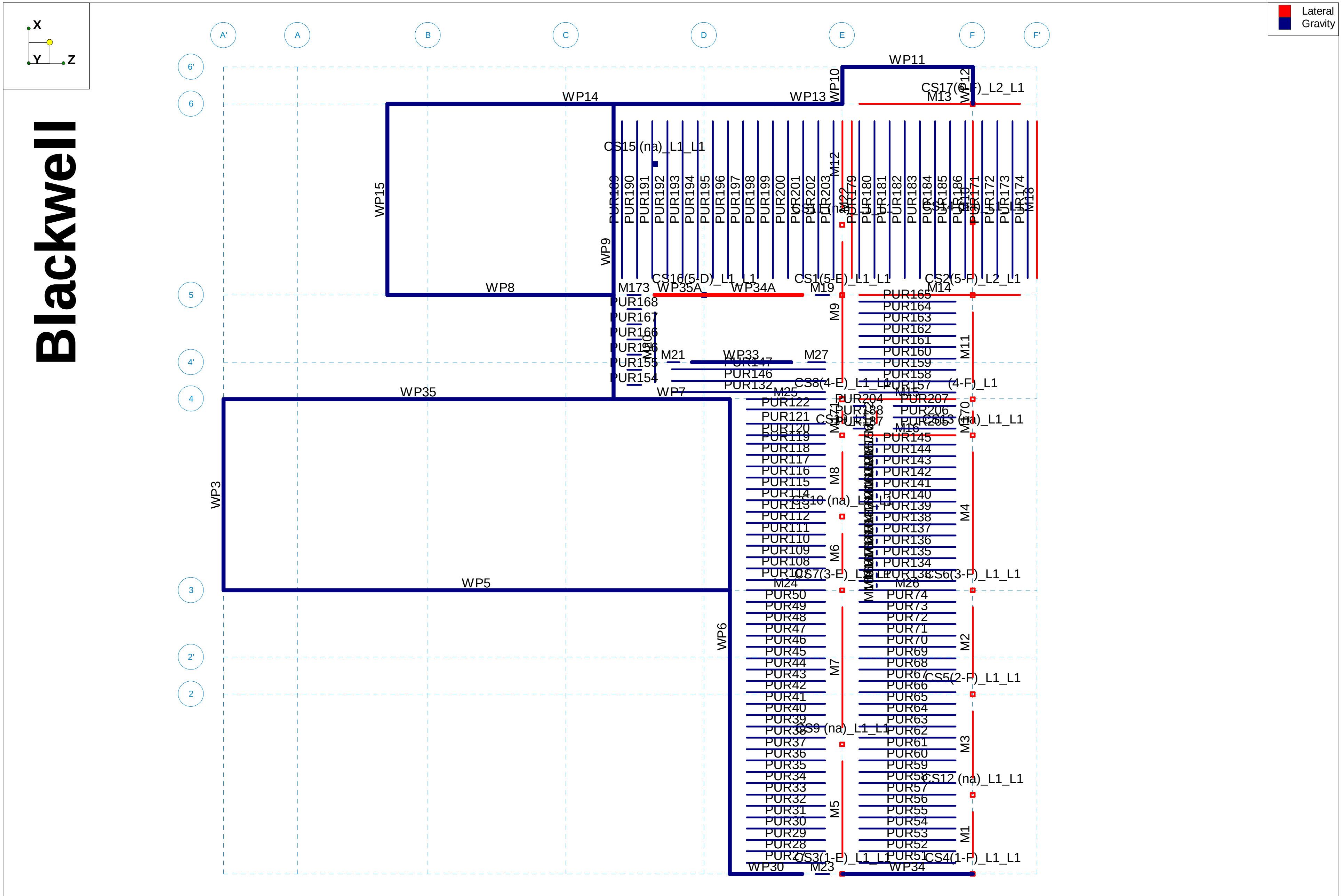
Blackwell Structural Engineers	17.5' V2 V3 Top of (low) windows	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:56 PM
170266		KMR Volume 2 3 4.rfl



Blackwell Structural Engineers	15'-8"	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:56 PM
170266		KMR Volume 2 3 4.rfl



Blackwell Structural Engineers	12'-8"	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:54 PM
170266		KMR Volume 2 3 4.rfl



Blackwell Structural Engineers	10' Plaza Level	MEMBER DESIGNATION
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 3:54 PM
170266		KMR Volume 2 3 4.rfl

Column Stacks

	Stack L...	Project...	Z [ft]	X [ft]	Lift ...	Lengt...	Bot El...	Top E...	Shape	Material	Funct...	Design ...	Flexural La...	Shear Lay...
1	CS1(5-E...	5-E	54.5	51	1	27.924	0	27.924	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
2	CS2(5-F...	5-F	66	51	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
3					2	16.007	10	26.007	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
4	CS3(1-E...	1-E	54.5	0	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
5	CS4(1-F...	1-F	66	0	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
6	CS5(2-F...	2-F	66	15.8...	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
7	CS6(3-F...	3-F	66	25	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
8	CS7(3-E...	3-E	54.5	25	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
9					2	18.07	10	28.07	HSS5x5x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
10	CS8(4-E...	4-E	54.5	41.8...	1	28.07	0	28.07	HSS5x5x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
11	CS9 (na...	-	54.5	11.4...	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
12	CS10 (n...	-	54.5	31.5	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
13	CS11 (n...	-	54.5	57.1...	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
14	CS12 (n...	-	66	6.979	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
15	CS13 (n...	-	66	38.6...	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
16	CS14 (n...	-	66	57.4...	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
17	CS15 (n...	-	37.9...	62.5...	1	19	0	19	4-2X6	Spruce-Pine-Fir	Gravity	Typical	N/A	N/A
18	CS16(5-...	5-D	42.3...	51	1	29.952	0	29.952	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
19	CS17(6-...	6-F	66	67.8...	1	10	0	10	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
20					2	16.007	10	26.007	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
21	(4-F)	4-F	66	41.8...	1	10	0	10	HSS4x4x4	A992	Lateral	Typical	N/A	N/A
22	CS19	-	54.5	38.6...	1	10	0	10	HSS4x4x4	A992	Lateral	Typical	N/A	N/A
23	CS24(6-...	6-F'	71.6...	67.8...	1	15.063	10	25.063	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
24	CS29(6-...	6-B	18	67.8...	1	18.34	15.667	34.008	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
25	CS30(6-...	6-C	30.1...	67.8...	1	16.313	15.667	31.98	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
26	CS31(6-...	6-D	42.3...	67.8...	1	14.285	15.667	29.952	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
27	CS32(6-...	6-E	54.5	67.8...	1	15.257	12.667	27.924	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
28	CS36(3-...	3-A	6.5	25	1	26.07	10	36.07	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
29	CS37(3-...	3-B	18	25	1	24.154	10	34.154	HSS5x5x5	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
30	CS38(3-...	3-C	30.1...	25	1	22.126	10	32.126	HSS5x5x5	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
31	CS39(3-...	3-D	42.3...	25	1	20.098	10	30.098	HSS5x5x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
32	CS40(4-...	4-D	42.3...	41.8...	1	20.098	10	30.098	HSS5x5x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
33	CS42 (n...	-	57.5...	41.8...	1	17.563	10	27.563	HSS5x5x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
34	CS43 (n...	-	14.4...	67.8...	1	18.938	15.667	34.605	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
35	CS44 (n...	-	71.6...	64.1...	1	15.063	10	25.063	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
36	CS45 (n...	-	57.5...	38.6...	1	17.563	10	27.563	HSS5x5x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
37	CS35(5-...	5-F'	71.6...	51	1	7.563	17.5	25.063	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
38	CS69 (n...	-	18.4...	28.8...	1	9	10	19	4-2X6	Spruce-Pine-Fir	Gravity	Typical	N/A	N/A
39	CS75(5-...	5-B	18	51	1	15.007	19	34.008	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
40	CS79(5-...	5-C	30.1...	51	1	12.98	19	31.98	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
41	CS83(3-...	3-A'	0	25	1	18.154	19	37.154	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
42	CS84(4-...	4-A'	0	41.8...	1	18.154	19	37.154	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
43	CS86(4-...	4-A	6.5	41.8...	1	17.07	19	36.07	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
44	CS88(4-...	4-B	18	41.8...	1	15.154	19	34.154	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
45	CS90(4-...	4-C	30.1...	41.8...	1	13.126	19	32.126	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
46	CS97 (n...	-	14.4...	51	1	4.333	19	23.333	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
47	CS102 (...	-	14.4...	54.8...	1	4.333	19	23.333	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
48					2	11.272	23.333	34.605	HSS4x4x4	A500 Gr.B Rect	Gravity	Typical	N/A	N/A
49	CS134 (...	-	0	32.2...	1	18.154	19	37.154	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A
50	CS166 (...	-	57.5...	25	1	5.563	22	27.563	HSS4x4x4	A500 Gr.B Rect	Lateral	Typical	N/A	N/A

Beam Primary Data : 25' 1/4" Roof

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M80	N154	N156	3-1.75X14FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
2	M83	N147	N149	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
3	M85	N151	N153	3-1.75X14FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	M86	N153	N155	3-1.75X14FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	M89	N159	N160	W12x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
6	M90	N147	N148	W12x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
7	PUR217	N413	N414	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
8	PUR218	N415	N416	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
9	PUR219	N417	N418	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
10	PUR220	N419	N420	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
11	PUR221	N421	N422	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
12	PUR222	N423	N424	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
13	PUR223	N425	N426	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
14	PUR224	N427	N428	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
15	PUR225	N429	N430	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
16	PUR226	N431	N432	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
17	PUR227	N433	N434	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
18	PUR228	N435	N436	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
19	PUR229	N437	N438	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
20	PUR230	N439	N440	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
21	PUR231	N441	N442	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
22	PUR232	N443	N444	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
23	PUR233	N445	N446	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
24	PUR234	N447	N448	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
25	PUR235	N449	N450	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
26	PUR236	N451	N452	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
27	PUR237	N453	N454	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
28	PUR238	N455	N456	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
29	PUR239	N457	N458	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
30	PUR240	N459	N460	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
31	PUR241	N461	N462	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
32	PUR242	N463	N464	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
33	PUR243	N465	N466	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
34	PUR244	N467	N468	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
35	PUR245	N469	N470	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
36	PUR246	N471	N472	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
37	PUR247	N473	N474	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
38	PUR248	N475	N476	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
39	PUR249	N477	N478	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
40	PUR250	N479	N480	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
41	PUR251	N481	N482	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
42	PUR252	N483	N484	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
43	PUR253	N485	N486	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
44	PUR254	N487	N488	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
45	PUR255	N489	N490	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
46	PUR256	N491	N492	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
47	PUR257	N493	N494	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
48	PUR258	N495	N496	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
49	PUR259	N497	N498	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
50	M66	N90	N95	W12x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
51	M67	N247	N248	W12x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
52	M106	N156	N160	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 25' 1/4" Roof (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
53	M100	N87	N88	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
54	M101	N92	N93	3-1.75X14FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
55	M60	N92	N91	3-1.75X14FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
56	M62	N84	N247	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
57	M63	N203	N87	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
58	M64	N152	N148	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
59	PUR91	N193	N194	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
60	PUR92	N195	N196	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
61	PUR93	N197	N198	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
62	PUR94	N205	N206	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
63	PUR95	N207	N208	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
64	PUR96	N209	N210	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
65	PUR97	N211	N212	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
66	PUR98	N213	N214	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
67	PUR99	N215	N216	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
68	PUR100	N217	N218	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
69	PUR101	N219	N220	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
70	PUR102	N221	N222	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
71	PUR103	N223	N224	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
72	PUR104	N225	N226	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
73	M77	N87	N92	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
74	M78	N161	N162	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
75	M79	N163	N164	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
76	M81	N165	N166	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
77	M82	N167	N168	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
78	M84	N169	N170	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
79	M87	N171	N172	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
80	M88	N173	N174	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
81	M91	N175	N176	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
82	M92	N177	N178	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
83	M93	N179	N180	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
84	M94	N181	N182	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
85	M95	N183	N184	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
86	M96	N185	N186	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
87	M97	N88	N93	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
88	M102	N89	N94	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
89	M103	N187	N188	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
90	M104	N189	N190	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
91	M105	N191	N192	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
92	M108	N227	N228	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
93	M109	N229	N230	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
94	M110	N231	N232	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
95	M111	N233	N234	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
96	M112	N235	N236	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
97	M113	N237	N238	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
98	M114	N239	N240	Red_I90x14	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
99	M115	N122	N241	2-1.75X14FS	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
100	M116	N243	N248	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Fixed	
101	M107	N155	N159	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Fixed	
102	M117	N88	N90	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
103	M118	N93	N95	W12x26	A992	Typical	Gravity	Strong Axis	Pinned	Pinned	
104	M119	N121	N202	Rectangular	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 25' 1/4" Roof (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
105	M120	N244	N203	Rectangular	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
106	M121	N245	N204	Rectangular	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 23'-4" V3 Nanny

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M1	N248	N247	W8x18	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
2	PUR25	N77	N78	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
3	PUR26	N79	N80	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	PUR27	N81	N82	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	PUR28	N83	N96	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
6	PUR29	N97	N98	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
7	PUR30	N99	N100	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
8	PUR31	N101	N102	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
9	PUR32	N103	N104	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
10	PUR33	N105	N106	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
11	PUR34	N107	N108	Red_I45x9.5	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 22' V2 Top of Window

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M1	N155	N157	HSS4x3x4	A500 Gr.B Rect	Typical	Gravity	Weak Axis	Pinned	Pinned	
2	M3	N156	N158	3-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 19' V1 Mezz V3 Study

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M1	N149	GRDR...	3-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
2	M2	N32	N34	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
3	M3	N32	N35	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	PUR20	N68	N69	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	PUR21	N70	N71	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
6	PUR22	N72	N73	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
7	PUR23	N74	N75	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
8	PUR24	N76	N77	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
9	PUR25	N78	N79	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
10	PUR26	N80	N81	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
11	PUR27	N82	N83	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
12	M19	N107	N106	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Fixed	Pinned	
13	M20	N110	N109	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Fixed	Pinned	
14	M21	N107	N108	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
15	M22	N67	N111	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
16	PUR54	N165	N166	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
17	PUR55	N167	N168	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
18	PUR56	N169	N170	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
19	PUR57	N171	N172	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
20	PUR58	N173	N174	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
21	PUR59	N175	N176	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
22	PUR60	N177	N178	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
23	PUR61	N179	N180	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
24	PUR62	N181	N182	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
25	PUR63	N183	N184	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
26	PUR64	N185	N186	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 19' V1 Mezz V3 Study (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
27	M32	N149	N151	W10x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
28	M33	N59	N149	W10x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
29	M34	N106	N64	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
30	M35	N93	N116	3-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
31	PUR66	N196	N198	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
32	PUR67	N201	N202	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
33	PUR68	N203	N204	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
34	PUR69	N205	N206	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
35	PUR70	N207	N208	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
36	PUR71	N209	N210	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
37	PUR72	N211	N212	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
38	PUR73	N213	N214	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
39	PUR74	N215	N216	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
40	PUR75	N217	N218	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
41	PUR76	N219	N220	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
42	PUR77	N221	N222	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
43	M43	N66	N121	Rectangular	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 17.5' V2 V3 Top of (low) windows

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M1	N153	N155	HSS4x3x4	A500 Gr.B Rect	Typical	Gravity	Weak Axis	Pinned	Pinned	
2	M2	N151	N153	HSS4x3x4	A500 Gr.B Rect	Typical	Gravity	Weak Axis	Pinned	Pinned	
3	M3	N32	N88	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
4	M4	N88	N89	3-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
5	M5	N93	N94	HSS4x3x4	A500 Gr.B Rect	Typical	Gravity	Weak Axis	Pinned	Pinned	

Beam Primary Data : 15'-8"

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
No Data to Print ...											

Beam Primary Data : 12'-8"

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
No Data to Print ...											

Beam Primary Data : 10' Plaza Level

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
1	M1	N25	N33	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
2	M2	N26	N27	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
3	M3	N26	N33	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
4	M4	N27	N34	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
5	M5	N24	N30	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
6	M6	N28	N31	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
7	M7	N28	N30	W10x30	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
8	M8	N38	N31	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
9	M9	N29	N32	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
10	M10	N89	N94	W10x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
11	M11	N94	N37	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
12	M12	N88	N32	W10x22	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
13	M13	N88	N90	W10x49	A992	Typical	Lateral	Strong Axis	Pinned	Fixed	
14	M14	N93	N95	W10x49	A992	Typical	Lateral	Strong Axis	Pinned	Fixed	

Beam Primary Data : 10' Plaza Level (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
15	M15	N29	N37	W16x67	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
16	M16	N34	N38	W16x67	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
17	M18	N90	N95	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
18	M19	N54	N93	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
19	M20	N58	N59	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
20	M21	N56	N60	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
21	M22	N57	N62	3-1.75X11.875FS	2.0E Microllam L...	Typical	Lateral	Strong Axis	Pinned	Pinned	
22	M23	N53	N24	3-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
23	M24	N22	N28	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
24	M25	N36	N29	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
25	M26	N28	N27	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
26	M27	N55	N63	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	
27	PUR27	N65	N66	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
28	PUR28	N67	N68	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
29	PUR29	N69	N70	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
30	PUR30	N71	N72	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
31	PUR31	N73	N74	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
32	PUR32	N75	N76	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
33	PUR33	N77	N78	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
34	PUR34	N79	N80	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
35	PUR35	N81	N82	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
36	PUR36	N83	N84	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
37	PUR37	N85	N86	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
38	PUR38	N87	N91	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
39	PUR39	N96	N97	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
40	PUR40	N98	N99	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
41	PUR41	N100	N101	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
42	PUR42	N102	N103	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
43	PUR43	N104	N105	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
44	PUR44	N106	N107	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
45	PUR45	N108	N109	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
46	PUR46	N110	N111	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
47	PUR47	N112	N113	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
48	PUR48	N114	N115	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
49	PUR49	N116	N117	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
50	PUR50	N118	N119	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
51	PUR51	N66	N120	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
52	PUR52	N68	N121	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
53	PUR53	N70	N122	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
54	PUR54	N72	N123	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
55	PUR55	N74	N124	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
56	PUR56	N76	N125	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
57	PUR57	N78	N126	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
58	PUR58	N80	N127	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
59	PUR59	N82	N128	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
60	PUR60	N84	N129	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
61	PUR61	N86	N130	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
62	PUR62	N91	N131	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
63	PUR63	N97	N132	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
64	PUR64	N99	N133	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
65	PUR65	N101	N134	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
66	PUR66	N103	N135	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 10' Plaza Level (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
67	PUR67	N105	N136	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
68	PUR68	N107	N137	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
69	PUR69	N109	N138	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
70	PUR70	N111	N139	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
71	PUR71	N113	N140	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
72	PUR72	N115	N141	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
73	PUR73	N117	N142	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
74	PUR74	N119	N143	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
75	PUR107	N208	N209	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
76	PUR108	N210	N211	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
77	PUR109	N212	N213	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
78	PUR110	N214	N215	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
79	PUR111	N216	N217	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
80	PUR112	N218	N219	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
81	PUR113	N220	N221	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
82	PUR114	N222	N223	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
83	PUR115	N224	N225	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
84	PUR116	N226	N227	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
85	PUR117	N228	N229	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
86	PUR118	N230	N231	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
87	PUR119	N232	N233	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
88	PUR120	N234	N38	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
89	PUR121	N236	N237	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
90	PUR122	N238	N239	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
91	PUR133	N248	N249	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
92	PUR134	N250	N251	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
93	PUR135	N252	N253	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
94	PUR136	N254	N255	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
95	PUR137	N256	N257	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
96	PUR138	N258	N259	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
97	PUR139	N260	N261	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
98	PUR140	N262	N263	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
99	PUR141	N264	N265	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
100	PUR142	N266	N267	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
101	PUR143	N268	N269	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
102	PUR144	N270	N271	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
103	PUR145	N272	N273	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
104	PUR157	N296	N297	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
105	PUR158	N298	N299	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
106	PUR159	N300	N301	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
107	PUR160	N302	N303	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
108	PUR161	N304	N305	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
109	PUR162	N306	N307	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
110	PUR163	N308	N309	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
111	PUR164	N310	N311	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
112	PUR165	N312	N313	Red_I65x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
113	PUR132	N278	N279	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
114	PUR146	N280	N281	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
115	PUR147	N282	N283	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
116	PUR154	N314	N315	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
117	PUR155	N316	N317	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
118	PUR156	N318	N319	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 10' Plaza Level (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
119	PUR166	N320	N321	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
120	PUR167	N322	N323	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
121	PUR168	N324	N325	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
122	PUR189	N362	N363	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
123	PUR190	N364	N365	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
124	PUR191	N366	N367	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
125	PUR192	N368	N369	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
126	PUR193	N370	N371	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
127	PUR194	N372	N373	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
128	PUR195	N374	N375	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
129	PUR196	N376	N377	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
130	PUR197	N378	N379	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
131	PUR198	N380	N381	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
132	PUR199	N382	N383	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
133	PUR200	N384	N385	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
134	PUR201	N386	N387	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
135	PUR202	N388	N389	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
136	PUR203	N390	N391	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
137	PUR179	N342	N343	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
138	PUR180	N344	N345	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
139	PUR181	N346	N347	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
140	PUR182	N348	N349	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
141	PUR183	N350	N351	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
142	PUR184	N352	N353	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
143	PUR185	N354	N355	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
144	PUR186	N356	N357	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
145	PUR171	N330	N331	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
146	PUR172	N332	N333	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
147	PUR173	N334	N335	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
148	PUR174	N336	N337	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
149	M156	GRDR...	N326	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
150	M157	N326	N295	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
151	M158	N295	N294	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
152	M159	N294	N293	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
153	M160	N293	N292	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
154	M161	N292	N291	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
155	M162	N291	N290	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
156	M163	N290	N289	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
157	M164	N289	N288	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
158	M165	N288	N287	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
159	M166	N287	N286	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
160	M167	N286	N285	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
161	M168	N285	N284	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
162	M169	N284	GRDR...	2X6	Spruce-Pine-Fir	Typical	Gravity	Strong Axis	Pinned	Pinned	
163	M170	N37	N34	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
164	M171	N38	N29	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
165	M172	GRDR...	GRDR...	W10x26	A992	Typical	Lateral	Strong Axis	Pinned	Pinned	
166	PUR187	N202	N394	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
167	PUR188	N204	N396	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
168	PUR204	N206	N398	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
169	PUR205	N394	N203	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
170	PUR206	N396	N205	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 10' Plaza Level (Continued)

	Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
171	PUR207	N398	N207	Red_I45x11.875	Wood Products ...	Typical	Gravity	Strong Axis	Pinned	Pinned	
172	M173	N327	N43	2-1.75X11.875FS	2.0E Microllam L...	Typical	Gravity	Strong Axis	Pinned	Pinned	

Beam Primary Data : 0' Basement Floor

Label	Start P...	End Po...	Shape	Material	Design ...	Function	Orientation	Start R...	End R...	Outrig...
No Data to Print ...										

Wall Panel Parameters

	Label	Top Floor	Bottom Floor	Start ...	End ...	Material T...	Material Set	Thickne...	Function	Design R...	Distance Below ...	Parapet...
1	WP2	25' 1/4" Roof	19' V1 Mezz...	N152	N154	Wood	Spruce-Pi...	5.5 (stu...	Lateral	4"	3	Default ...
2	WP1	25' 1/4" Roof	19' V1 Mezz...	N149	N151	Wood	Spruce-Pi...	5.5 (stu...	Lateral	4"	3	Default ...
3	WP3	19' V1 Mezz...	0' Basement...	N197	N147	Concrete	Conc3500...	8	Gravity	Typical	10	NA
4	WP4	19' V1 Mezz...	10' Plaza Le...	N147	N59	Concrete	Conc3500...	8	Gravity	Typical	2.667	NA
5	WP5	10' Plaza Le...	0' Basement...	N16	N22	Concrete	Conc3500...	8	Gravity	Typical	10	NA
6	WP6	10' Plaza Le...	0' Basement...	N23	N36	Concrete	Conc3500...	8	Gravity	Typical	10	Default ...
7	WP7	10' Plaza Le...	0' Basement...	N40	N36	Concrete	Conc3500...	8	Gravity	Typical	10	NA
8	WP8	19' V1 Mezz...	0' Basement...	N248	N64	Concrete	Conc3500...	8	Gravity	Typical	10	NA
9	WP9	19' V1 Mezz...	0' Basement...	N65	N464	Concrete	Conc3500...	8	Gravity	Typical	10	NA
10	WP10	10' Plaza Le...	0' Basement...	N88	N45	Concrete	Conc3500...	8	Gravity	Typical	10	Default ...
11	WP11	10' Plaza Le...	0' Basement...	N45	N46	Concrete	Conc3500...	8	Gravity	Typical	10	Default ...
12	WP12	10' Plaza Le...	0' Basement...	N46	N89	Concrete	Conc3500...	8	Gravity	Typical	10	Default ...
13	WP13	12'-8"	0' Basement...	N1	N2	Concrete	Conc3500...	8	Gravity	Typical	10	NA
14	WP14	15'-8"	0' Basement...	N1	N2	Concrete	Conc3500...	8	Gravity	Typical	10	NA
15	WP15	15'-8"	0' Basement...	N2	N3	Concrete	Conc3500...	8	Gravity	Typical	10	NA
16	WP16	23'-4" V3 Na...	15'-8"	N31	N32	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.833	NA
17	WP4	25' 1/4" Roof	15'-8"	N84	N86	Wood	Spruce-Pi...	5.5 (stu...	Lateral	4"	1.833	Default ...
18	WP18	25' 1/4" Roof	15'-8"	N86	N203	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.833	Default ...
19	WP6	25' 1/4" Roof	10' Plaza Le...	N121	N122	Wood	Spruce-Pi...	5.5 (stu...	Lateral	6"	2.667	NA
20	WP20	19' V1 Mezz...	15'-8"	N87	N105	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.833	NA
21	WP21	23'-4" V3 Na...	15'-8"	N247	N84	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.833	NA
22	WP23	19' V1 Mezz...	17.5' V2 V3 ...	N105	N88	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.5	NA
23	WP24	19' V1 Mezz...	15'-8"	N65	N87	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.833	NA
24	WP26	19' V1 Mezz...	17.5' V2 V3 ...	N93	N94	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.5	NA
25	WP27	19' V1 Mezz...	17.5' V2 V3 ...	N88	N89	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	1.5	NA
26	WP30	10' Plaza Le...	0' Basement...	N23	N53	Concrete	Conc3500...	8	Gravity	Typical	10	Default ...
27	WP33	10' Plaza Le...	0' Basement...	N55	N56	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	10	NA
28	WP34	10' Plaza Le...	0' Basement...	N24	N25	Wood	Spruce-Pi...	5.5 (stu...	Gravity	6"	10	Default ...
29	WP35	19' V1 Mezz...	0' Basement...	N197	N464	Concrete	Conc3500...	8	Gravity	Typical	10	NA
30	WP37	19' V1 Mezz...	15'-8"	N248	N61	Concrete	Conc3500...	8	Gravity	Typical	1.833	NA
31	WP3	25' 1/4" Roof	19' V1 Mezz...	N91	N243	Wood	Spruce-Pi...	5.5 (stu...	Lateral	2"	3	Default ...
32	WP35A	19' V1 Mezz...	0' Basement...	N92	N106	Wood	Spruce-Pi...	5.5 (stu...	Lateral	Typical	10	NA
33	WP34A	19' V1 Mezz...	0' Basement...	N116	N92	Wood	Spruce-Pi...	5.5 (stu...	Lateral	Typical	10	NA
34	WP34B	25' 1/4" Roof	19' V1 Mezz...	N244	N245	Wood	Spruce-Pi...	5.5 (stu...	Lateral	Typical	3	NA

Wood Wall Panel Parameters

	Label	Top Plate	Sill Plate	Studs	Min Stud Sp...	Max Stud Sp...	Green Lumb...	Header Size	Header Matl
1	Typical	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
2	6"	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
3	4"	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
4	2"	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall

Additional Wood Wall Panel Parameters

	Label	Schedule	Min. Panel...	Max. Pane...	Double Sid...	Max. Nail ...	Min. Nail S...	HD Chords	HD Chord ...	Hold Down
1	Typical	AWC 2015 PLY	.469	.469	No	6-in.	2-in.	2-2X6	Same as ...	HDU_DF-SP
2	6"	AWC 2015 PLY	.469	.469	No	6-in.	6-in.	2-2X6	Same as ...	HDU_DF-SP
3	4"	AWC 2015 PLY	.469	.469	No	4-in.	4-in.	2-2X6	Same as ...	HDU_DF-SP
4	2"	AWC 2015 PLY	.469	.469	No	2-in.	2-in.	2-2X6	Same as ...	HDU_DF-SP

Gravity Loading

Floors

	Label	Elevati...	Area Load De...	Floor T...	Deck D...	Deck A...	Parent	Inacti...	Splice Distance ...	Splice Type	No Wind/...	Para...
1	25' 1/4" Roof	25.063	Roof	Floor B...	Roof W...	0	None		.083	Shear		0
2	23'-4" V3 Nanny	23.333	Interior Floor	Floor B...	Interor ...	0	None		.083	Shear		0
3	22' V2 Top of Wi...	22	Interior Floor	Floor B...	Interor ...	0	None		.083	Shear		0
4	19' V1 Mezz V3 ...	19	Interior Floor	Floor B...	Interor ...	0	None		.083	Shear		0
5	17.5' V2 V3 Top ...	17.5	Interior Floor	Floor B...	Interor ...	0	None		.083	Shear		0
6	15'-8"	15.667	Interior Floor	Floor B...	Interor ...	0	None		.083	Shear		0
7	12'-8"	12.667	Interior Floor	Floor B...	Interor ...	0	None		.083	Shear		0
8	10' Plaza Level	10	Interior Floor	Floor B...	Plaza R...	90	None		.083	Shear		0
9	0' Basement Floor	0	Interior Floor	Floor B...	Interor ...	0	None		.083	Shear		0

Deck General Properties

	Label	Material Type	Deck	Unbraced[ft]	Max Spa...
1	Roof Wood	Wood Deck	1 in	.5	4
2	Interor Wood	Wood Deck	1 in	.5	4
3	Plaza Roof Wood	Wood Deck	1 in	.5	4

Deck Loads

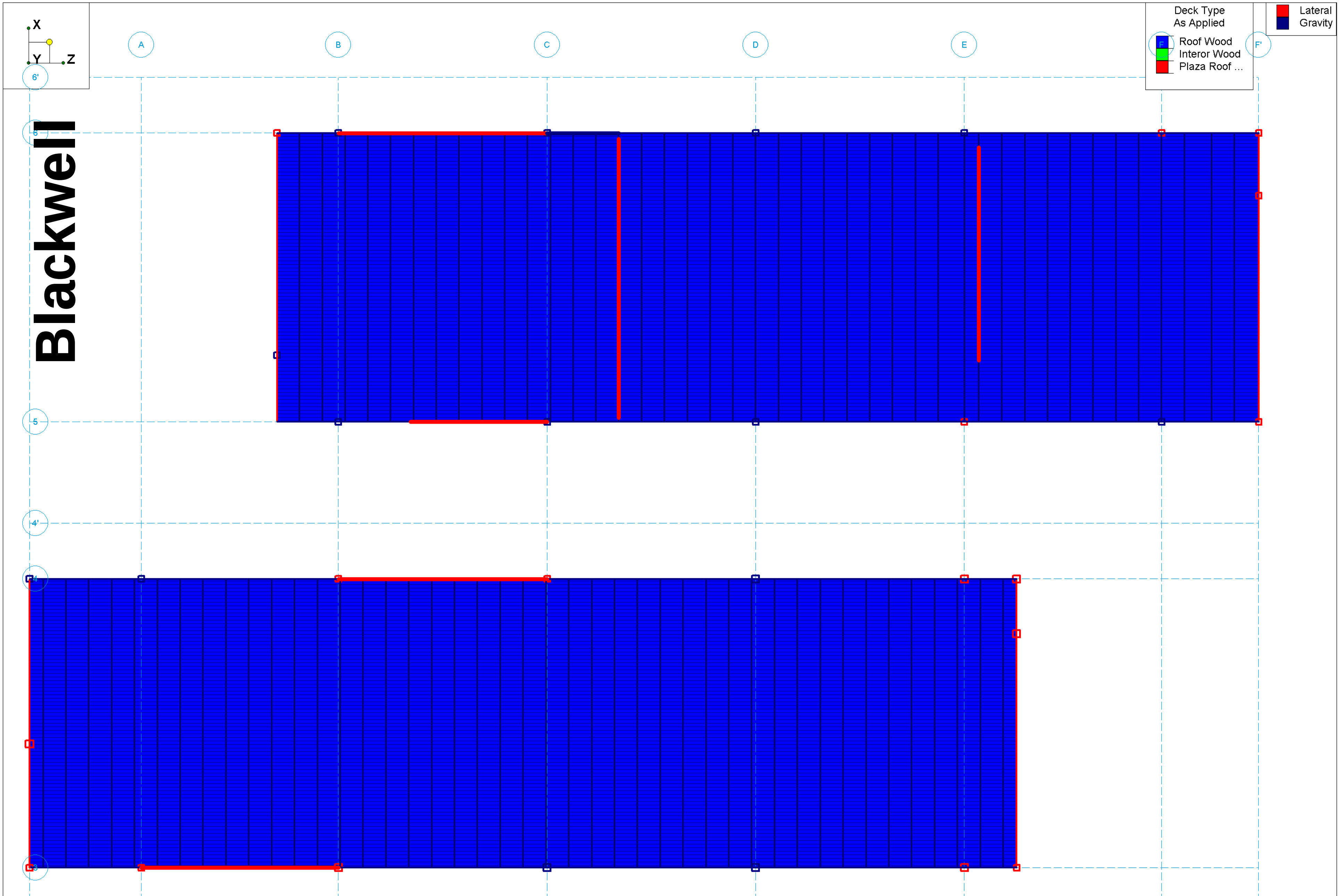
	Label	Two Way	Self Wt [psf]	Super DL [psf]	Const DL [psf]	Const LL [psf]
1	Roof Wood		3	25	0	0
2	Interor Wood		3	40	0	0
3	Plaza Roof Wood		3	50	0	0

Uniform Area Loads

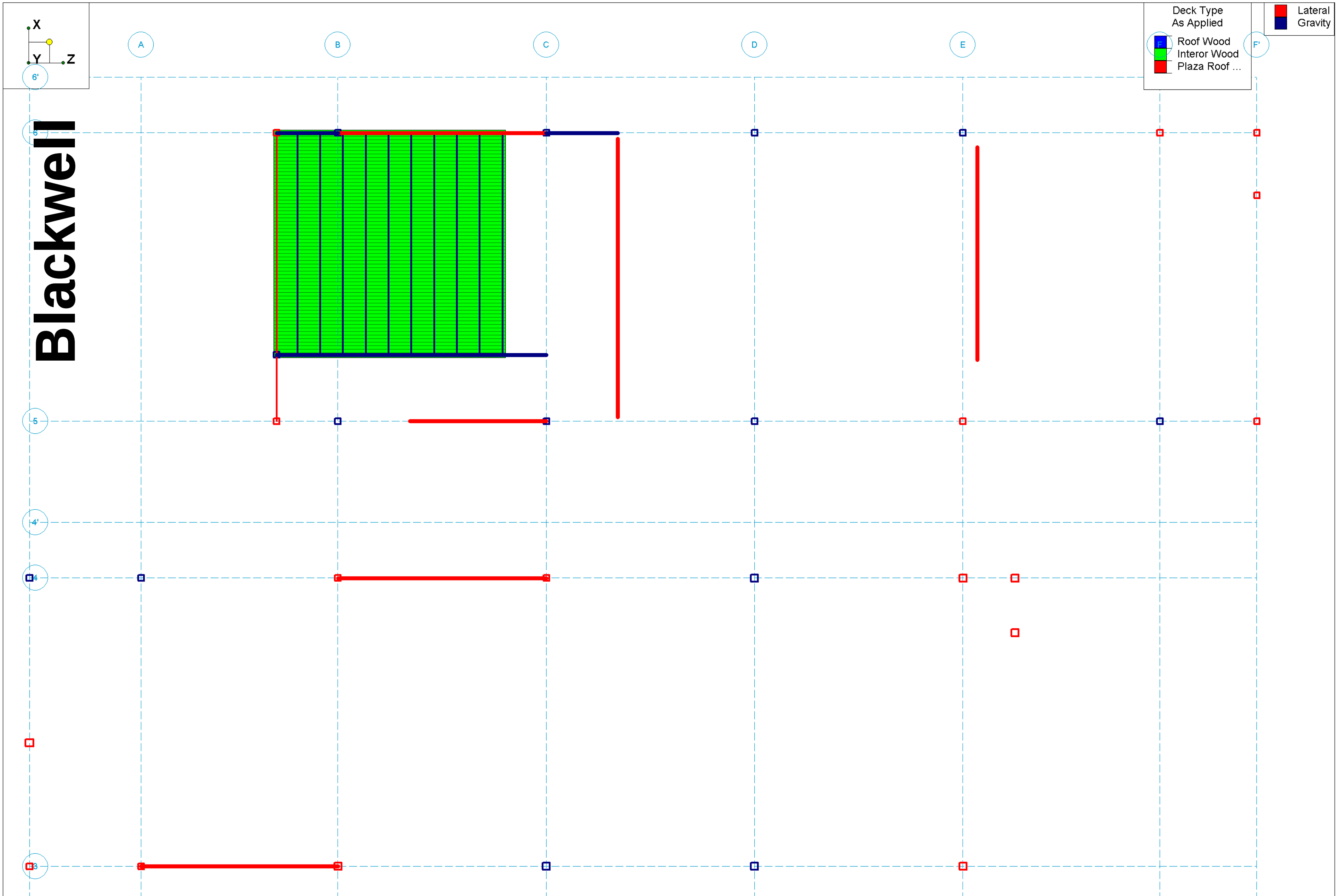
	Label	Additive	PreDL[psf]	PostDL[psf]	LL[psf]	LL Type	VL[psf]	Dyn Load[psf]
1	Interior Floor				40	LL-Non		
2	Roof				192	SL		
3	Plaza Roof				274	SL		

Combinations

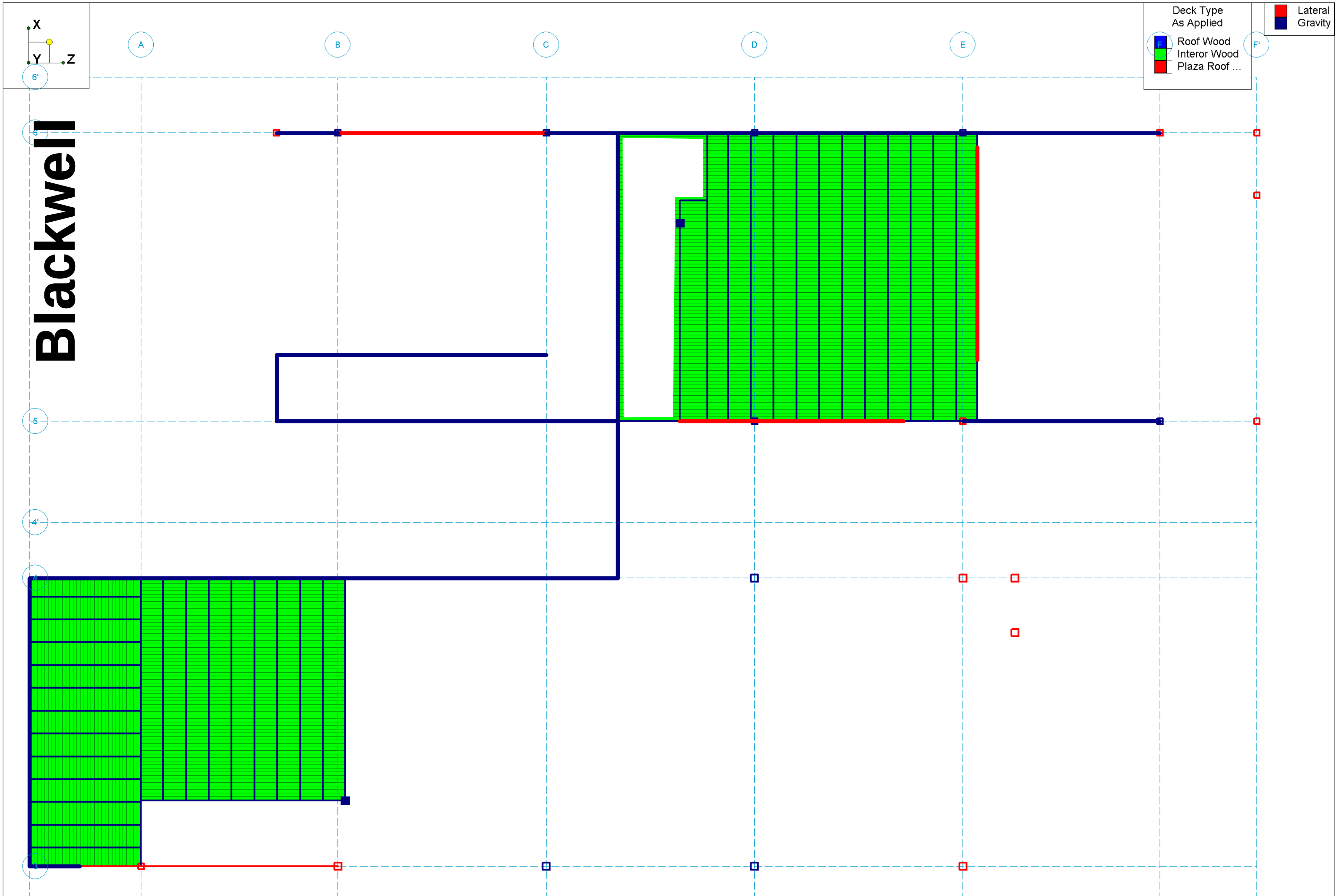
	Label	Sol...	Cat...	Fa...	Cat...	Fa...	Cat...	Fa...	Cat...	Fa...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...	Cat...	Fac...
1	ASCE Strength 1 ...	Yes	DL	1.4																		
2	ASCE Strength 2 (...	Yes	DL	1.2	LL	1.6																
3	ASCE Strength 2 (...	Yes	DL	1.2	LL	1.6	SL	.5														
4	ASCE Strength 3 (...	Yes	DL	1.2	LL	.5																
5	ASCE Strength 3 (...	Yes	DL	1.2	SL	1.6	LL	.5														
6	ASCE ASD 1 Post	Yes	DL	1																		
7	ASCE ASD 2 Post	Yes	DL	1	LL	1																
8	ASCE ASD 3 (b) ...	Yes	DL	1	SL	1																
9	ASCE ASD 4 (a) ...	Yes	DL	1	LL	.75																
10	ASCE ASD 4 (b) ...	Yes	DL	1	LL	.75	SL	.75														



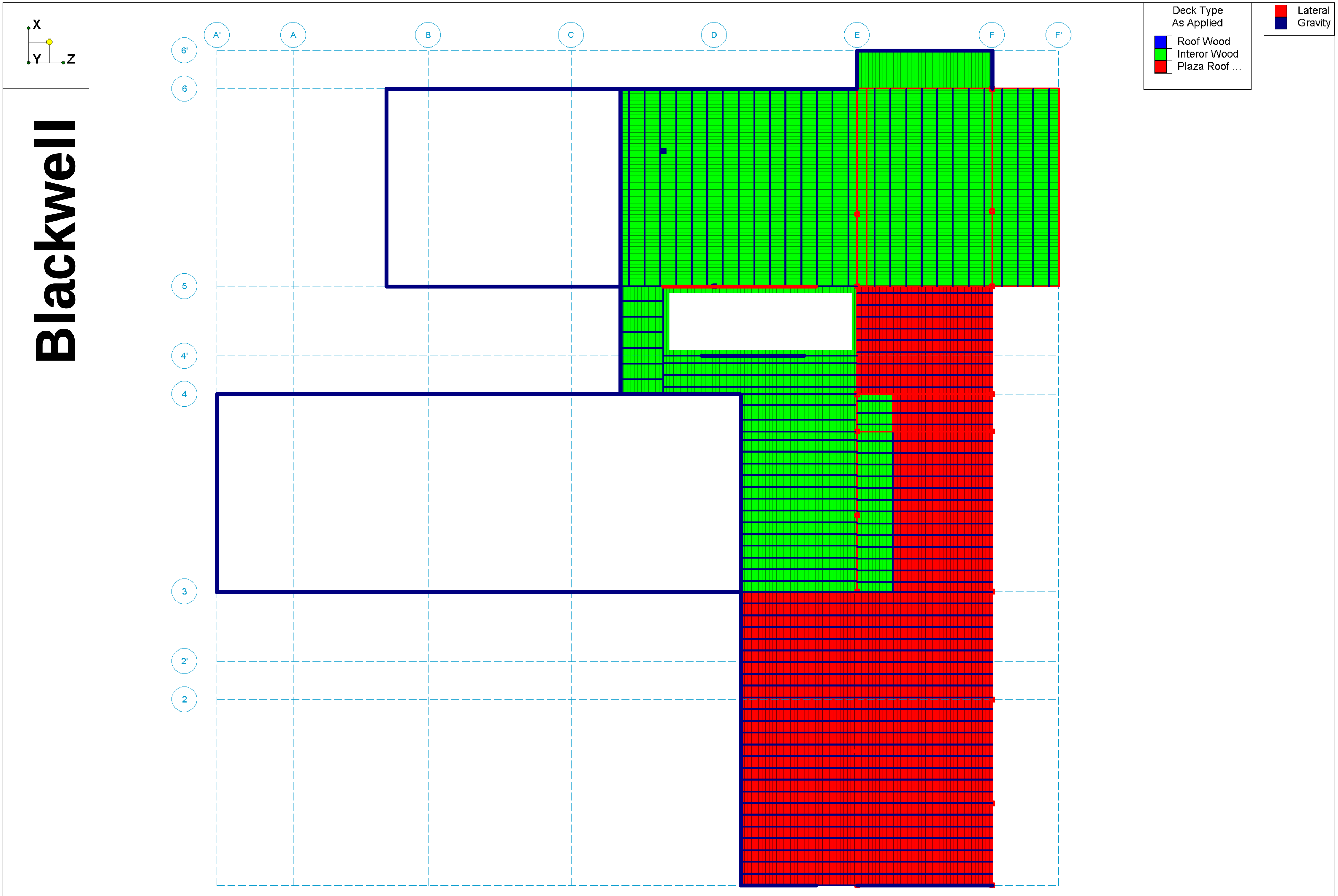
Blackwell Structural Engineers	25' 1/4" Roof	DECK ASSIGNMENT
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:17 PM
170266		KMR Volume 2 3 4.rfl



Blackwell Structural Engineers	23'-4" V3 Nanny	DECK ASSIGNMENT
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:17 PM
170266		KMR Volume 2 3 4.rfl

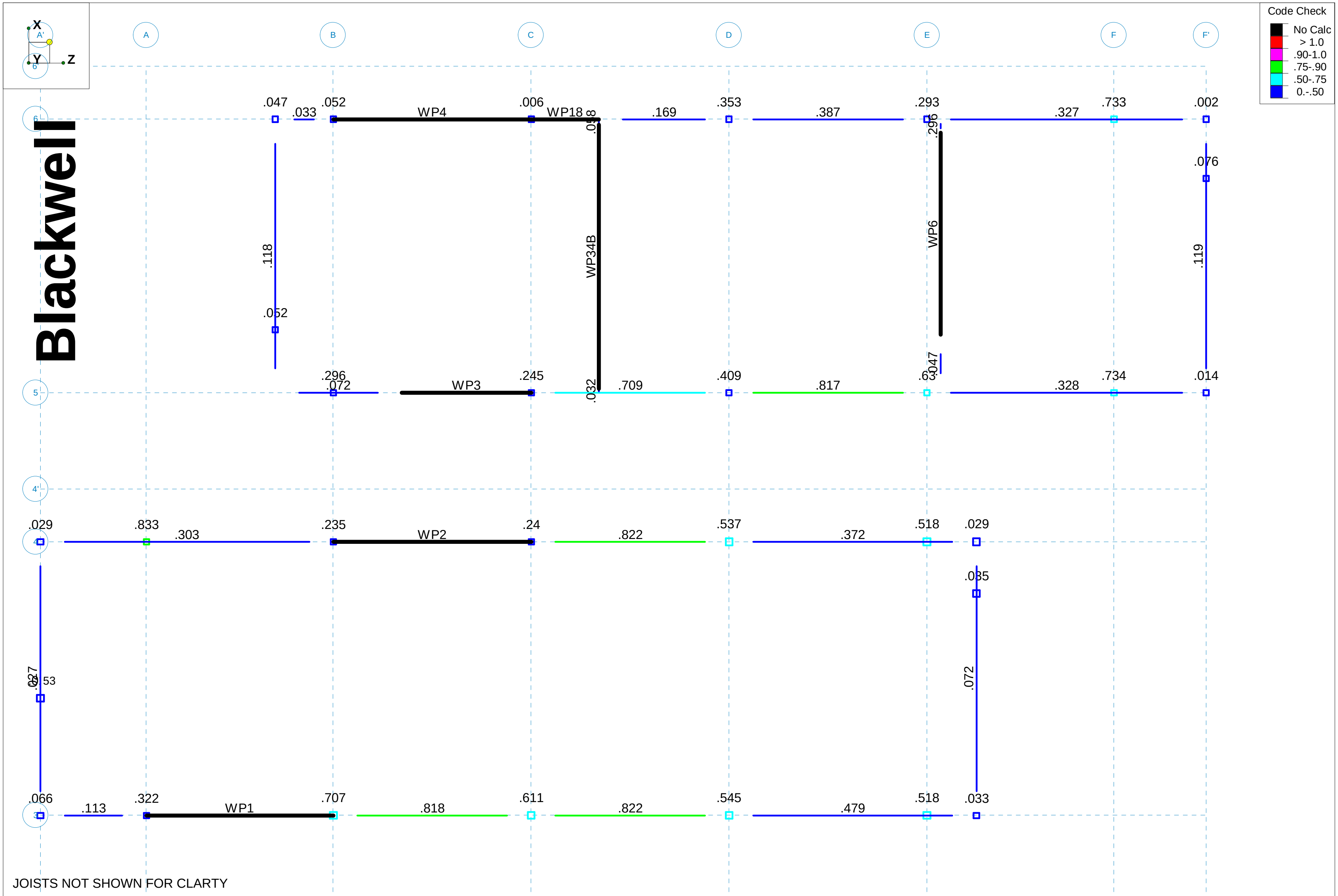


Blackwell Structural Engineers	19' V1 Mezz V3 Study	DECK ASSIGNMENT
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:18 PM
170266		KMR Volume 2 3 4.rfl

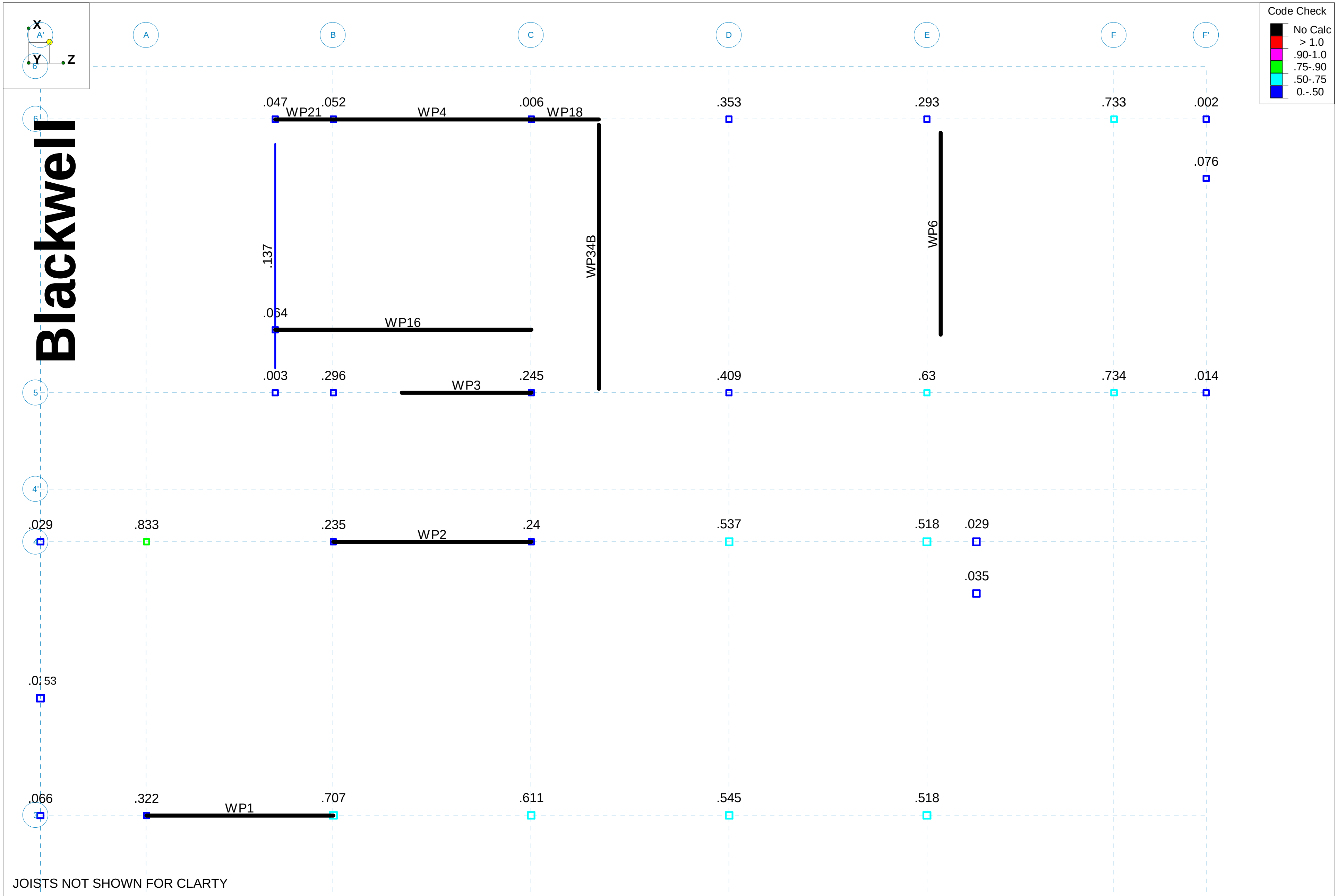


Blackwell Structural Engineers	10' Plaza Level	DECK ASSIGNMENT
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:18 PM
170266		KMR Volume 2 3 4.rfl

Gravity Steel and Wood Member Utilization



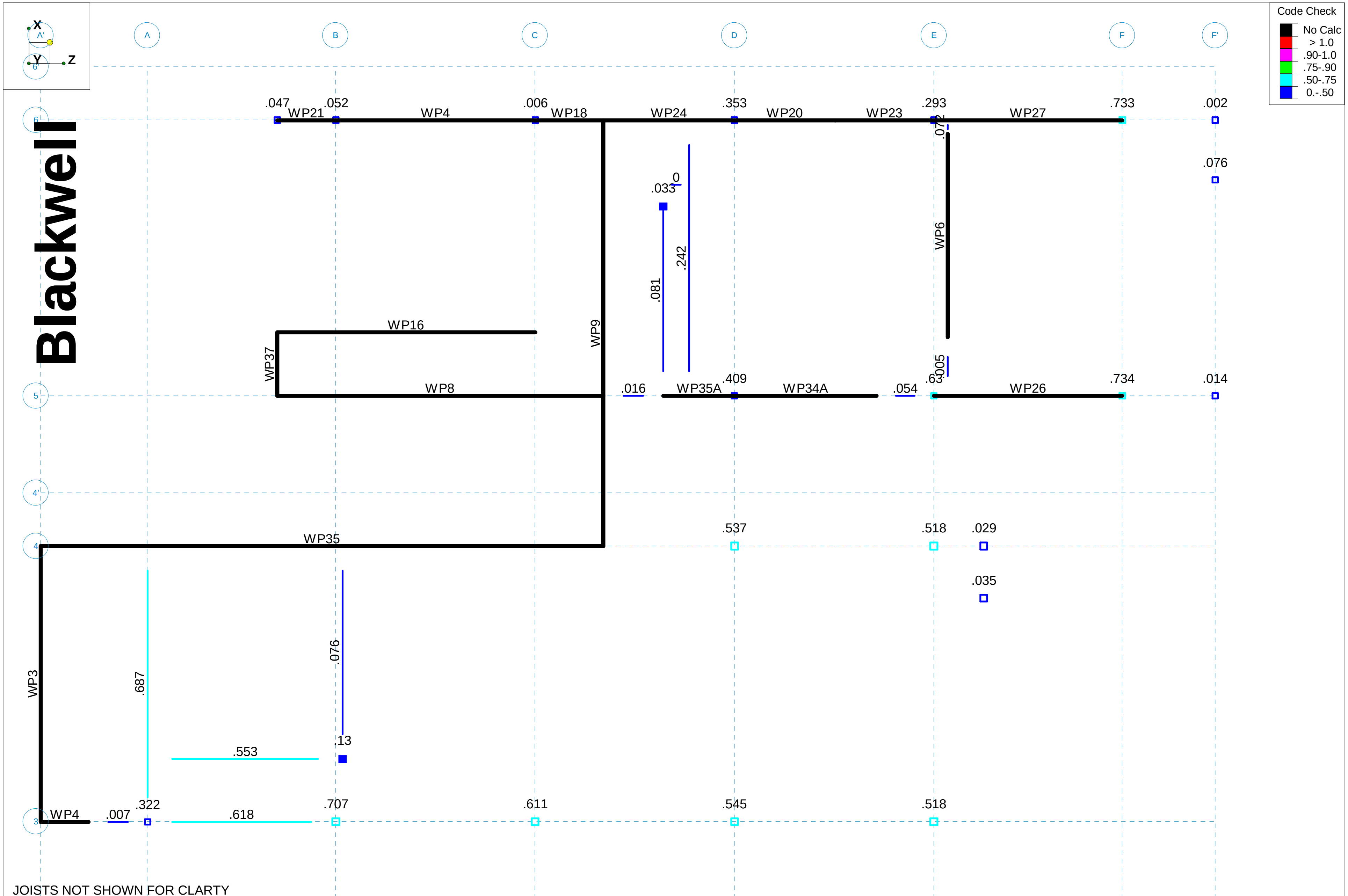
Blackwell Structural Engineers	25' 1/4" Roof	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:09 PM
170266		KMR Volume 2 3 4.rfl



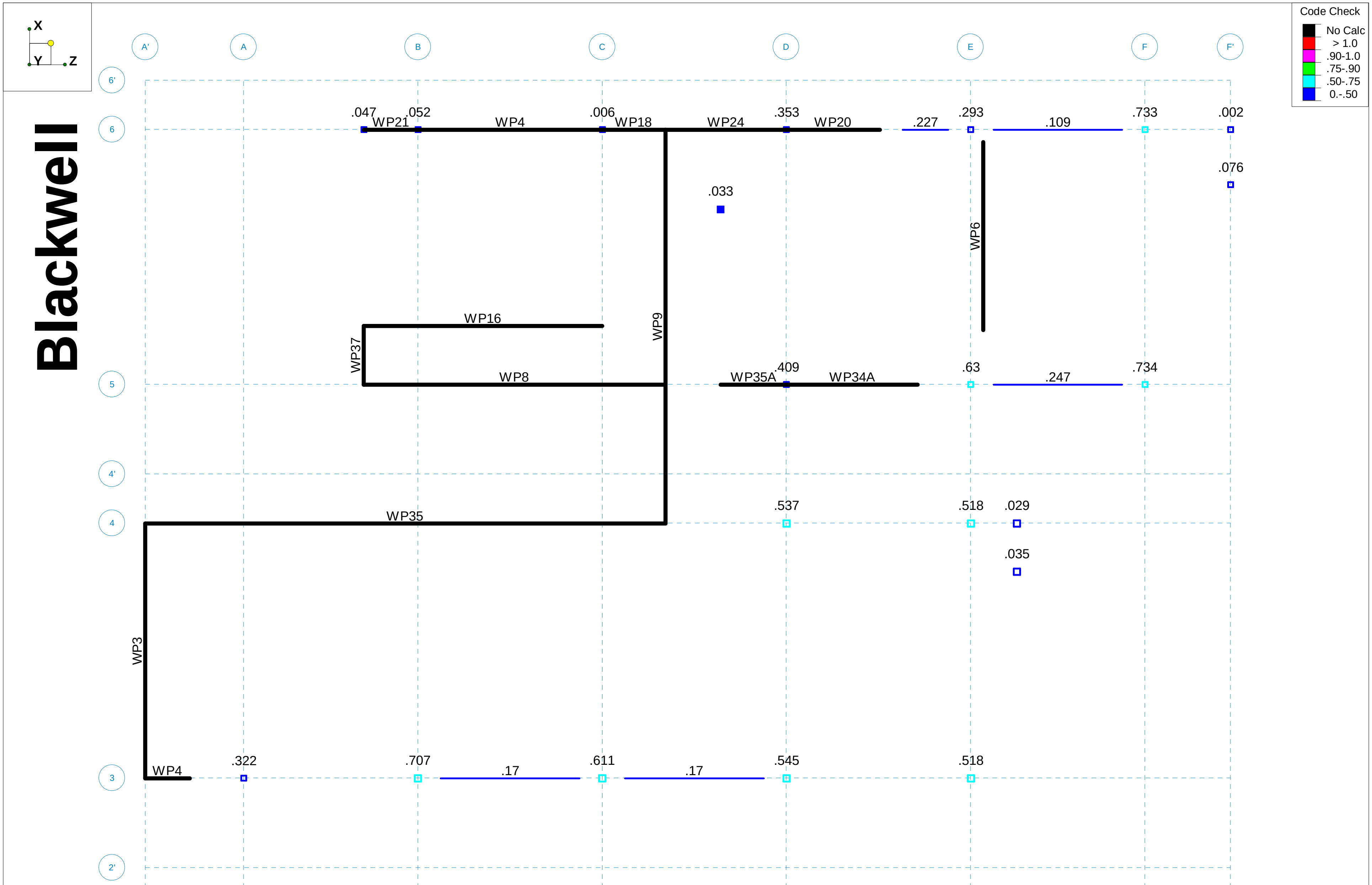
Blackwell Structural Engineers	23'-4" V3 Nanny	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:03 PM
170266		KMR Volume 2 3 4.rfl

Note due to modeling requirements some members are only modeled and designed in RISA3D

Blackwell Structural Engineers	22' V2 Top of Window	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:11 PM
170266		KMR Volume 2 3 4.rfl

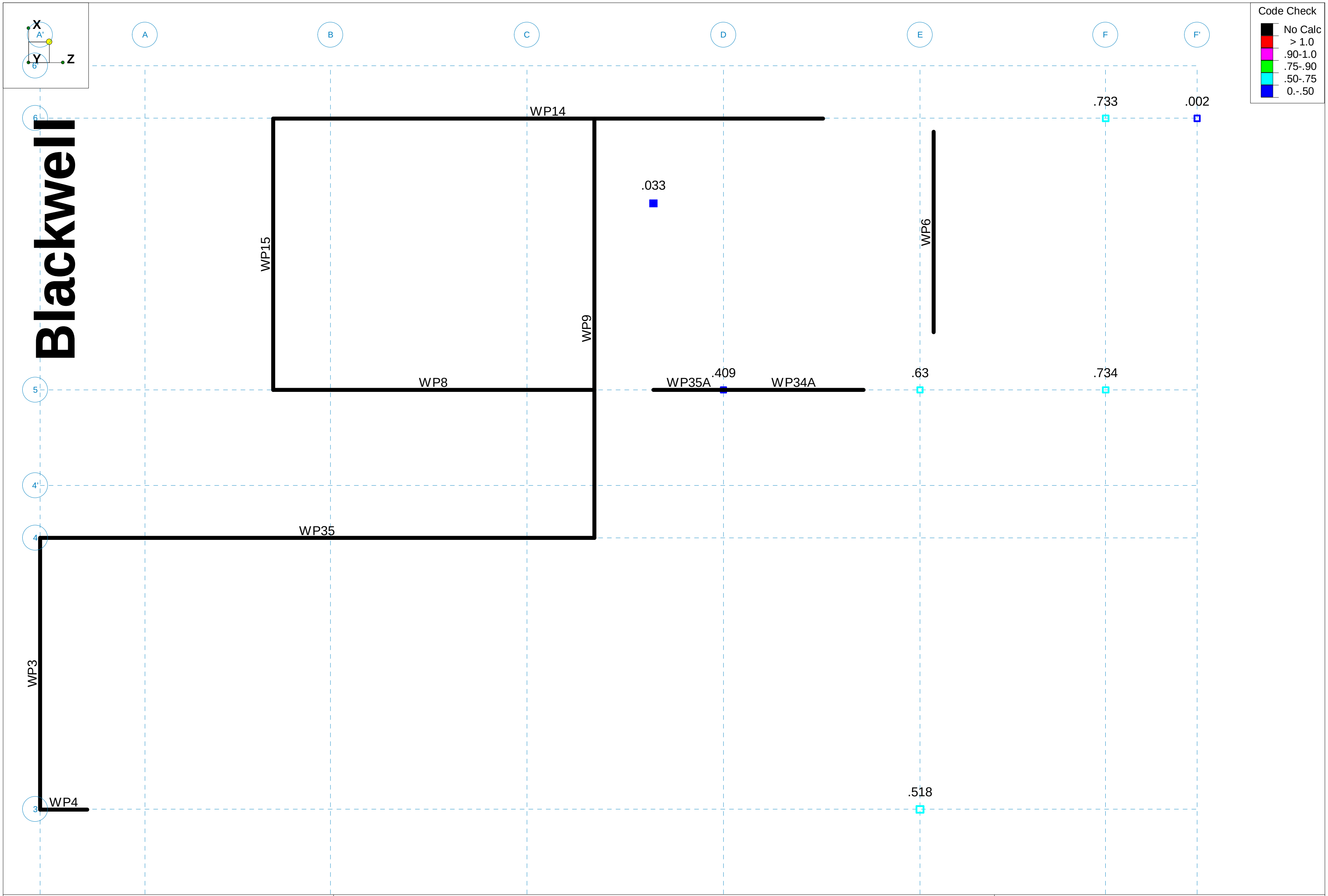


Blackwell Structural Engineers	19' V1 Mezz V3 Study	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:06 PM
170266		KMR Volume 2 3 4.rfl

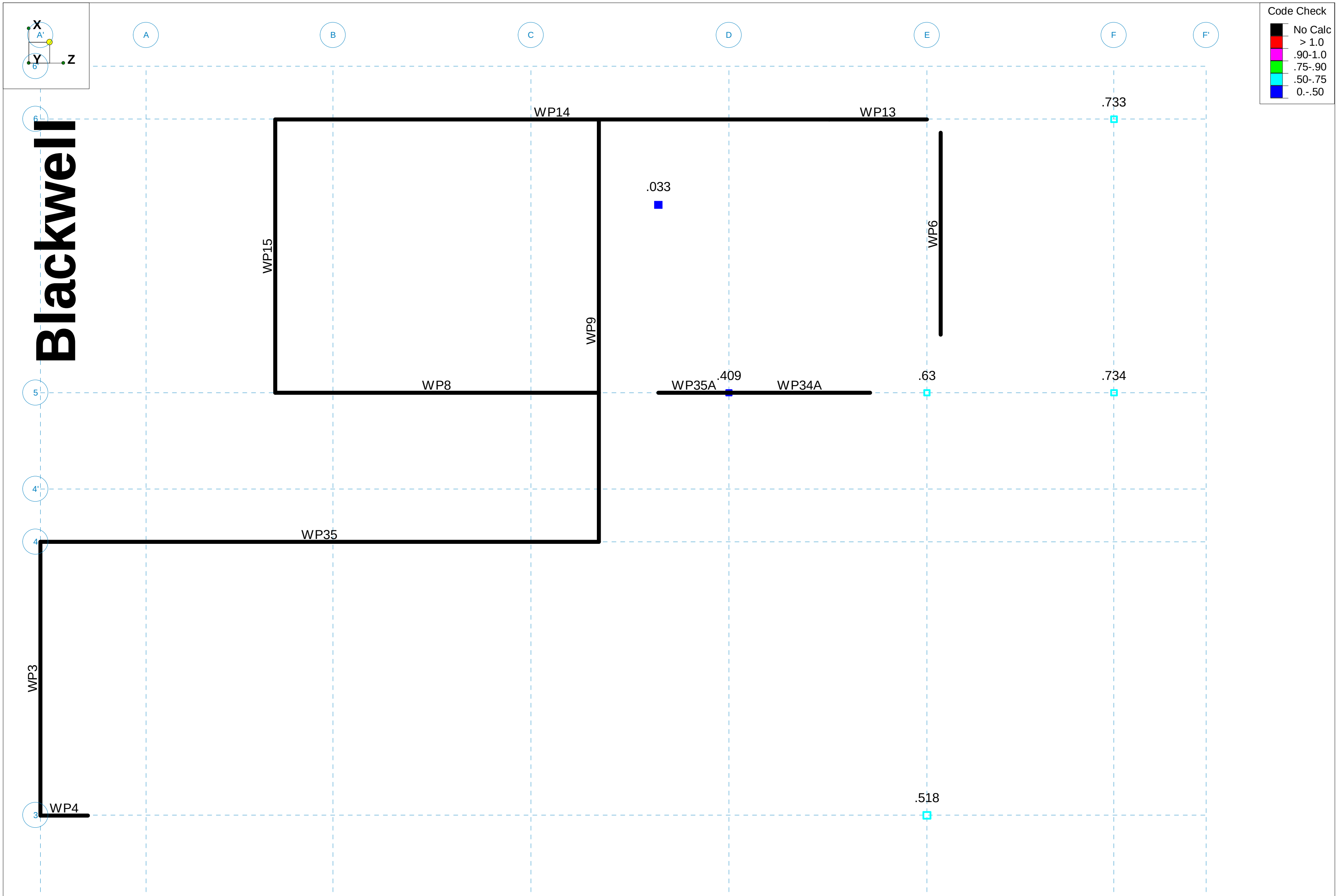


Note due to modeling requirements some members are only modeled and designed in RISA3D

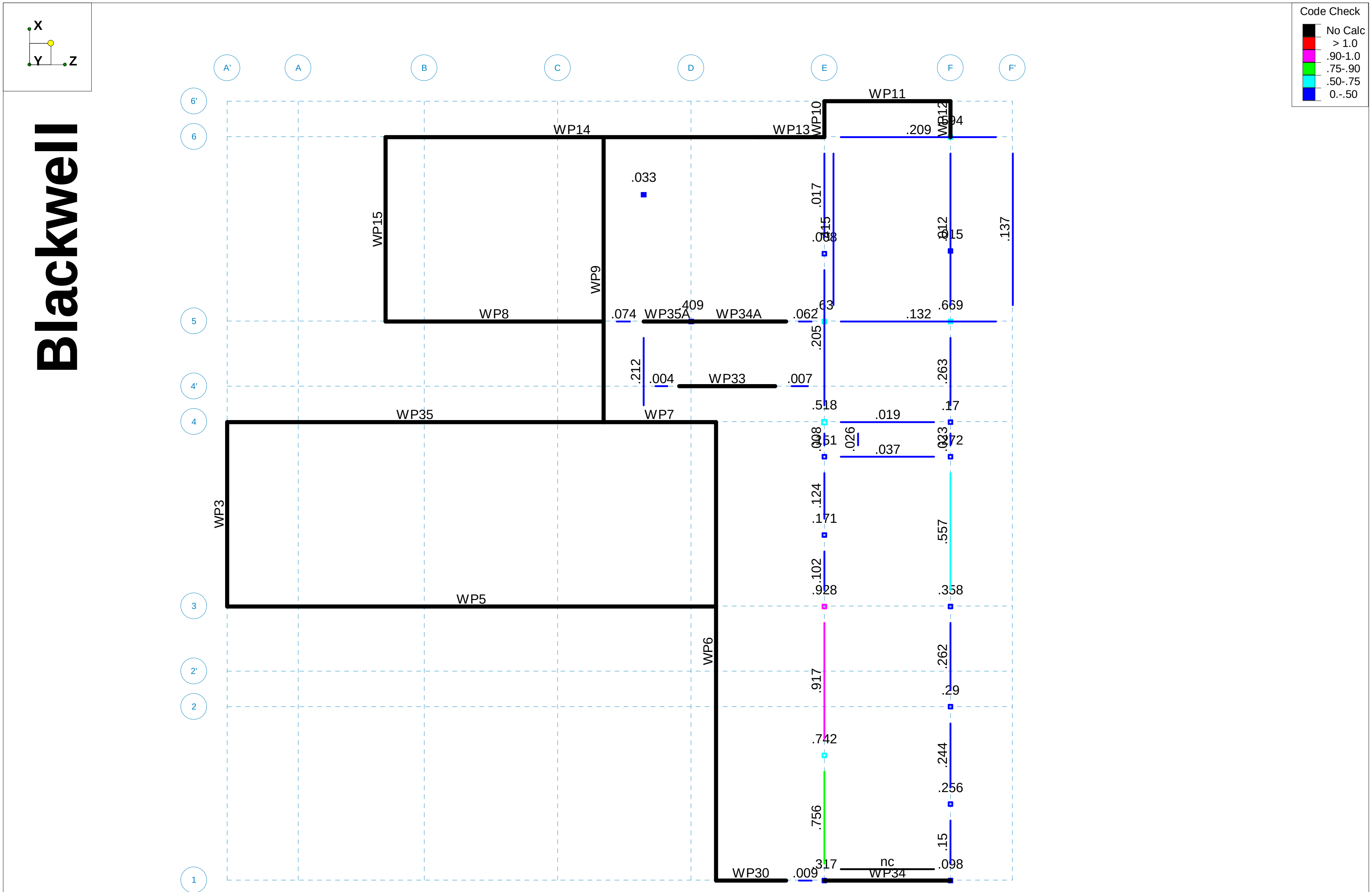
Blackwell Structural Engineers	17.5' V2 V3 Top of (low) windows	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:13 PM
170266		KMR Volume 2 3 4.rfl



Blackwell Structural Engineers	15'-8"	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:05 PM
170266		KMR Volume 2 3 4.rfl



Blackwell Structural Engineers	12'-8"	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:05 PM
170266		KMR Volume 2 3 4.rfl



JOISTS NOT SHOWN FOR CLARTY

Blackwell Structural Engineers	10' Plaza Level	BENDING CHECK
BG	Kimmelman May Residence Volume 2, 3 and 4	July 27, 2017 at 4:01 PM
170266		KMR Volume 2 3 4.rfl

Beam Code Summary for Hot Rolled : 25' 1/4" Roof

	Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M83	W12x26	Yes		0	A992	.113	3.501	5	.055	3.432	DL+...	.12	6.59	5
2	M89	W12x22	Yes		0	A992	.072	13.677	5	.025	0	LL	.013	13.5...	5
3	M90	W12x22	Yes		0	A992	.027	7.189	5	.025	0	LL	.009	7.364	5
4	M66	W12x22	Yes		0	A992	.119	3.682	5	.025	0	LL	.022	3.682	5
5	M67	W12x22	Yes		0	A992	.118	12.975	5	.025	0	LL	.021	12.8	5
6	M106	W12x26	Yes		0	A992	.372	12.367	5	.182	5.621	DL+...	.257	12.2...	5
7	M100	W12x26	Yes		0	A992	.387	6.681	5	.298	6.167	DL+...	.187	0	5
8	M62	W12x26	Yes		0	A992	.033	2.308	5	.025	0	LL	.051	0	5
9	M63	W12x26	Yes		0	A992	.169	4.055	5	.093	4.055	DL+...	.115	8.11	5
10	M64	W12x26	Yes		0	A992	.303	11.595	5	.157	5.322	DL+...	.224	11.5...	5
11	M116	W12x26	Yes		0	A992	.072	4.279	5	.029	7.9	DL+...	.106	4.197	5
12	M107	W12x26	Yes		0	A992	.479	12.367	5	.182	5.621	DL+...	.257	12.2...	5
13	M117	W12x26	Yes		0	A992	.327	11.603	5	.152	5.439	DL+...	.206	11.6...	5
14	M118	W12x26	Yes		0	A992	.328	11.603	5	.153	5.439	DL+...	.207	11.6...	5

Beam Code Summary for Hot Rolled : 23'-4" V3 Nanny

	Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M1	W8x18	Yes		0	A992	.137	3.858	2	.082	11.047	DL+...	.044	4.033	2

Beam Code Summary for Hot Rolled : 22' V2 Top of Window

	Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M1	HSS4x3x4	Yes		0	A500 ...	.17	6.084	1	.526	6.084	DL+...	.023	12.1...	1

Beam Code Summary for Hot Rolled : 19' V1 Mezz V3 Study

	Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M32	W10x22	Yes		0	A992	.618	6.229	5	.406	5.75	DL+...	.223	0	5
2	M33	W10x22	Yes		0	A992	.007	1.792	1	.025	0	LL	.01	3.583	1

Beam Code Summary for Hot Rolled : 17.5' V2 V3 Top of (low) windows

	Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M1	HSS4x3x4	Yes		0	A500 ...	.17	6.083	1	.526	6.083	DL+...	.023	0	1
2	M2	HSS4x3x4	Yes		0	A500 ...	.17	6.084	1	.526	6.084	DL+...	.023	12.1...	1
3	M5	HSS4x3x4	Yes		0	A500 ...	.247	5.87	1	.985	5.75	DL+...	.05	0	1

Beam Code Summary for Hot Rolled : 15'-8"

Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
No Data to Print ...														

Beam Code Summary for Hot Rolled : 12'-8"

Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
No Data to Print ...														

Beam Code Summary for Hot Rolled : 10' Plaza Level

	Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
1	M1	W10x26	Yes		0	A992	.15	3.053	5	.087	3.49	DL+...	.11	6.979	5
2	M2	W10x26	Yes		0	A992	.262	4.202	5	.186	4.583	DL+...	.18	0	5
3	M3	W10x26	Yes		0	A992	.244	4.796	5	.169	4.427	DL+...	.18	8.854	5
4	M4	W10x26	Yes		0	A992	.557	6.823	5	.557	6.823	DL+...	.224	0	5

Beam Code Summary for Hot Rolled : 10' Plaza Level (Continued)

	Label	Size	Explicit	Studs	Camb...	Material	Bending Check	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear ...	Loc[ft]	LC
5	M5	W10x26	Yes		0	A992	.756	5.946	5	.64	5.708	DL+...	.392	11.4...	5
6	M6	W10x26	Yes		0	A992	.102	2.911	5	.068	3.25	DL+...	.087	6.5	5
7	M7	W10x30	Yes		0	A992	.917	6.933	5	.896	6.792	DL+...	.387	13.5...	5
8	M8	W10x26	Yes		0	A992	.124	3.796	5	.088	3.647	DL+...	.106	7.145	5
9	M9	W10x26	Yes		0	A992	.205	3.679	5	.142	4.319	DL+...	.187	9.117	5
10	M10	W10x22	Yes		0	A992	.012	10.345	2	.025	0	LL	.009	10.3...	2
11	M11	W10x26	Yes		0	A992	.263	4.584	5	.185	4.584	DL+...	.157	0	5
12	M12	W10x22	Yes		0	A992	.017	5.322	2	.025	0	LL	.009	0	2
13	M13	W10x49	Yes		0	A992	.209	11.623	5	.33	17.167	DL+...	.109	11.4...	3
14	M14	W10x49	Yes		0	A992	.132	11.623	3	.152	17.167	DL+...	.088	11.4...	3
15	M15	W16x67	Yes		0	A992	.019	2.995	5	.025	0	LL	.02	2.995	5
16	M16	W16x67	Yes		0	A992	.037	8.385	5	.025	0	LL	.032	11.5	5
17	M18	W10x26	Yes		0	A992	.137	3.682	5	.171	7.715	DL+...	.062	0	5
18	M170	W10x26	Yes		0	A992	.023	1.594	5	.025	0	LL	.035	3.188	5
19	M171	W10x26	Yes		0	A992	.008	1.594	2	.025	0	LL	.012	3.188	2
20	M172	W10x26	Yes		0	A992	.026	1.594	5	.025	0	LL	.04	0	5

Beam Code Summary for Wood : 25' 1/4" Roof

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M80	3-1.75X14FS	Yes	2.0E ...	.822	6.681	8	.69	6.167	DL+...	.761	12.3...	8
2	M85	3-1.75X14FS	Yes	2.0E ...	.818	5.525	8	.689	6.167	DL+...	.782	12.3...	8
3	M86	3-1.75X14FS	Yes	2.0E ...	.822	6.681	8	.69	6.167	DL+...	.761	12.3...	8
4	M101	3-1.75X14FS	Yes	2.0E ...	.817	6.681	8	.687	6.167	DL+...	.634	0	8
5	M60	3-1.75X14FS	Yes	2.0E ...	.709	5.396	8	.587	6.038	DL+...	.665	12.3...	8
6	M115	2-1.75X14FS	Yes	Spruc...	.047	1.791	8	.025	0	LL	.088	0	8
7	M119	2X2	No	Spruc...	.296	.416	8	.111	.416	DL+...	.432	0	8
8	M120	2X2	No	Spruc...	.058	.166	8	.025	0	LL	.21	0	8
9	M121	2X2	No	Spruc...	.032	.125	8	.025	0	LL	.158	0	8

Beam Code Summary for Wood : 23'-4" V3 Nanny

Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC

No Data to Print ...

Beam Code Summary for Wood : 22' V2 Top of Window

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M3	3-1.75X11.875FS	Yes	2.0E ...	.058	6.084	6	.043	6.084	DL+...	.043	12.1...	6

Beam Code Summary for Wood : 19' V1 Mezz V3 Study

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M1	3-1.75X11.875FS	Yes	2.0E ...	.687	6.488	7	.798	8.066	DL+...	.412	0	7
2	M2	2-1.75X11.875FS	Yes	2.0E ...	.553	5.959	7	.459	5.959	DL+...	.379	0	7
3	M3	2-1.75X11.875FS	Yes	2.0E ...	.076	6.5	7	.067	6.5	DL+...	.052	0	7
4	M19	2-1.75X11.875FS	Yes	2.0E ...	.081	7.119	7	.098	0	DL+...	.067	1.343	7
5	M20	2-1.75X11.875FS	Yes	2.0E ...	.242	8.767	7	.278	8.767	DL+...	.132	16.8...	7
6	M21	2-1.75X11.875FS	Yes	2.0E ...	0	.791	7	.025	0	LL	.002	0	7
7	M22	2-1.75X11.875FS	Yes	2.0E ...	.005	1.791	7	.025	0	LL	.014	0	7
8	M34	2-1.75X11.875FS	Yes	2.0E ...	.016	1.823	6	.025	0	LL	.039	3.646	6
9	M35	3-1.75X11.875FS	Yes	2.0E ...	.054	1.714	7	.025	0	LL	.142	0	7
10	M43	2X2	No	Spruc...	.072	.416	7	.025	0	LL	.105	0	7

Beam Code Summary for Wood : 17.5' V2 V3 Top of (low) windows

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M3	2-1.75X11.875FS	Yes	2.0E ...	.227	2.938	7	.09	3	DL+...	.365	0	7
2	M4	3-1.75X11.875FS	Yes	2.0E ...	.109	5.75	6	.077	5.75	DL+...	.086	0	6

Beam Code Summary for Wood : 15'-8"

Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC

No Data to Print ...

Beam Code Summary for Wood : 12'-8"

Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC

No Data to Print ...

Beam Code Summary for Wood : 10' Plaza Level

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
1	M19	2-1.75X11.875FS	Yes	2.0E ...	.062	1.422	7	.025	0	LL	.215	0	7
2	M20	2-1.75X11.875FS	Yes	2.0E ...	.212	2.674	7	.132	4.297	DL+...	.287	0	7

Beam Code Summary for Wood : 10' Plaza Level (Continued)

	Label	Size	Explicit	Material	Bending...	Loc[ft]	LC	Defl Ch...	Loc[ft]	Cat	Shear C..	Loc[ft]	LC
3	M21	2-1.75X11.875FS	Yes	2.0E ...	.004	1.625	7	.025	0	LL	.01	0	7
4	M22	3-1.75X11.875FS	Yes	2.0E ...	.415	8.416	8	.63	8.416	DL+...	.212	0	8
5	M23	3-1.75X11.875FS	Yes	2.0E ...	.009	1.75	8	.025	0	LL	.023	0	8
6	M27	2-1.75X11.875FS	Yes	2.0E ...	.007	2.25	7	.025	0	LL	.014	0	7
7	M156	2X6	Yes	Spruc...	.016	.411	6	.025	0	LL	.075	0	6
8	M157	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
9	M158	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
10	M159	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
11	M160	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
12	M161	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
13	M162	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	1	6
14	M163	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
15	M164	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
16	M165	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
17	M166	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
18	M167	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
19	M168	2X6	Yes	Spruc...	.024	.5	6	.025	0	LL	.091	0	6
20	M169	2X6	Yes	Spruc...	.016	.411	6	.025	0	LL	.075	.823	6
21	M173	2-1.75X11.875FS	Yes	2.0E ...	.074	1.557	7	.025	0	LL	.216	0	7

Beam Design for Wood Products : 25' 1/4" Roof

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
1	PUR217	Red_I90x14	Yes	-1.999	2.921	-8.413	13.144	1.999	1.999	.293	.293
2	PUR218	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
3	PUR219	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
4	PUR220	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
5	PUR221	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
6	PUR222	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
7	PUR223	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
8	PUR224	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
9	PUR225	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
10	PUR226	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
11	PUR227	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
12	PUR228	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
13	PUR229	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
14	PUR230	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
15	PUR231	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
16	PUR232	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
17	PUR233	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
18	PUR234	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
19	PUR235	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
20	PUR236	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
21	PUR237	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
22	PUR238	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
23	PUR239	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
24	PUR240	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
25	PUR241	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
26	PUR242	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
27	PUR243	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
28	PUR244	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
29	PUR245	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36

Beam Design for Wood Products : 25' 1/4" Roof (Continued)

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
30	PUR246	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
31	PUR247	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
32	PUR248	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
33	PUR249	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
34	PUR250	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
35	PUR251	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
36	PUR252	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
37	PUR253	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
38	PUR254	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
39	PUR255	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
40	PUR256	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
41	PUR257	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
42	PUR258	Red_I90x14	Yes	-2.514	2.921	-10.579	13.144	2.514	2.514	.36	.36
43	PUR259	Red_I90x14	Yes	-1.999	2.921	-8.413	13.144	1.999	1.999	.293	.293
44	PUR91	Red_I90x14	Yes	-2.492	2.921	-10.489	13.144	2.492	2.492	.357	.357
45	PUR92	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
46	PUR93	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
47	PUR94	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
48	PUR95	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
49	PUR96	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
50	PUR97	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
51	PUR98	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
52	PUR99	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
53	PUR100	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
54	PUR101	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
55	PUR102	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
56	PUR103	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
57	PUR104	Red_I90x14	Yes	-2.492	2.921	-10.489	13.144	2.492	2.492	.357	.357
58	M77	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
59	M78	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
60	M79	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
61	M81	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
62	M82	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
63	M84	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
64	M87	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
65	M88	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
66	M91	Red_I90x14	Yes	-2.691	2.921	-11.324	13.144	2.691	2.691	.383	.383
67	M92	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
68	M93	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
69	M94	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
70	M95	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
71	M96	Red_I90x14	Yes	-2.527	2.921	-10.633	13.144	2.527	2.527	.361	.361
72	M97	Red_I90x14	Yes	-2.23	2.921	-9.384	13.144	2.23	2.23	.323	.323
73	M102	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
74	M103	Red_I90x14	Yes	-2.74	2.921	-11.531	13.144	2.74	2.74	.389	.389
75	M104	Red_I90x14	Yes	-2.74	2.921	-11.531	13.144	2.74	2.74	.389	.389
76	M105	Red_I90x14	Yes	-2.598	2.921	-10.934	13.144	2.598	2.598	.371	.371
77	M108	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
78	M109	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
79	M110	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
80	M111	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
81	M112	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359

Beam Design for Wood Products : 25' 1/4" Roof (Continued)

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
82	M113	Red_I90x14	Yes	-2.508	2.921	-10.555	13.144	2.508	2.508	.359	.359
83	M114	Red_I90x14	Yes	-2.533	2.921	-10.661	13.144	2.533	2.533	.362	.362

Beam Design for Wood Products : 23'-4" V3 Nanny

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
1	PUR25	Red_I45x9.5	Yes	.701	1.59	-2.272	3.62	.701	.701	.37	.37
2	PUR26	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
3	PUR27	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
4	PUR28	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
5	PUR29	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
6	PUR30	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
7	PUR31	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
8	PUR32	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
9	PUR33	Red_I45x9.5	Yes	.729	1.59	-2.363	3.62	.729	.729	.385	.385
10	PUR34	Red_I45x9.5	Yes	.461	1.59	-1.495	3.62	.461	.461	.246	.246

Beam Design for Wood Products : 22' V2 Top of Window

Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
No Data to Print ...										

Beam Design for Wood Products : 19' V1 Mezz V3 Study

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
1	PUR20	Red_I45x11....	Yes	.725	1.785	-2.355	4.685	.725	.725	.383	.383
2	PUR21	Red_I45x11....	Yes	.735	1.785	-2.39	4.685	.735	.735	.389	.389
3	PUR22	Red_I45x11....	Yes	.735	1.785	-2.39	4.685	.735	.735	.389	.389
4	PUR23	Red_I45x11....	Yes	.735	1.785	-2.39	4.685	.735	.735	.389	.389
5	PUR24	Red_I45x11....	Yes	.735	1.785	-2.39	4.685	.735	.735	.389	.389
6	PUR25	Red_I45x11....	Yes	.735	1.785	-2.39	4.685	.735	.735	.389	.389
7	PUR26	Red_I45x11....	Yes	.735	1.785	-2.39	4.685	.735	.735	.389	.389
8	PUR27	Red_I45x11....	Yes	.725	1.785	-2.355	4.685	.725	.725	.383	.383
9	PUR54	Red_I45x11....	Yes	-.913	1.785	-3.842	4.685	.913	.913	.483	.483
10	PUR55	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
11	PUR56	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
12	PUR57	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
13	PUR58	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
14	PUR59	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
15	PUR60	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
16	PUR61	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
17	PUR62	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
18	PUR63	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
19	PUR64	Red_I45x11....	Yes	-.913	1.785	-3.842	4.685	.913	.913	.483	.483
20	PUR66	Red_I45x11....	Yes	.334	1.785	-.543	4.685	.334	.334	.177	.177
21	PUR67	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
22	PUR68	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
23	PUR69	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
24	PUR70	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
25	PUR71	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
26	PUR72	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
27	PUR73	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
28	PUR74	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194

Beam Design for Wood Products : 19' V1 Mezz V3 Study (Continued)

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
29	PUR75	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
30	PUR76	Red_I45x11....	Yes	.368	1.785	-.598	4.685	.368	.368	.194	.194
31	PUR77	Red_I45x11....	Yes	.334	1.785	-.543	4.685	.334	.334	.177	.177

Beam Design for Wood Products : 17.5' V2 V3 Top of (low) windows

Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
No Data to Print ...										

Beam Design for Wood Products : 15'-8"

Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
No Data to Print ...										

Beam Design for Wood Products : 12'-8"

Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
No Data to Print ...										

Beam Design for Wood Products : 10' Plaza Level

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
1	M24	Red_I45x11....	Yes	-1.516	2.053	-3.758	5.388	1.607	1.607	.837	.837
2	M25	Red_I45x11....	Yes	-1.321	1.785	-3.276	4.685	1.321	1.321	1.168	1.168
3	M26	Red_I65x11....	Yes	1.779	2.593	-5.065	7.762	1.823	1.755	.641	.358
4	PUR27	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
5	PUR28	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
6	PUR29	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
7	PUR30	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
8	PUR31	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
9	PUR32	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
10	PUR33	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
11	PUR34	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
12	PUR35	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
13	PUR36	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
14	PUR37	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
15	PUR38	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
16	PUR39	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
17	PUR40	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
18	PUR41	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
19	PUR42	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
20	PUR43	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
21	PUR44	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
22	PUR45	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
23	PUR46	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
24	PUR47	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
25	PUR48	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
26	PUR49	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
27	PUR50	Red_I45x11....	Yes	-1.634	2.053	-4.051	5.388	1.634	1.634	.275	.275
28	PUR51	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
29	PUR52	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
30	PUR53	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
31	PUR54	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
32	PUR55	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325

Beam Design for Wood Products : 10' Plaza Level (Continued)

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
33	PUR56	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
34	PUR57	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
35	PUR58	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
36	PUR59	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
37	PUR60	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
38	PUR61	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
39	PUR62	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
40	PUR63	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
41	PUR64	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
42	PUR65	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
43	PUR66	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
44	PUR67	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
45	PUR68	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
46	PUR69	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
47	PUR70	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
48	PUR71	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
49	PUR72	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
50	PUR73	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
51	PUR74	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
52	PUR107	Red_I45x11....	Yes	-.407	1.785	-1.008	4.685	.407	.407	.217	.217
53	PUR108	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
54	PUR109	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
55	PUR110	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
56	PUR111	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
57	PUR112	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
58	PUR113	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
59	PUR114	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
60	PUR115	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
61	PUR116	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
62	PUR117	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
63	PUR118	Red_I45x11....	Yes	-.424	1.785	-1.051	4.685	.424	.424	.226	.226
64	PUR119	Red_I45x11....	Yes	-.368	1.785	-.913	4.685	.368	.368	.197	.197
65	PUR120	Red_I45x11....	Yes	-.373	1.785	-.924	4.685	.373	.373	.199	.199
66	PUR121	Red_I45x11....	Yes	-.48	1.785	-1.19	4.685	.48	.48	.255	.255
67	PUR122	Red_I45x11....	Yes	-.458	1.785	-1.136	4.685	.458	.458	.243	.243
68	PUR133	Red_I65x11....	Yes	-1.659	2.593	-4.554	7.762	1.228	1.673	.355	.324
69	PUR134	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
70	PUR135	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
71	PUR136	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
72	PUR137	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
73	PUR138	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
74	PUR139	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
75	PUR140	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
76	PUR141	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
77	PUR142	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
78	PUR143	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
79	PUR144	Red_I65x11....	Yes	-1.819	2.593	-4.994	7.762	1.346	1.835	.388	.354
80	PUR145	Red_I65x11....	Yes	-1.659	2.593	-4.554	7.762	1.228	1.673	.355	.324
81	PUR157	Red_I65x11....	Yes	1.509	2.593	-4.339	7.762	1.509	1.509	.262	.262
82	PUR158	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
83	PUR159	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
84	PUR160	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325

Beam Design for Wood Products : 10' Plaza Level (Continued)

	Label	Size	Explicit	Vmax[k]	V'[k]	Mmax[k-ft]	M'r[k-ft]	Max Start Re...	Max End R...	Min Start R...	Min End Rea...
85	PUR161	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
86	PUR162	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
87	PUR163	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
88	PUR164	Red_I65x11....	Yes	1.901	2.593	-5.465	7.762	1.901	1.901	.325	.325
89	PUR165	Red_I65x11....	Yes	1.509	2.593	-4.339	7.762	1.509	1.509	.262	.262
90	PUR132	Red_I45x11....	Yes	.577	1.785	-2.38	4.685	.577	.577	.309	.309
91	PUR146	Red_I45x11....	Yes	.705	1.785	-2.91	4.685	.705	.705	.375	.375
92	PUR147	Red_I45x11....	Yes	.577	1.785	-2.38	4.685	.577	.577	.309	.309
93	PUR154	Red_I45x11....	Yes	-.201	1.785	-.184	4.685	.201	.201	.106	.106
94	PUR155	Red_I45x11....	Yes	-.207	1.785	-.19	4.685	.207	.207	.11	.11
95	PUR156	Red_I45x11....	Yes	-.207	1.785	-.19	4.685	.207	.207	.11	.11
96	PUR166	Red_I45x11....	Yes	-.207	1.785	-.19	4.685	.207	.207	.11	.11
97	PUR167	Red_I45x11....	Yes	-.207	1.785	-.19	4.685	.207	.207	.11	.11
98	PUR168	Red_I45x11....	Yes	-.201	1.785	-.184	4.685	.201	.201	.106	.106
99	PUR189	Red_I45x11....	Yes	-.749	1.785	-3.154	4.685	.749	.749	.398	.398
100	PUR190	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
101	PUR191	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
102	PUR192	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
103	PUR193	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
104	PUR194	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
105	PUR195	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
106	PUR196	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
107	PUR197	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
108	PUR198	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
109	PUR199	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
110	PUR200	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
111	PUR201	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
112	PUR202	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
113	PUR203	Red_I45x11....	Yes	-.749	1.785	-3.154	4.685	.749	.749	.398	.398
114	PUR179	Red_I45x11....	Yes	-.72	1.785	-3.03	4.685	.72	.72	.383	.383
115	PUR180	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
116	PUR181	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
117	PUR182	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
118	PUR183	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
119	PUR184	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
120	PUR185	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
121	PUR186	Red_I45x11....	Yes	-.72	1.785	-3.03	4.685	.72	.72	.383	.383
122	PUR171	Red_I45x11....	Yes	-.778	1.785	-3.274	4.685	.778	.778	.413	.413
123	PUR172	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
124	PUR173	Red_I45x11....	Yes	-.952	1.785	-4.007	4.685	.952	.952	.503	.503
125	PUR174	Red_I45x11....	Yes	-.778	1.785	-3.274	4.685	.778	.778	.413	.413
126	PUR187	Red_I45x11....	Yes	-.104	1.785	-.079	4.685	.104	.104	.056	.056
127	PUR188	Red_I45x11....	Yes	-.13	1.785	-.099	4.685	.13	.13	.069	.069
128	PUR204	Red_I45x11....	Yes	-.104	1.785	-.079	4.685	.104	.104	.056	.056
129	PUR205	Red_I45x11....	Yes	1.113	2.053	-2.353	5.388	1.113	1.113	.189	.189
130	PUR206	Red_I45x11....	Yes	1.393	2.053	-2.946	5.388	1.393	1.393	.235	.235
131	PUR207	Red_I45x11....	Yes	1.113	2.053	-2.353	5.388	1.113	1.113	.189	.189

Hot Rolled Steel Column Code Checks

	Stack	Lift	Shape	Code Ch...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	phi*Pnc ...	phi*Pnt [k]	phi*Mn y...	phi*Mn z...	Cb	Eqn
1	CS1(5-E)_...	1	HSS4x4x4	.630	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
2	CS2(5-F)_...	1	HSS4x4x4	.669	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
3		2	HSS4x4x4	.734	10	5	.000	10		10	47.756	139.518	16.181	16.181	1	H1-1a
4	CS3(1-E)_...	1	HSS4x4x4	.317	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
5	CS4(1-F)_...	1	HSS4x4x4	.098	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1b*
6	CS5(2-F)_...	1	HSS4x4x4	.290	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
7	CS6(3-F)_...	1	HSS4x4x4	.358	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
8	CS7(3-E)_...	1	HSS4x4x4	.928	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
9		2	HSS5x5x4	.518	10	5	.000	10		10	76.086	178.02	26.255	26.255	1	H1-1a
10	CS8(4-E)_...	1	HSS5x5x4	.518	10.234	5	.000	0		10	76.086	178.02	26.255	26.255	1	H1-1a
11	CS9 (na)_...	1	HSS4x4x4	.742	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
12	CS10 (na)...	1	HSS4x4x4	.171	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1b*
13	CS11 (na)...	1	HSS4x4x4	.008	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1b
14	CS12 (na)...	1	HSS4x4x4	.256	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
15	CS13 (na)...	1	HSS4x4x4	.272	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
16	CS14 (na)...	1	HSS4x4x4	.015	0	3	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1b*
17	CS16(5-D)...	1	HSS4x4x4	.409	19.032	5	.000	0		10	84.454	139.518	16.181	16.181	1	H1-1a
18	CS17(6-F)...	1	HSS4x4x4	.594	0	5	.000	0		10	91.807	139.518	16.181	16.181	1	H1-1a
19		2	HSS4x4x4	.733	10	5	.000	10		10	47.756	139.518	16.181	16.181	1	H1-1a
20	(4-F)	1	HSS4x4x4	.170	0	5	.000	0		10	96.223	151.65	17.588	17.588	1	H1-1b*
21	CS19	1	HSS4x4x4	.151	0	5	.000	0		10	96.223	151.65	17.588	17.588	1	H1-1b*
22	CS24(6-F'...	1	HSS4x4x4	.002	23.494	5	.000	10		10	138.935	139.518	16.181	16.181	1	H1-1b*
23	CS29(6-B)...	1	HSS4x4x4	.052	23.5	5	.000	15.667		10	86.602	139.518	16.181	16.181	1	H1-1b*
24	CS30(6-C)...	1	HSS4x4x4	.006	15.667	1	.000	15.667		10	45.986	139.518	16.181	16.181	1	H1-1b*
25	CS31(6-D)...	1	HSS4x4x4	.353	19.089	5	.000	15.667		10	84.454	139.518	16.181	16.181	1	H1-1a
26	CS32(6-E)...	1	HSS4x4x4	.293	19.024	5	.000	12.667		10	99.972	139.518	16.181	16.181	1	H1-1a
27	CS36(3-A)...	1	HSS4x4x4	.322	10	5	.000	10		10	99.405	139.518	16.181	16.181	1	H1-1a
28	CS37(3-B)...	1	HSS5x5x5	.707	10	5	.000	10		10	51.092	217.764	31.602	31.602	1	H1-1a
29	CS38(3-C)...	1	HSS5x5x5	.611	10	5	.000	10		10	60.887	217.764	31.602	31.602	1	H1-1a
30	CS39(3-D)...	1	HSS5x5x4	.545	10	5	.000	10		10	62.143	178.02	26.255	26.255	1	H1-1a
31	CS40(4-D)...	1	HSS5x5x4	.537	10	5	.000	10		10	62.143	178.02	26.255	26.255	1	H1-1a
32	CS42 (na)...	1	HSS5x5x4	.029	23.355	5	.000	10		10	177.557	178.02	26.255	26.255	1	H1-1b
33	CS43 (na)...	1	HSS4x4x4	.047	15.667	5	.000	15.667		10	138.935	139.518	16.181	16.181	1	H1-1b*
34	CS44 (na)...	1	HSS4x4x4	.076	10	5	.000	10		10	53.932	139.518	16.181	16.181	1	H1-1b*
35	CS45 (na)...	1	HSS5x5x4	.035	10	5	.000	10		10	79.75	178.02	26.255	26.255	1	H1-1b*
36	CS35(5-F'...	1	HSS4x4x4	.014	17.5	5	.000	17.5		10	138.935	139.518	16.181	16.181	1	H1-1b*
37	CS75(5-B)...	1	HSS4x4x4	.296	19	5	.000	19		10	54.332	139.518	16.181	16.181	1	H1-1a
38	CS79(5-C)...	1	HSS4x4x4	.245	19	5	.000	19		10	68.932	139.518	16.181	16.181	1	H1-1a
39	CS83(3-A'...	1	HSS4x4x4	.066	19	5	.000	19		10	138.935	139.518	16.181	16.181	1	H1-1b*
40	CS84(4-A'...	1	HSS4x4x4	.029	19	5	.000	19		10	138.935	139.518	16.181	16.181	1	H1-1b*
41	CS86(4-A)...	1	HSS4x4x4	.833	19	5	.000	19		10	41.996	139.518	16.181	16.181	1	H1-1a
42	CS88(4-B)...	1	HSS4x4x4	.235	19	5	.000	19		10	53.287	139.518	16.181	16.181	1	H1-1a
43	CS90(4-C)...	1	HSS4x4x4	.240	19	5	.000	19		10	67.839	139.518	16.181	16.181	1	H1-1a
44	CS97 (na)...	1	HSS4x4x4	.003	22.024	3	.000	19		10	138.935	139.518	16.181	16.181	1	H1-1b
45	CS102 (na...	1	HSS4x4x4	.064	19	5	.000	19		10	128.975	139.518	16.181	16.181	1	H1-1b*
46		2	HSS4x4x4	.052	23.333	5	.000	23.333		10	81.98	139.518	16.181	16.181	1	H1-1b*
47	CS134 (na...	1	HSS4x4x4	.053	19	5	.000	19		10	37.13	139.518	16.181	16.181	1	H1-1b*
48	CS166 (na...	1	HSS4x4x4	.033	22	5	.000	22		10	122.569	139.518	16.181	16.181	1	H1-1b

Wood Column Code Checks

	Stack	Lift	Shape	Code C...	Elev[ft]	LC	Shear C...	Elev[ft]	Dir	LC	Fc' [ksi]	Ft' [ksi]	Fb1' [ksi]	Fb2' [ksi]	Fv' [ksi]	Eqn
1	CS15 (na)...	1	4-2X6	.033	0	7	.000	0	z	10	.705	.585	1.136	1.308	.135	3.6.3
2	CS69 (na)...	1	4-2X6	.130	10	7	.000	10	z	10	.807	.585	1.136	1.308	.135	3.6.3

Gravity Wall Utilization

Wall Results, Wood Wall Panel

	Wall Panel	Region	Stud Size	Stud Spacing[in]	Axial Check	Gov LC
1	WP2	R1	2X6	16	.249	8
2	WP1	R1	2X6	16	.201	8
3	WP16	R1	2X6	16	.092	7
4	WP4	R2	2X6	16	.297	8
5		R3	2X6	16	.192	8
6	WP18	R1	2X6	16	.502	8
7	WP6	R2	2X6	16	.061	8
8		R3	2X6	16	.037	8
9	WP20	R1	2X6	16	.125	7
10	WP21	R1	2X6	16	.049	7
11	WP23	R1	2X6	16	.107	7
12	WP24	R1	2X6	16	.056	7
13	WP26	R1	2X6	16	.018	6
14	WP27	R1	2X6	16	.018	6
15	WP33	R1	2X6	16	.017	7
16	WP34	R1	2X6	16	.035	8
17	WP3	R1	2X6	16	.238	8
18	WP35A	R2	2X6	16	.419	7
19		R3	2X6	16	.158	7
20	WP34A	R2	2X6	16	.338	7
21		R3	2X6	16	.157	7
22	WP34B	R1	2X6	16	.04	8

LATERAL SYSTEM
Designed using RISA3D detached from RISAFloor

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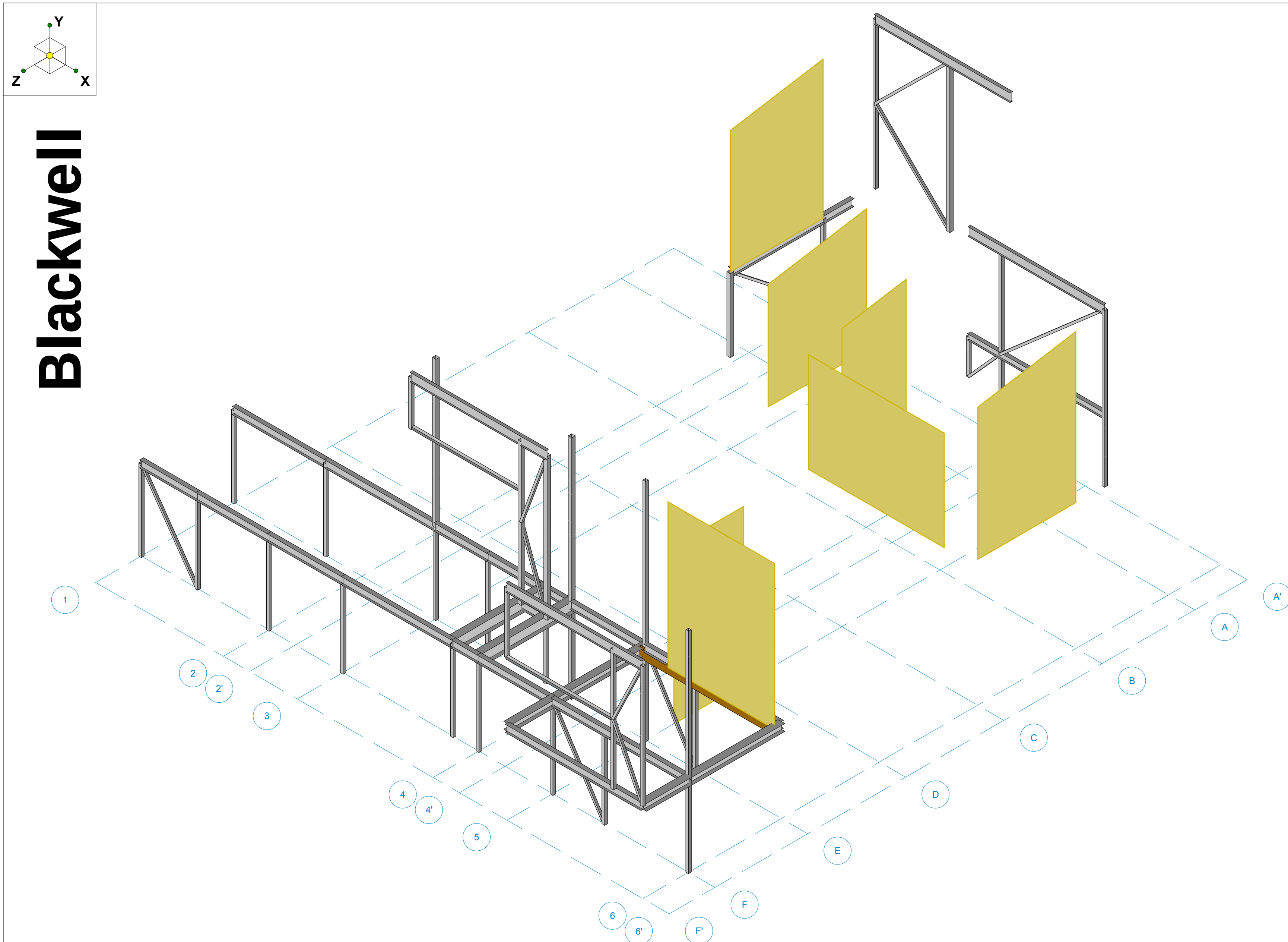

*RENDERED VIEW SHOWN FOR CONTEXT ONLY. REFER TO MEMBER PROPERTIES AND STRUCTURAL DRAWINGS FOR DETAILS.

Blackwell Structural Engineers	KMR V2 V3 V4 Lateral	GENERAL LATERAL RENDER
BG		July 27, 2017 at 5:11 PM
170266		KMR V2 V3 V4 Lateral System.r3d

Lateral Geometry Definition

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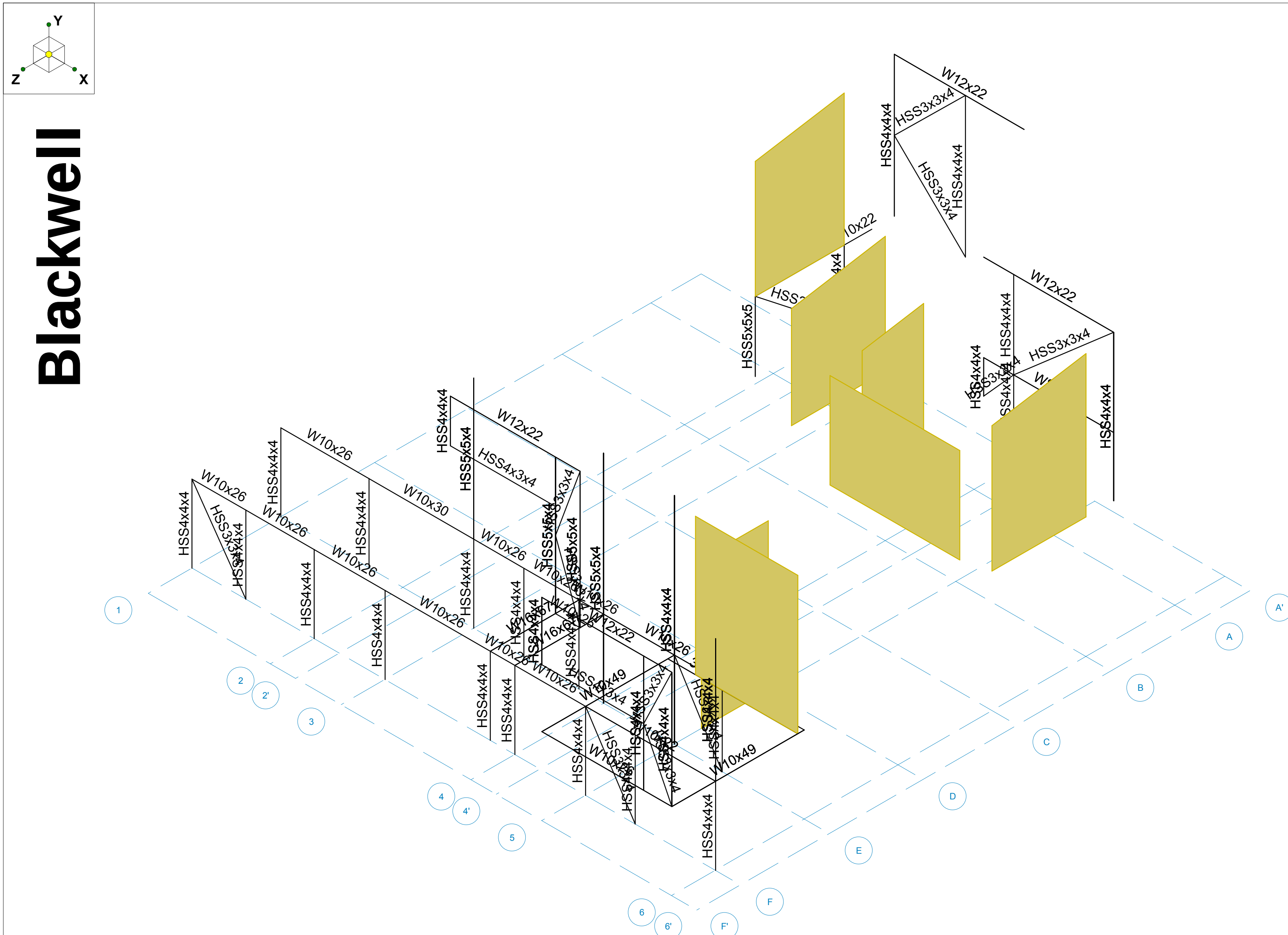

Blackwell Structural Engineers	KMR V2 V3 V4 Lateral	MEMBER SHAPES
BG		July 27, 2017 at 5:12 PM
170266		KMR V2 V3 V4 Lateral System.r3d

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Lateral Wall and Member Designation

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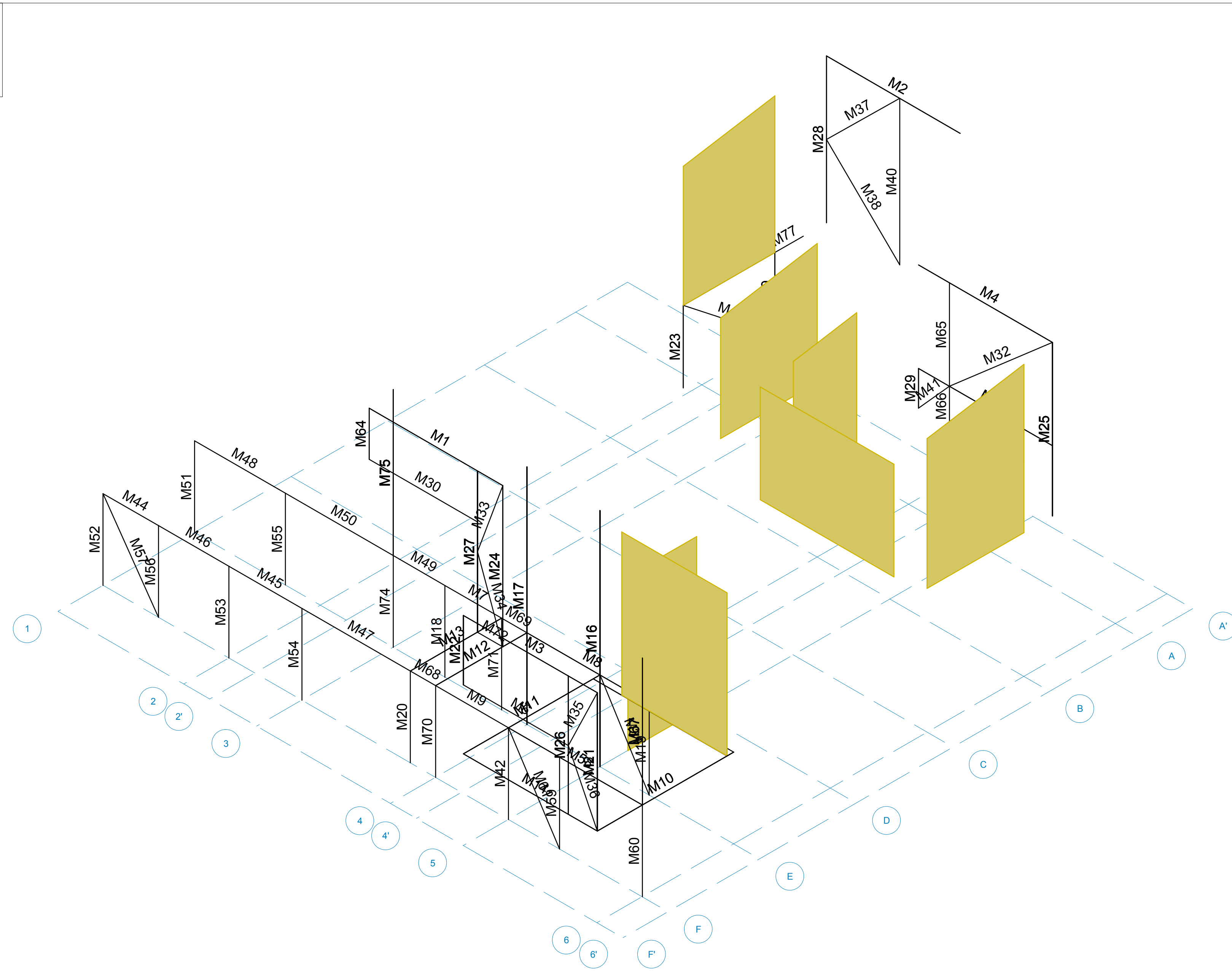

Blackwell Structural Engineers	KMR V2 V3 V4 Lateral	MEMBER DESIGNATIONS
BG		July 27, 2017 at 5:15 PM
170266		KMR V2 V3 V4 Lateral System.r3d

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Brace	HSS3x3x4	VBrace	SquareTube	A500 Gr.B Rect	Typical	2.44	3.02	3.02	5.08

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N15	N16			W12x22	Beam	None	A992	Typical
2	M2	N8	N9			W12x22	Beam	None	A992	Typical
3	M3	N4	N7			W12x22	Beam	None	A992	Typical
4	M4	N17	N18			W12x22	Beam	None	A992	Typical
5	M5	N42	N41			W8x18	Beam	None	A992	Typical
6	M6	N96	N90		90	HSS4x3x4	Beam	None	A500 Gr.B...	Typical
7	M7	N119	N115			W10x26	Beam	None	A992	Typical
8	M8	N114	N116			W10x26	Beam	None	A992	Typical
9	M9	N112	N118			W10x26	Beam	None	A992	Typical
10	M10	N107	N109			W10x49	Beam	None	A992	Typical
11	M11	N111	N113			W10x49	Beam	None	A992	Typical
12	M12	N114	N118			W16x67	Beam	None	A992	Typical
13	M13	N117	N119			W16x67	Beam	None	A992	Typical
14	M14	N109	N113			W10x26	Beam	None	A992	Typical
15	M15	N122	N123			3-1.75X11.875...	Beam	None	2.0E Micro...	Typical
16	M16	N124	N6			HSS4x4x4	Column	None	A500 Gr.B...	Typical
17	M17	N126	N14			HSS5x5x4	Column	None	A500 Gr.B...	Typical
18	M18	N127	N115			HSS4x4x4	Column	None	A500 Gr.B...	Typical
19	M19	N128	N116			HSS4x4x4	Column	None	A500 Gr.B...	Typical
20	M20	N129	N117			HSS4x4x4	Column	None	A500 Gr.B...	Typical
21	M21	N109	N4			HSS4x4x4	Column	None	A500 Gr.B...	Typical
22	M22	N90	N7			HSS4x4x4	Column	None	A500 Gr.B...	Typical
23	M23	N133	N76			HSS5x5x5	Column	None	A500 Gr.B...	Typical
24	M24	N134	N16			HSS5x5x4	Column	None	A500 Gr.B...	Typical
25	M25	N135	N17			HSS4x4x4	Column	None	A500 Gr.B...	Typical
26	M26	N136	N19			HSS4x4x4	Column	None	A500 Gr.B...	Typical
27	M27	N137	N20			HSS5x5x4	Column	None	A500 Gr.B...	Typical
28	M28	N139	N8			HSS4x4x4	Column	None	A500 Gr.B...	Typical
29	M29	N142	N42			HSS4x4x4	Column	None	A500 Gr.B...	Typical
30	M30	N151	N1		90	HSS4x3x4	Beam	Wide Flange	A992	Typical
31	M31	N111	N128			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
32	M32	N17	N45			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
33	M33	N16	N152			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
34	M34	N152	N134			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
35	M35	N4	N96			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
36	M36	N96	N109			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
37	M37	N21	N153			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
38	M38	N153	N246			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
39	M39	N132	N75			HSS4x4x4	Column	None	A500 Gr.B...	Typical
40	M40	N246	N21			HSS4x4x4	Column	None	A500 Gr.B...	Typical
41	M41	N45	N142			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
42	M42	N125	N112			HSS4x4x4	Column	None	A500 Gr.B...	Typical
43	M43	N132	N76			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
44	M44	N171	N176			W10x26	Beam	None	A992	Typical
45	M45	N172	N173			W10x26	Beam	None	A992	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
46	M46	N172	N176			W10x26	Beam	None	A992	Typical
47	M47	N173	N117			W10x26	Beam	None	A992	Typical
48	M48	N170	N175			W10x26	Beam	None	A992	Typical
49	M49	N174	N115			W10x26	Beam	None	A992	Typical
50	M50	N174	N175			W10x30	Beam	None	A992	Typical
51	M51	N177	N170			HSS4x4x4	Column	None	A500 Gr.B...	Typical
52	M52	N178	N171			HSS4x4x4	Column	None	A500 Gr.B...	Typical
53	M53	N179	N172			HSS4x4x4	Column	None	A500 Gr.B...	Typical
54	M54	N180	N173			HSS4x4x4	Column	None	A500 Gr.B...	Typical
55	M55	N183	N175			HSS4x4x4	Column	None	A500 Gr.B...	Typical
56	M56	N184	N176			HSS4x4x4	Column	None	A500 Gr.B...	Typical
57	M57	N171	N184			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
58	M58	N108	N112			W10x22	Beam	None	A992	Typical
59	M59	N186	N185			HSS4x4x4	Column	None	A500 Gr.B...	Typical
60	M60	N187	N108			HSS4x4x4	Column	None	A500 Gr.B...	Typical
61	M61	N112	N186			Brace	VBrace	SquareTube	A500 Gr.B...	Typical
62	M62	N28	N29			RE2X2	Beam	None	Null	Typical
63	M63	N84	N85			RE2X2	Beam	None	Null	Typical
64	M64	N151	N15			HSS4x4x4	Column	None	A500 Gr.B...	Typical
65	M65	N45	N27			HSS4x4x4	Beam	Wide Flange	A500 Gr.B...	Typical
66	M66	N45	N207			HSS4x4x4	Beam	Wide Flange	A500 Gr.B...	Typical
67	M67	N108	N208			HSS4x4x4	Column	None	A500 Gr.B...	Typical
68	M68	N118	N117			W10x26	Beam	None	A992	Typical
69	M69	N119	N114			W10x26	Beam	None	A992	Typical
70	M70	N275	N118			HSS4x4x4	Column	None	A992	Typical
71	M71	N276	N119			HSS4x4x4	Column	None	A992	Typical
72	M72	N134	N137			W10x26	Beam	None	A992	Typical
73	M73	N75	N76			W10x22	Beam	None	A992	Typical
74	M74	N181	N174			HSS4x4x4	Column	None	A500 Gr.B...	Typical
75	M75	N174	N192			HSS5x5x4	Column	None	A500 Gr.B...	Typical
76	M76	N107	N116			W10x22	Beam	None	A992	Typical
77	M77	F4_N59	N75			W10x22	Beam	None	A992	Typical
78	M78	N121	N110			RE2X2	Beam	None	gen_Conc...	Typical

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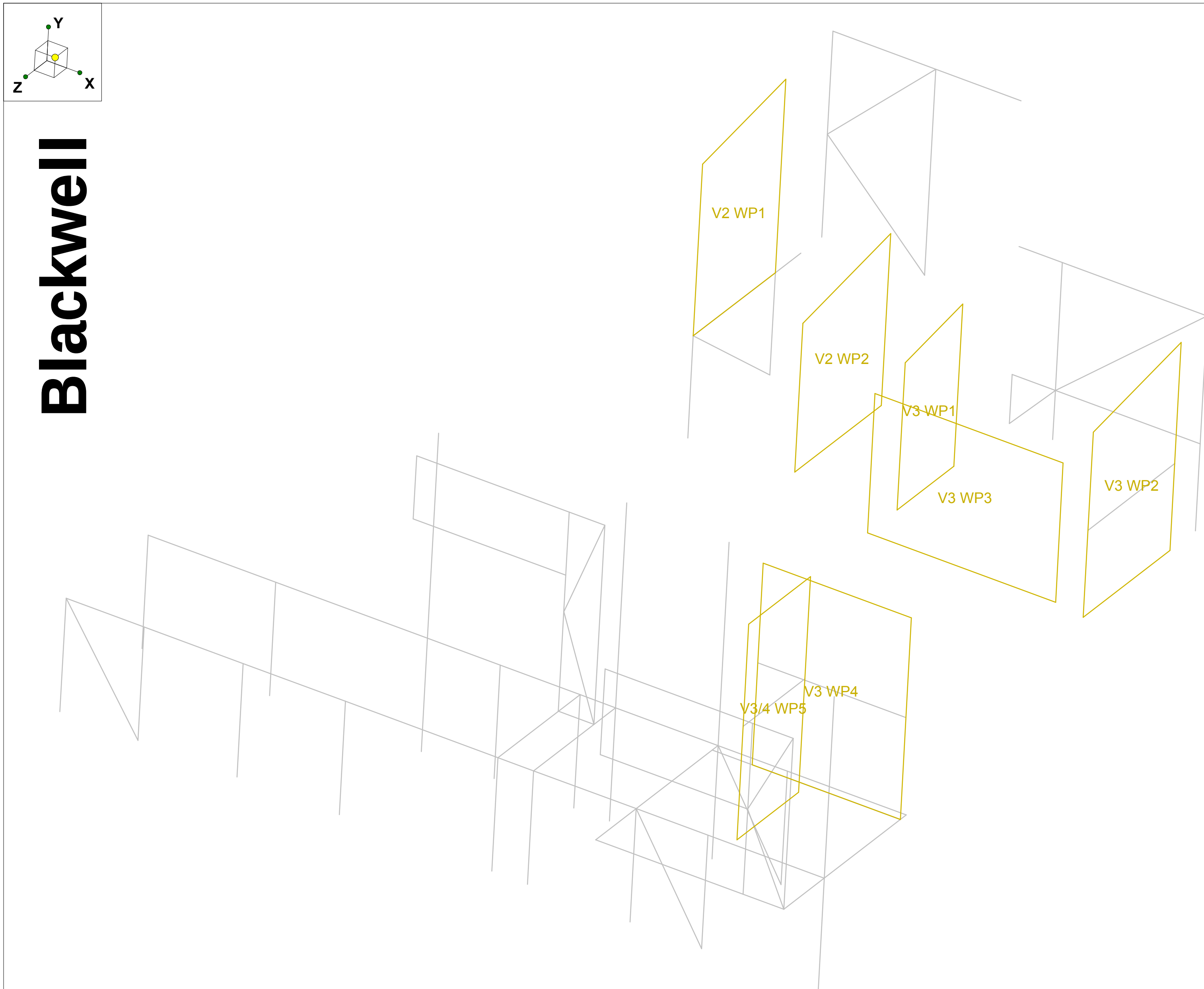

Envelope Only Solution

Blackwell Structural Engineers	KMR V2 V3 V4 Lateral	WALL PANEL DESIGNATION
BG		July 27, 2017 at 5:22 PM
170266		KMR V2 V3 V4 Lateral System.r3d

Wood Wall Panel Parameters

	Label	Top Plate	Sill Plate	Studs	Min Stud S...	Max Stud ...	Green Lumber?	Header Size	Header Matl
1	Typical	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
2	6"	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
3	4"	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
4	2"	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
5	6" Triple	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
6	4" Triple	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall
7	2" Triple	2-2X6	2X6	2X6	16	16		4-2X6	Same as Wall

Additional Wood Wall Panel Parameters

	Label	Schedule	Min. P...	Max. P...	Double Sided ...	Max. N...	Min. N...	HD Chor...	HD Chord M...	Hold Down	Ecce...
1	Typical	AWC 2015 PLY 0.469 ...	.469	.469	No	6-in.	2-in.	2-2X6	Same as Wall	HDU_DF-SP	Yes
2	6"	AWC 2015 PLY 0.469 ...	.469	.469	No	6-in.	6-in.	2-2X6	Same as Wall	HDU_DF-SP	Yes
3	4"	AWC 2015 PLY 0.469 ...	.469	.469	No	4-in.	4-in.	2-2X6	Same as Wall	HDU_DF-SP	Yes
4	2"	AWC 2015 PLY 0.469 ...	.469	.469	No	2-in.	2-in.	2-2X6	Same as Wall	HDU_DF-SP	Yes
5	6" Triple	S1_15/32_8d@6	.469	.469	No	6-in.	6-in.	3-2X6	Same as Wall	HDU_DF-SP	Yes
6	4" Triple	AWC 2015 PLY 0.469 ...	.469	.469	No	4-in.	4-in.	3-2X6	Same as Wall	HDU_DF-SP	Yes
7	2" Triple	AWC 2015 PLY 0.469 ...	.469	.469	No	2-in.	2-in.	3-2X6	Same as Wall	HDU_DF-SP	Yes

Wall Panel Data

	Label	A Joint	B Joint	C Joint	D Joint	Material Ty...	Material Set	Thicknes...	Design Rule	Panel/Spacing
1	V2 WP1	N10	N11	N76	N75	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@4 | 16
2	V2 WP2	N12	N13	N141	N140	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@4 | 16
3	V3 WP1	N5	N198	N202	N138	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@3 | 16
4	V3 WP2	N2	N3	N131	N130	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@4 | 16
5	V3 WP3	N24	N23	N83	N146	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@6 | 16
6	V3 WP4	N25	N26	N145	N122	Wood	Spruce-Pin...	5.5 (stud)	Typical	S1_15/32_8d@6 | 16
7	V3/4 WP5	F4_N116	N188	N148	N252	Wood	Spruce-Pin...	5.5 (stud)	6" Triple	S1_15/32_8d@6 | 16

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Structural Engineers

Lateral Model Loading
Note: vertical loads applied
from RISAFloor

Basic Load Cases

	BLC Description	Category	X Grav...	Y Grav...	Z Gravi...	Joint	Point	Distributed	Area(M...	Surfac...
1	Dead Load	DL		-1		27	234	47		
2	Live Load	LL				10	99	29		
5	Snow Load	SL				18	161	10		
29	EQ X	ELX						23		
30	EQ Z	ELZ						8		

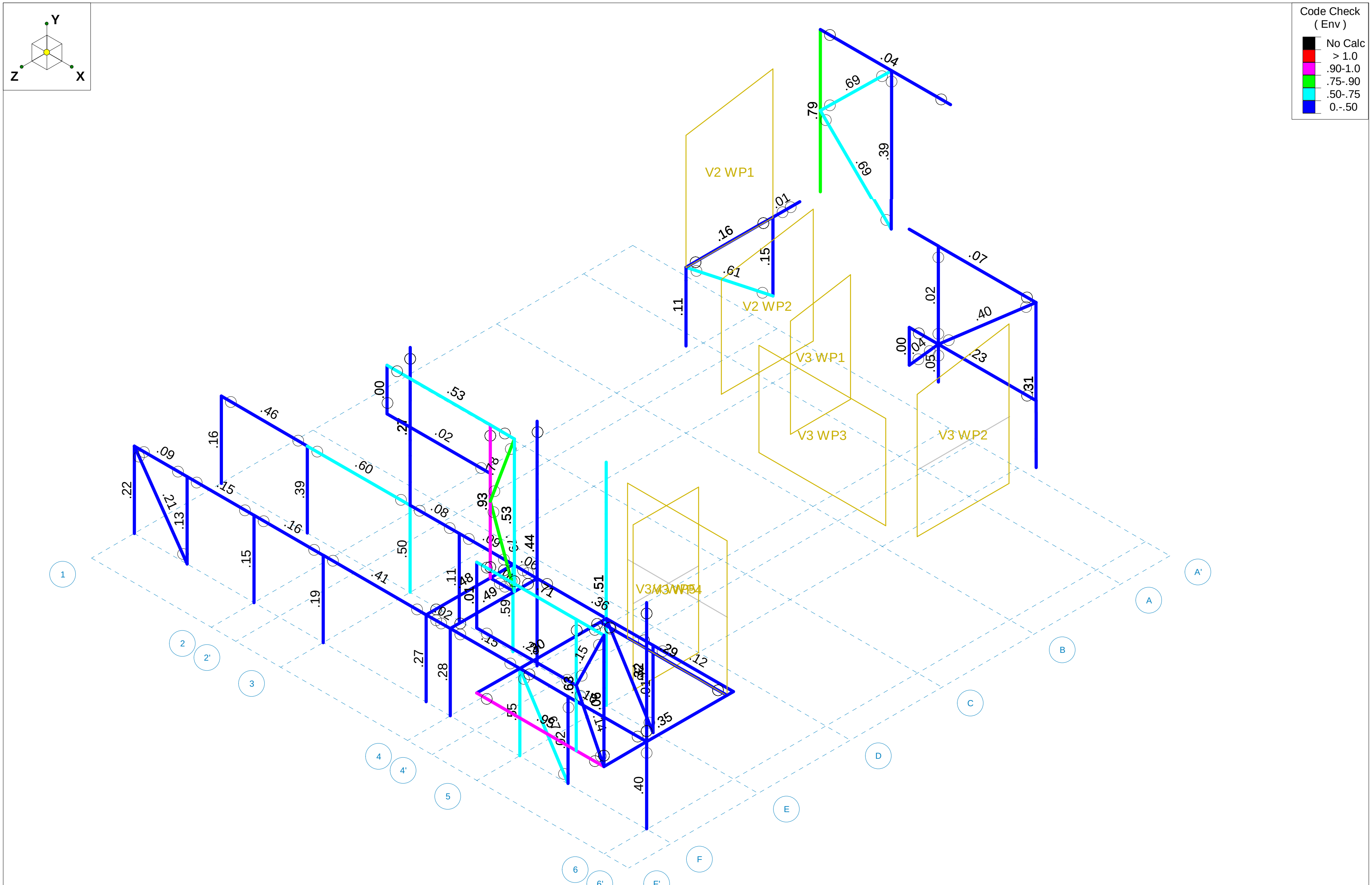
Load Combinations

	Description	Sol...	P...	S...	BLC	Fa...	BLC	Fac...	BLC	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac...
1	Dead Load		Y		DL	1																		
2	Live Load		Y		LL	1																		
3	Snow Load		Y		SL	1																		
4	Earthquake Load X		Y		ELX	1																		
5	Earthquake Load Z		Y		ELZ	1																		
6			Y																					
7	ASCE Strength 5 (a)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	1	LL	.5	LLS	1	SL	.2	S...	.2						
8	ASCE Strength 5 (b)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	1	LL	.5	LLS	1	SL	.2	S...	.2						
9	ASCE Strength 5 (c)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	-1	LL	.5	LLS	1	SL	.2	S...	.2						
10	ASCE Strength 5 (d)	Yes	Y		DL	1.2	Sds*...	.2	Rho*...	-1	LL	.5	LLS	1	SL	.2	S...	.2						
11	ASCE Strength 7 (a)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	1														
12	ASCE Strength 7 (b)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	1														
13	ASCE Strength 7 (c)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	-1														
14	ASCE Strength 7 (d)	Yes	Y		DL	.9	Sds*...	-.2	Rho*...	-1														
15	ASCE ASD 5 (b) (a)	Yes	Y		DL	1	Sds*...	.14	Rho*...	.7														
16	ASCE ASD 5 (b) (b)	Yes	Y		DL	1	Sds*...	.14	Rho*...	.7														
17	ASCE ASD 5 (b) (c)	Yes	Y		DL	1	Sds*...	.14	Rho*...	-.7														
18	ASCE ASD 5 (b) (d)	Yes	Y		DL	1	Sds*...	.14	Rho*...	-.7														
19	ASCE ASD 6 (b) (a)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75										
20	ASCE ASD 6 (b) (b)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75										
21	ASCE ASD 6 (b) (c)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75										
22	ASCE ASD 6 (b) (d)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75										
23	ASCE ASD 6 (d) (a)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75	SL	.75	S...	.75						
24	ASCE ASD 6 (d) (b)	Yes	Y		DL	1	Sds*...	.105	Rho*...	.525	LL	.75	LLS	.75	SL	.75	S...	.75						
25	ASCE ASD 6 (d) (c)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75	SL	.75	S...	.75						
26	ASCE ASD 6 (d) (d)	Yes	Y		DL	1	Sds*...	.105	Rho*...	-.525	LL	.75	LLS	.75	SL	.75	S...	.75						
27	ASCE ASD 8 (a)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	.7														
28	ASCE ASD 8 (b)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	.7														
29	ASCE ASD 8 (c)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	-.7														
30	ASCE ASD 8 (d)	Yes	Y		DL	.6	Sds*...	-.14	Rho*...	-.7														

Seismic Forces

Consideration for the different lateral resisting systems in each direction was taken into account by use of the response modification factor, R, for wood frame shear wall and steel ordinary concentrically braced frame. See Design Loading Report in Appendix A. ASCE7-10 cl. 12.2.3.3 and cl. 12.2.3.1 were considered in determining the appropriate response modification factor. Note that 30% of the roof or ground snow load (as appropriate) was considered in the seismic force calculations as per Section 1605.3.1 and 1605.3.2 of the Utah Amended Code.

Lateral Steel and Wood Member Utilization



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Blackwell Structural Engineers	KMR V2 V3 V4 Lateral	
BG		July 28, 2017 at 4:26 PM
170266		KMR V2 V3 V4 Lateral System.r3d

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

	Member	Shape	Code Che...	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pnc [...	phi*Pnt [...	phi*Mn y...	phi*Mn z-...	Cb	Eqn
1	M1	W12x22	.528	13.501	23	.187	16.833	y	23	246.774	291.6	13.725	109.875	1	H1-1b
2	M2	W12x22	.057	9.118	23	.007	9.118	y	24	246.774	291.6	13.725	50.972	1.7...	H1-1b
3	M3	W12x22	.715	3.682	23	.090	3.507	y	24	246.774	291.6	13.725	43.421	1.5...	H1-1b
4	M4	W12x22	.067	5.962	23	.010	12.8	y	25	246.774	291.6	13.725	37.805	1.3...	H1-1b
5	M5	W8x18	.234	3.858	7	.041	4.033	y	7	44.128	236.7	17.475	38.627	1.3...	H1-1b
6	M6	HSS4x3x4	.256	6.593	9	.034	0	z	9	35.275	120.474	10.764	13.144	1	H1-1b
7	M7	W10x26	.095	3.796	23	.070	7.145	y	25	256.216	342.45	28.125	117.375	1.1...	H1-1b
8	M8	W10x26	.355	9.117	7	.102	9.117	y	23	93.82	342.45	28.125	117.375	1.6...	H1-1a
9	M9	W10x26	.152	4.584	23	.086	0	y	25	212.426	342.45	28.125	112.414	1.1...	H1-1b
10	M10	W10x49	.348	11.445	7	.121	11.623	y	7	401.616	648	106.125	226.5	1.8...	H1-1b
11	M11	W10x49	.296	11.623	9	.105	11.623	y	9	401.616	648	106.125	226.5	1.7...	H1-1b
12	M12	W16x67	.492	3.115	7	.320	0	y	7	701.239	882	133.125	487.5	1.3...	H1-1b
13	M13	W16x67	.477	8.385	7	.309	8.505	y	7	701.239	882	133.125	487.5	1.3...	H1-1b
14	M14	W10x26	.946	3.682	9	.267	0	y	9	78.068	342.45	28.125	84.473	1.3...	H1-1b
15	M16	HSS4x4x4	.507	9.89	25	.001	0	y	23	42.342	139.518	16.181	16.181	1	H1-1a
16	M17	HSS5x5x4	.439	9.941	7	.000	0	y	13	177.557	178.02	26.255	26.255	1	H1-1a
17	M18	HSS4x4x4	.113	0	25	.000	0	y	7	91.807	139.518	16.181	16.181	1	H1-1...
18	M19	HSS4x4x4	.007	0	13	.000	0	z	23	91.807	139.518	16.181	16.181	1	H1-1...
19	M20	HSS4x4x4	.268	0	9	.000	0	y	9	91.807	139.518	16.181	16.181	1.6...	H1-1a
20	M21	HSS4x4x4	.058	0	11	.008	0	z	7	53.932	139.518	16.181	16.181	1.1...	H1-1...
21	M22	HSS4x4x4	.006	0	9	.000	5.909	z	9	109.816	139.518	16.181	16.181	1.18	H1-1b
22	M23	HSS5x5x5	.110	0	8	.000	7.5	z	8	175.247	217.764	31.602	31.602	1	H1-1...
23	M24	HSS5x5x4	.533	0	7	.001	13.355	y	9	79.75	178.02	26.255	26.255	1.2...	H1-1a
24	M25	HSS4x4x4	.307	7.496	7	.007	0	z	7	34.121	139.518	16.181	16.181	1.3...	H1-1a
25	M26	HSS4x4x4	.633	0	9	.030	0	y	9	53.932	139.518	16.181	16.181	2.6...	H1-1a
26	M27	HSS5x5x4	.928	8.781	13	.010	8.781	y	9	80.21	178.02	26.255	26.255	1	H1-1a
27	M28	HSS4x4x4	.787	9.077	9	.000	0	y	7	37.13	139.518	16.181	16.181	1.3...	H1-1a
28	M29	HSS4x4x4	.003	4.333	7	.000	3.024	z	7	128.975	139.518	16.181	16.181	1	H1-1b
29	M30	HSS4x3x4	.024	6.823	7	.003	0	z	9	32.946	130.95	11.7	14.287	1.6...	H1-1b
30	M31	HSS3x3x4	.364	6.37	23	.001	11.76	y	7	34.26	101.016	8.556	8.556	1.1...	H1-1a
31	M32	HSS3x3x4	.403	9.124	9	.003	0	y	7	16.063	101.016	8.556	8.556	1.1...	H1-1a
32	M33	HSS3x3x4	.777	5.158	13	.004	0	y	9	51.02	101.016	8.556	8.556	1.1...	H1-1a
33	M34	HSS3x3x4	.790	5.158	7	.002	9.342	y	9	51.02	101.016	8.556	8.556	1.1...	H1-1a
34	M35	HSS3x3x4	.146	8.396	9	.016	8.396	y	7	58.183	101.016	8.556	8.556	1.1...	H1-1...
35	M36	HSS3x3x4	.137	8.339	7	.019	0	y	9	58.617	101.016	8.556	8.556	1.1...	H1-1...
36	M37	HSS3x3x4	.689	6.734	9	.002	12.93	y	9	28.34	101.016	8.556	8.556	1.1...	H1-1a
37	M38	HSS3x3x4	.689	6.734	7	.002	12.93	y	7	28.34	101.016	8.556	8.556	1.1...	H1-1a
38	M39	HSS4x4x4	.146	0	26	.000	7.5	z	8	99.405	139.518	16.181	16.181	1	H1-1...
39	M40	HSS4x4x4	.392	0	7	.000	0	y	7	37.13	139.518	16.181	16.181	1	H1-1a
40	M41	HSS3x3x4	.036	5.813	9	.001	0	y	9	77.543	101.016	8.556	8.556	1.1...	H1-1...
41	M42	HSS4x4x4	.548	10	25	.003	0	z	9	91.807	139.518	16.181	16.181	1.6...	H1-1a
42	M43	HSS3x3x4	.606	6.997	10	.002	0	y	10	22.218	101.016	8.556	8.556	1.1...	H1-1a
43	M44	W10x26	.094	3.053	25	.058	6.979	y	23	259.653	342.45	28.125	117.375	1.1...	H1-1b
44	M45	W10x26	.159	4.202	25	.094	0	y	25	212.426	342.45	28.125	111.977	1.1...	H1-1b
45	M46	W10x26	.148	4.796	25	.094	8.854	y	23	219.345	342.45	28.125	113.63	1.1...	H1-1b
46	M47	W10x26	.409	6.823	25	.119	0	y	25	118.809	342.45	28.125	89.929	1.14	H1-1b
47	M48	W10x26	.460	5.946	23	.203	11.417	y	23	163.271	342.45	28.125	100.943	1.1...	H1-1b
48	M49	W10x26	.077	2.911	23	.058	6.5	y	23	269.356	342.45	28.125	117.375	1.1...	H1-1b
49	M50	W10x30	.604	6.933	23	.201	13.583	y	23	142.005	397.8	33.15	110.294	1.1...	H1-1b
50	M51	HSS4x4x4	.165	0	25	.000	0	y	7	91.807	139.518	16.181	16.181	1	H1-1...
51	M52	HSS4x4x4	.218	0	9	.000	0	y	7	91.807	139.518	16.181	16.181	1	H1-1a

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

	Member	Shape	Code Che...	Loc[ft]	LC	Shear C...	Loc[ft]	Dir	LC	phi*Pnc [...	phi*Pnt [...	phi*Mn y...	phi*Mn z-...	Cb	Eqn
52	M53	HSS4x4x4	.152	0	23	.000	0	y	7	91.807	139.518	16.181	16.181	1	H1-1...
53	M54	HSS4x4x4	.189	0	24	.000	0	z	9	91.807	139.518	16.181	16.181	1	H1-1...
54	M55	HSS4x4x4	.386	0	25	.000	0	y	7	91.807	139.518	16.181	16.181	1	H1-1a
55	M56	HSS4x4x4	.134	0	24	.000	0	y	7	91.807	139.518	16.181	16.181	1	H1-1...
56	M57	HSS3x3x4	.213	0	9	.001	0	y	8	31.861	101.016	8.556	8.556	1.1...	H1-1...
57	M58	W10x22	.098	10.521	9	.014	10.521	y	9	63.119	292.05	22.875	77.435	1.7...	H1-1b
58	M59	HSS4x4x4	.021	0	25	.009	0	z	9	91.807	139.518	16.181	16.181	1	H1-1...
59	M60	HSS4x4x4	.397	0	23	.000	0	y	7	91.807	139.518	16.181	16.181	1	H1-1a
60	M61	HSS3x3x4	.670	6.436	7	.021	11.882	y	9	33.56	101.016	8.556	8.556	1.1...	H1-1a
61	M64	HSS4x4x4	.001	5.563	9	.000	3.071	y	7	122.569	139.518	16.181	16.181	1.3...	H1-1b
62	M65	HSS4x4x4	.020	0	24	.009	0	y	7	81.98	139.518	16.181	16.181	1	H1-1...
63	M66	HSS4x4x4	.053	4.333	9	.000	0	y	7	128.975	139.518	16.181	16.181	1	H1-1...
64	M67	HSS4x4x4	.320	0	25	.000	0	y	9	47.756	139.518	16.181	16.181	1.2...	H1-1a
65	M68	W10x26	.018	1.594	25	.018	3.188	y	25	323.232	342.45	28.125	117.375	1.1...	H1-1b
66	M69	W10x26	.061	3.188	7	.008	3.188	y	9	323.232	342.45	28.125	117.375	1.1...	H1-1...
67	M70	HSS4x4x4	.276	0	7	.000	0	y	9	96.223	151.65	17.588	17.588	1.6...	H1-1a
68	M71	HSS4x4x4	.587	0	13	.000	0	y	9	96.223	151.65	17.588	17.588	1.6...	H1-1a
69	M72	W10x26	.024	0	13	.032	0	y	23	323.232	342.45	28.125	117.375	1.1...	H1-1...
70	M73	W10x22	.161	8.266	24	.090	0	y	26	132.186	292.05	22.875	79.806	1.1...	H1-1b
71	M74	HSS4x4x4	.502	10	25	.001	0	y	13	91.807	139.518	16.181	16.181	1.6...	H1-1a
72	M75	HSS5x5x4	.270	2.635	25	.001	5.835	y	13	76.588	178.02	26.255	26.255	1.2...	H1-1a
73	M76	W10x22	.123	0	11	.006	0	y	7	148.072	292.05	22.875	83.556	1.1...	H1-1...
74	M77	W10x22	.006	1.792	8	.009	3.583	y	10	266.43	292.05	22.875	97.5	1.1...	H1-1b

Envelope Wood Code Checks

	Mem...	Shape	Code Check	Loc[ft]	LC	Shear Ch...	Loc[ft]	Dir	LC	Fc' [...	Ft' [...	Fb1'...	Fb2'...	Fv' [...	RB	CL	CP	Eqn
1	M15	3-1.75X...	.292	13.326	27	.228	13.151	y	25	.346	2.488	4.081	4.16	.456	9.329	.981	.086	3.6.3

Shear Wall Utilization

Wood Wall Panel Axial Code Checks (AWC NDS-15: ASD)

	Wall Panel	Region	Stud Size	Stud Spaci...	Axial Check	Gov LC	Chord Size	Chord Axial Ch...	Gov LC
1	V2 WP1	R1	2X6	16	0	N/A	2-2X6	.894	26
2	V2 WP2	R1	2X6	16	0	N/A	2-2X6	.647	24
3	V3 WP1	R1	2X6	16	0	N/A	2-2X6	.967	26
4	V3 WP2	R1	2X6	16	0	N/A	2-2X6	.926	26
5	V3 WP3	R1	2X6	16	0	N/A	2-2X6	.255	15
6	V3 WP4	R1	2X6	16	0	N/A	2-2X6	.994	17
7	V3/4 WP5	R1	2X6	16	0	N/A	3-2X6	.69	18

See note below regarding tie down forces

Wood Wall Panel In Plane Code Checks (AWC NDS-15: ASD)

	Wall Panel	Shear Panel Label	Region	Shear Check	Shear Forc...	Gov LC	Hold-Down ...	Tension Ch...	Tie-Dow...	Gov LC
1	V2 WP1	S1_15/32_8d@4	R1	.726	.312	16	HDU4-SDS...	.928	4.235	30
2	V2 WP2	S1_15/32_8d@4	R1	.726	.312	16	HDU4-SDS...	.734	3.352	28
3	V3 WP1	S1_15/32_8d@3	R1	.968	.532	16	HDU8-SDS...	.897	7.056	30
4	V3 WP2	S1_15/32_8d@4	R1	.708	.304	16	HDU2-SDS...	.805	2.474	30
5	V3 WP3	S1_15/32_8d@6	R1	.67	.187	15	HDU2-SDS...	.655	2.014	27
6	V3 WP4	S1_15/32_8d@6	R1	.995	.278	15	HDU4-SDS...	.895	4.085	29
7	V3/4 WP5	S1_15/32_8d@6	R1	.904	.231	16	HDU2-SDS...	.296	.909	30

Envelope Wall Panel Forces

	Wall Label	Elevation ...		Axial [k]	LC	x Shear [k]	LC	z Shear [k]	LC	x-x Mo...	LC	z-z Mo...	LC
1	V2 WP1	19	max	16.325	24	3.591	30	0	30	0	16	57.577	28
2		19	min	2.04	30	-3.591	16	0	30	0	24	-58.315	18
3	V2 WP2	19	max	20.229	26	3.799	18	0	30	0	28	53.728	16
4		19	min	2.444	28	-3.799	16	0	30	0	26	-53.712	30
5	V3 WP1	19	max	12.45	26	4.235	28	0	30	0	20	60.011	18
6		19	min	1.667	28	-4.235	18	0	30	0	25	-56.434	28
7	V3 WP2	15.667	max	23.376	26	3.703	18	0	30	0	21	54.393	28
8		15.667	min	4.11	28	-3.703	28	0	30	0	24	-62.898	18
9	V3 WP3	19	max	4.462	25	3.156	29	0	30	0	25	55.433	1
10		19	min	.707	27	-4.508	1	0	30	0	29	-38.747	29
11	V3 WP4	10	max	4.286	25	5.271	1	0	17	0	17	58.324	17
12		10	min	.944	27	-3.69	29	0	19	0	19	-82.476	1
13	V3/4 WP5	0	max	12.135	1	2.002	28	0	30	0	1	26.923	18
14		0	min	4.707	30	-2.002	18	0	30	0	25	-26.36	28

Tie Down Anchorage Note:

The tie down forces in V2 WP1 and V2 WP2 as well as V1 WP2 will be resolved through connection to the adjacent columns using Simpson Strong-Drive TB Wood-to-Steel Screws. See data sheet on next page.

Fastener Calculation

Max Tie Down Force / Height of Adjacent Column = 4.235 kips / 17 ft = 249 lbs per foot

Fastener Resistance to Seismic Force = 335 lbs

Therefore, minimum spacing of fastener = 335/249 = 1.345 ft

Use 12" c/c.

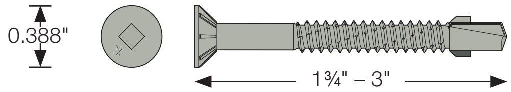
Strong-Drive®

TB WOOD-TO-STEEL Screw

Common Applications:

- Wood to hot-rolled steel (Maximum recommended thicknesses: 5⁄16")

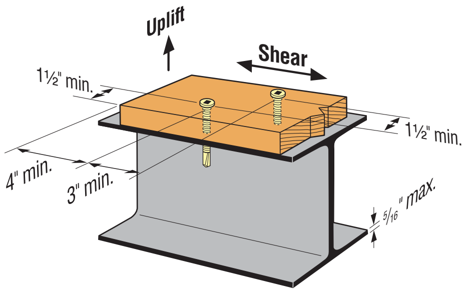
For More Product Information, see p. 100

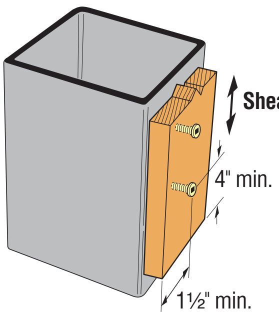


TB – Allowable Loads – DF and SP Lumber Attachment to Steel (Steel Members 16 ga. - 5⁄16" Thick)

Model No.	Length in. (mm)	Nominal Wood Thickness (in.)	Steel Thickness mil (ga.)	DF/SP Allowable Load (lb.)			
				Uplift		Shear	
				C_D=1.0	C_D=1.6	C_D=1.0	C_D=1.6
TB1460S	2⅜ (60)	2x	54 (16)	195	195	210	335
			68 (14)	225	225	210	335
			97-312 (12 – 5⁄16")	245	390	215	345
TB1475S	3 (75)		54 (16)	195	195	210	335
			68 (14)	225	225	210	335
			97-312 (12 – 5⁄16")	245	390	215	345

1. For use with structural steel members up to 5⁄16" thick or cold-formed steel members 54 mil (16 ga.) or thicker.
2. Standard product available in a black phosphate, yellow zinc or N2000 coating for additional corrosion protection *(TBG1460S or TBG1475S).*
3. For use with 2x (1½") DF/SP only.
4. For use with QD HSD60 or HSD75 Tool.
5. Use increased allowable loads (C_D=1.6) only when resisting wind or seismic forces.



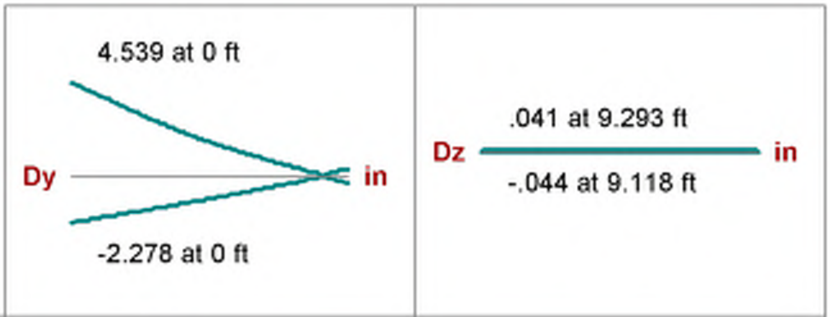


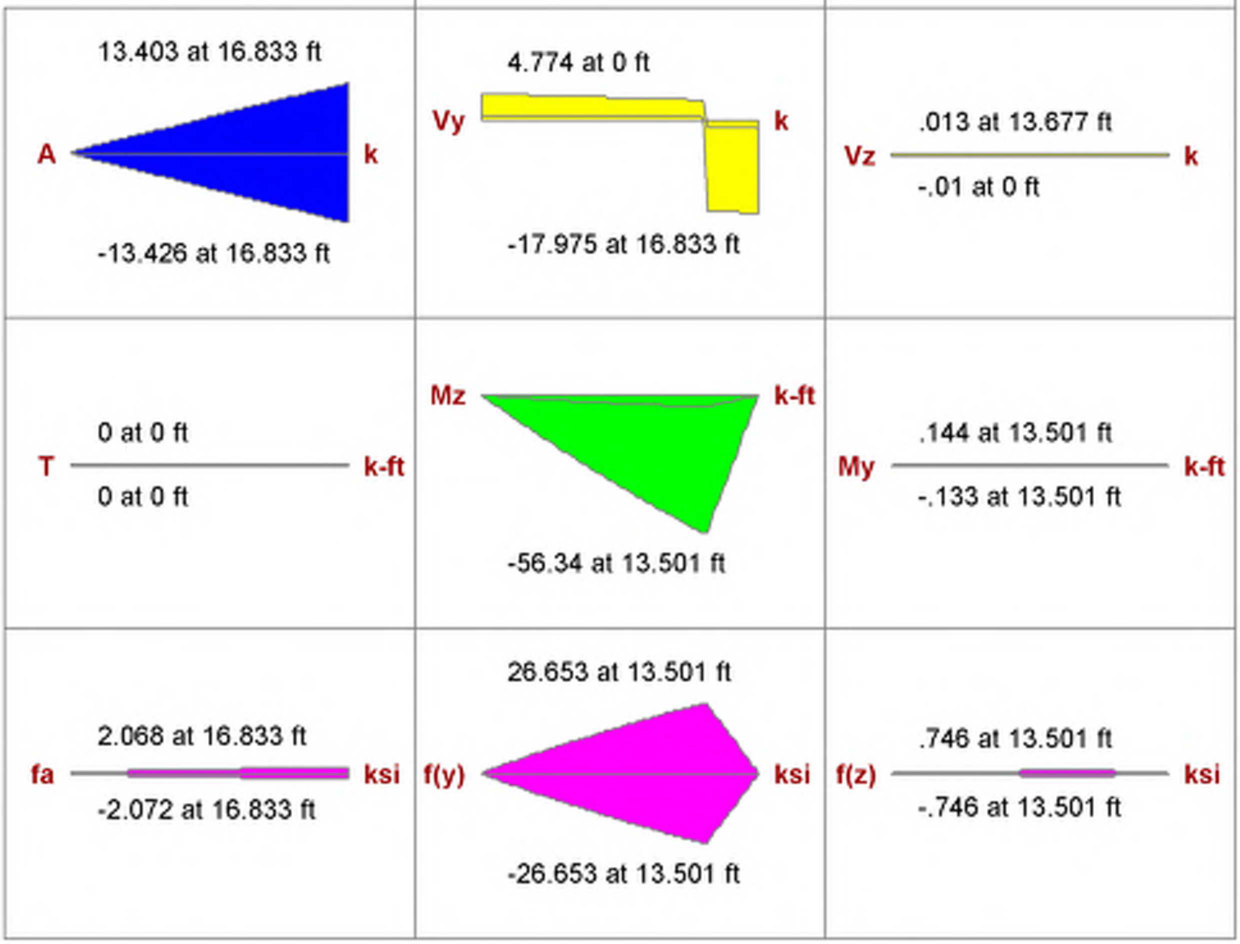
Blackwell
Structural Engineers

Lateral Member Detailed Reports

Beam: *M1*

Shape: **W12x22**
Material: **A992**
Length: **16.833 ft**
I Joint: **N15**
J Joint: **N16**
Envelope
Code Check: **0.528 (LC 23)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

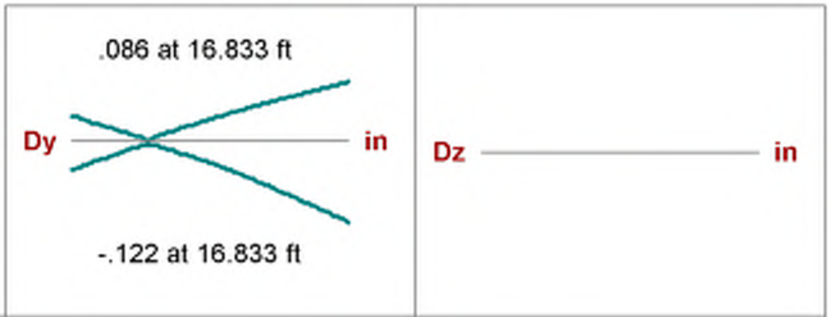
Direct Analysis Method

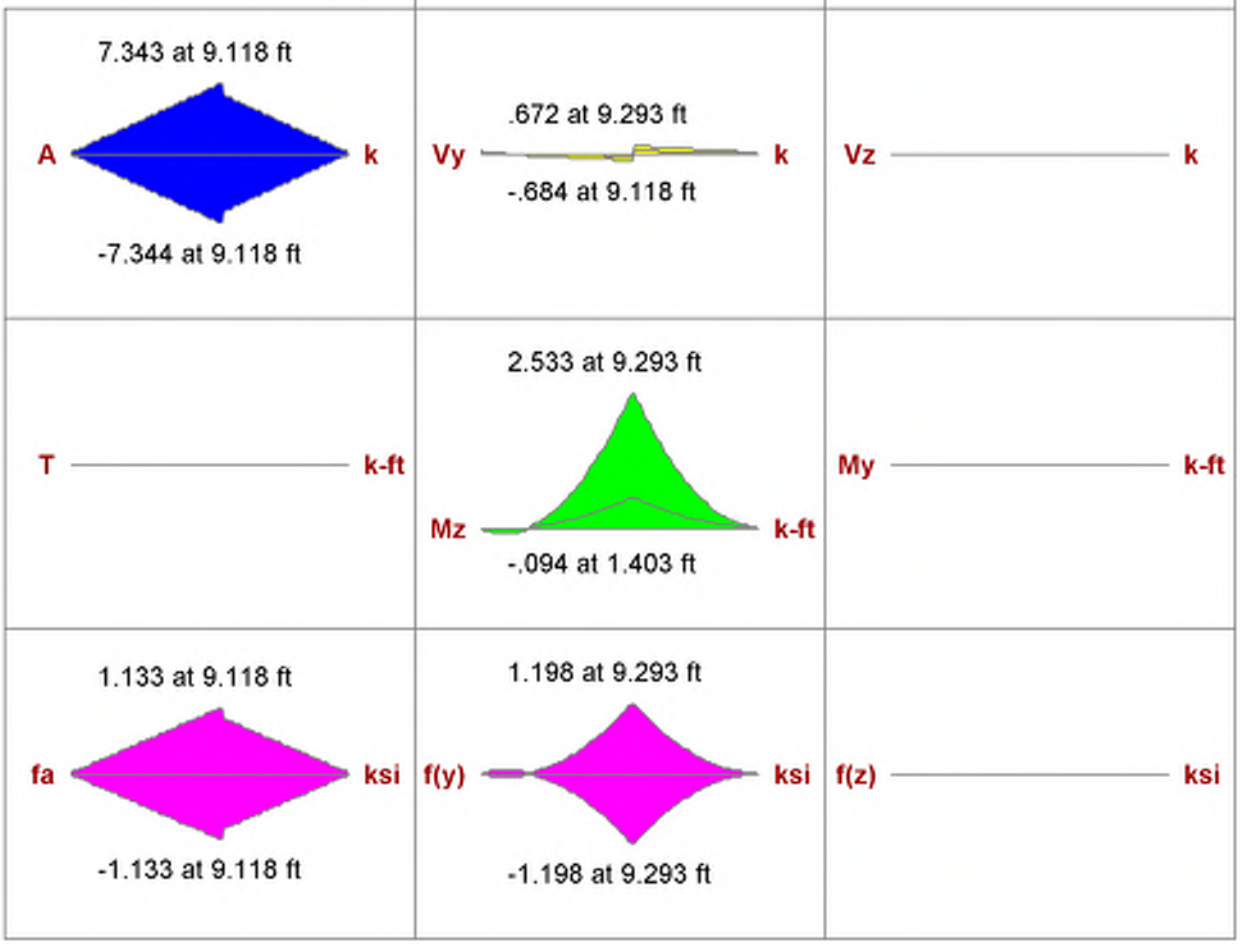
Max Bending Check	**0.528 (LC 23)**	Max Shear Check	**0.187 (y) (LC 23)**
Location	**13.501 ft**	Location	**16.833 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/42**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=.952**

			y-y	z-z
Fy	**50 ksi**	Lb	**2.667 ft**	**16.833 ft**
phi*Pnc	**246.774 k**	KL/r	**37.74**	**41.169**
phi*Pnt	**291.6 k**			
phi*Mny	**13.725 k-ft**	L Comp Flange	**.5 ft**	
phi*Mnz	**109.875 k-ft**	L-torque	**16.833 ft**	
phi*Vny	**95.94 k**	Tau_b	**1**	
phi*Vnz	**92.489 k**			
Cb	**1**			

Beam: ***M2***

Shape: **W12x22**
Material: **A992**
Length: **16.833 ft**
I Joint: **N8**
J Joint: **N9**
Envelope
Code Check: **0.057 (LC 23)**
Report Based On 97 Sections





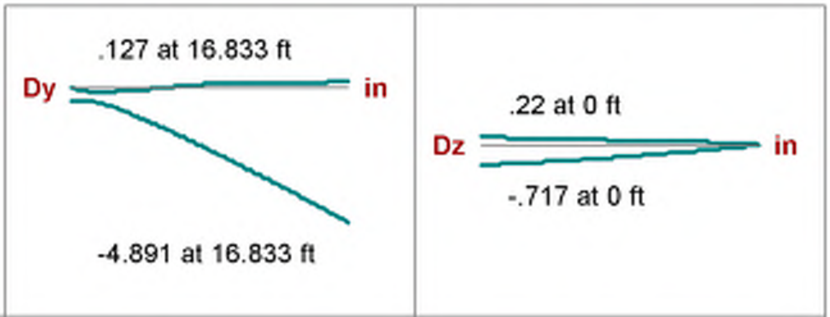
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

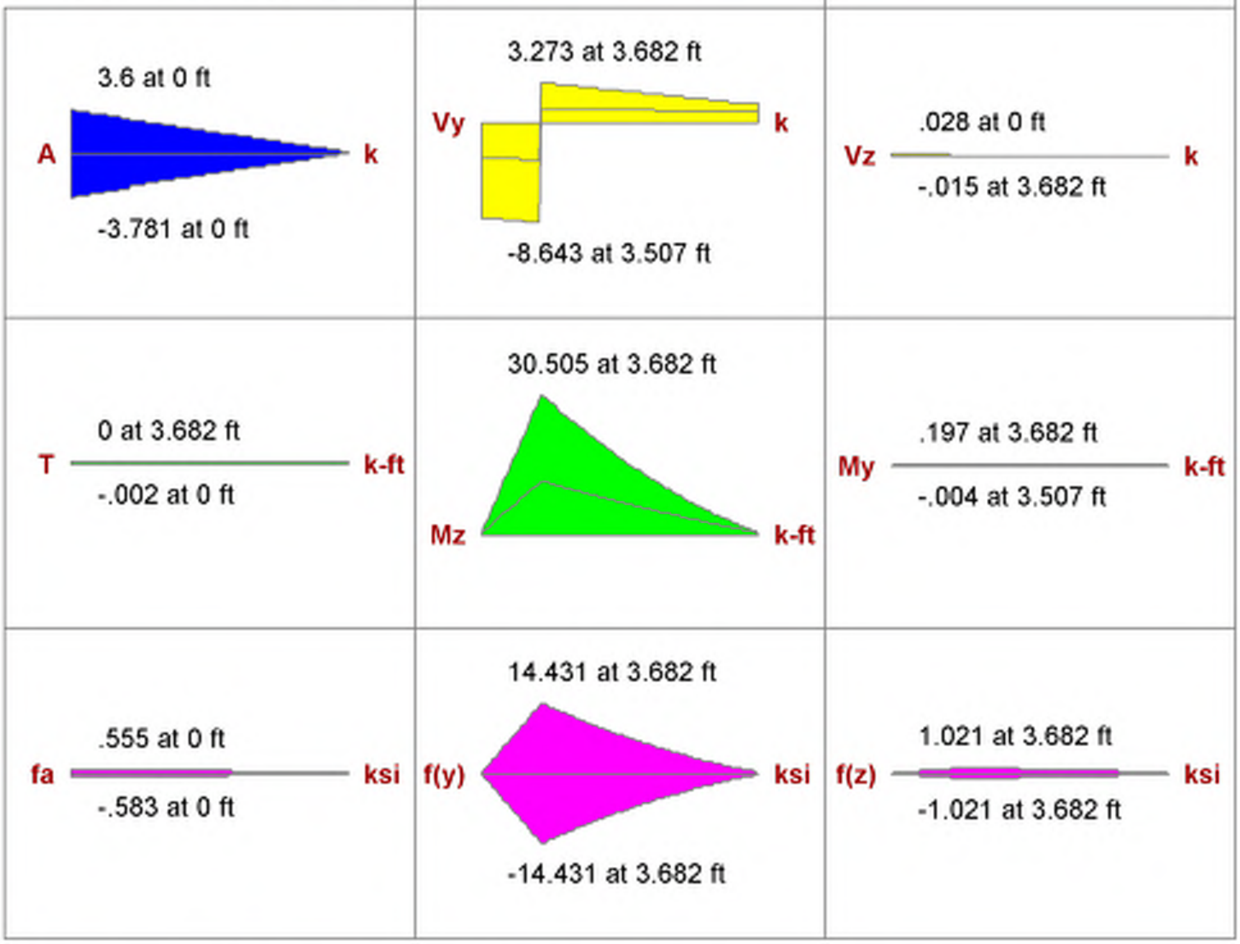
Max Bending Check	**0.057 (LC 23)**	Max Shear Check	**0.007 (y) (LC 24)**
Location	**9.118 ft**	Location	**9.118 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/1323**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=.952**

			y-y	z-z
Fy	**50 ksi**	Lb	**2.667 ft**	**16.833 ft**
phi*Pnc	**246.774 k**	KL/r	**37.74**	**41.169**
phi*Pnt	**291.6 k**			
phi*Mny	**13.725 k-ft**	L Comp Flange	**16.833 ft**	
phi*Mnz	**50.972 k-ft**	L-torque	**16.833 ft**	
phi*Vny	**95.94 k**	Tau_b	**1**	
phi*Vnz	**92.489 k**			
Cb	**1.788**			

Beam: ***M3***

Shape: **W12x22**
Material: **A992**
Length: **16.833 ft**
I Joint: **N4**
J Joint: **N7**
Envelope
Code Check: **0.715 (LC 23)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

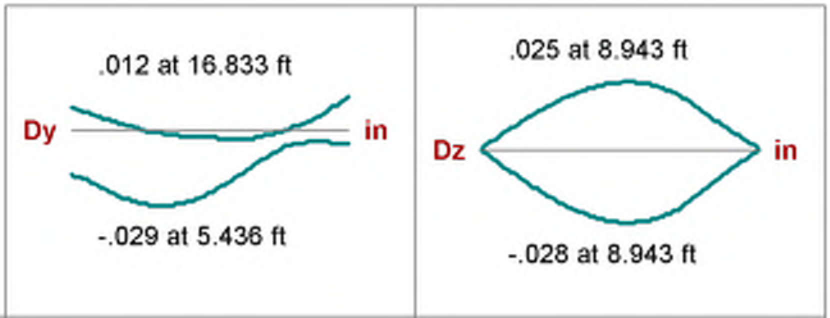
Direct Analysis Method

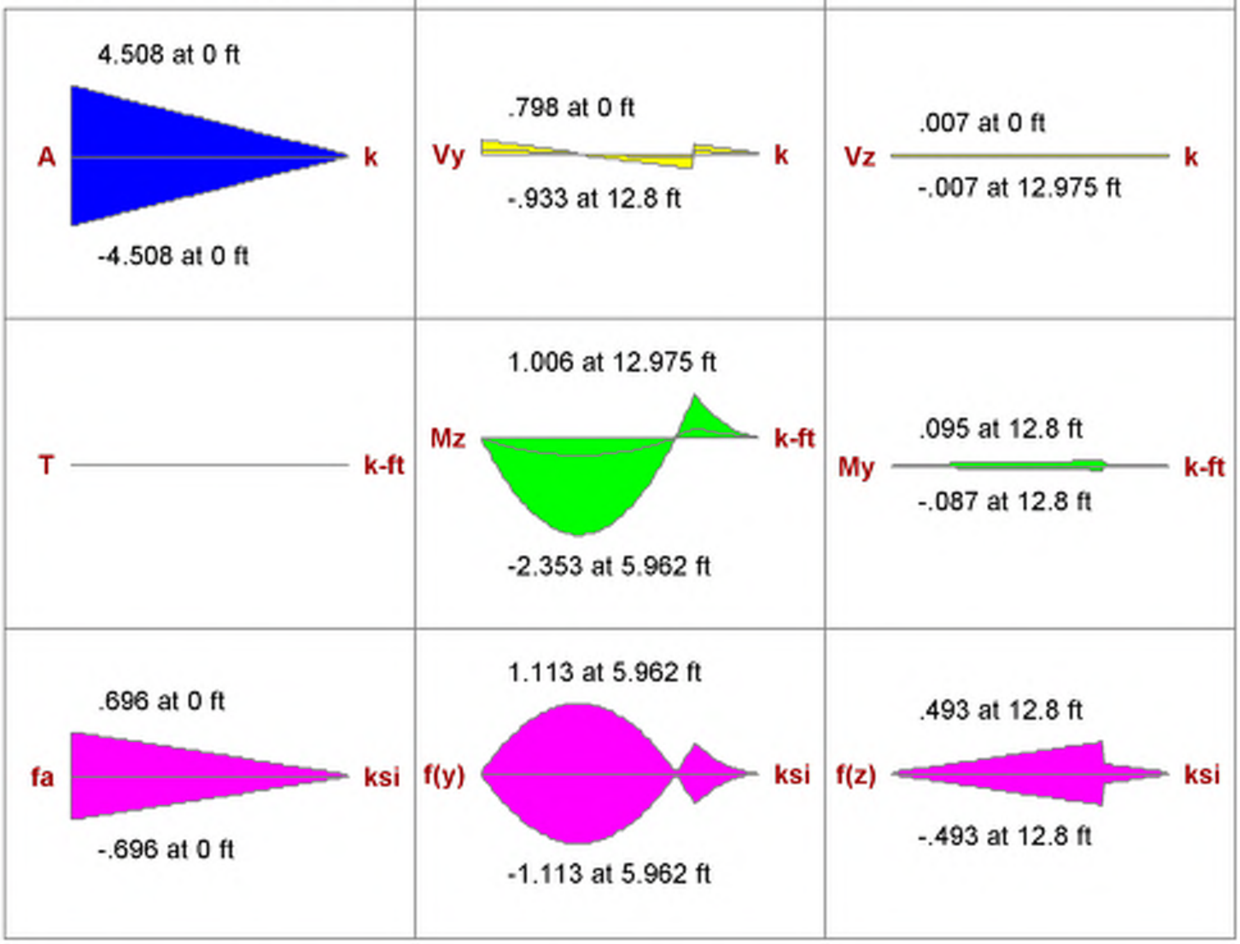
Max Bending Check	**0.715 (LC 23)**	Max Shear Check	**0.090 (y) (LC 24)**	
Location	**3.682 ft**	Location	**3.507 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/42**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=.952**

			y-y	z-z
Fy	**50 ksi**	Lb	**2.667 ft**	**16.833 ft**
phi*Pnc	**246.774 k**	KL/r	**37.74**	**41.169**
phi*Pnt	**291.6 k**			
phi*Mny	**13.725 k-ft**	L Comp Flange	**16.833 ft**	
phi*Mnz	**43.421 k-ft**	L-torque	**16.833 ft**	
phi*Vny	**95.94 k**	Tau_b	**1**	
phi*Vnz	**92.489 k**			
Cb	**1.523**			

Beam: ***M4***

Shape: **W12x22**
Material: **A992**
Length: **16.833 ft**
I Joint: **N17**
J Joint: **N18**
Envelope
Code Check: **0.067 (LC 23)**
Report Based On 97 Sections





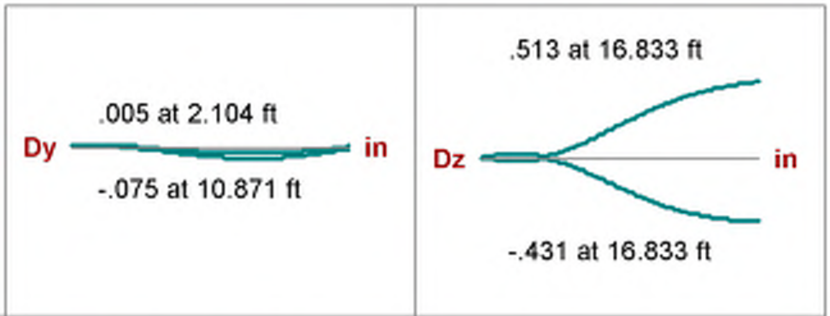
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

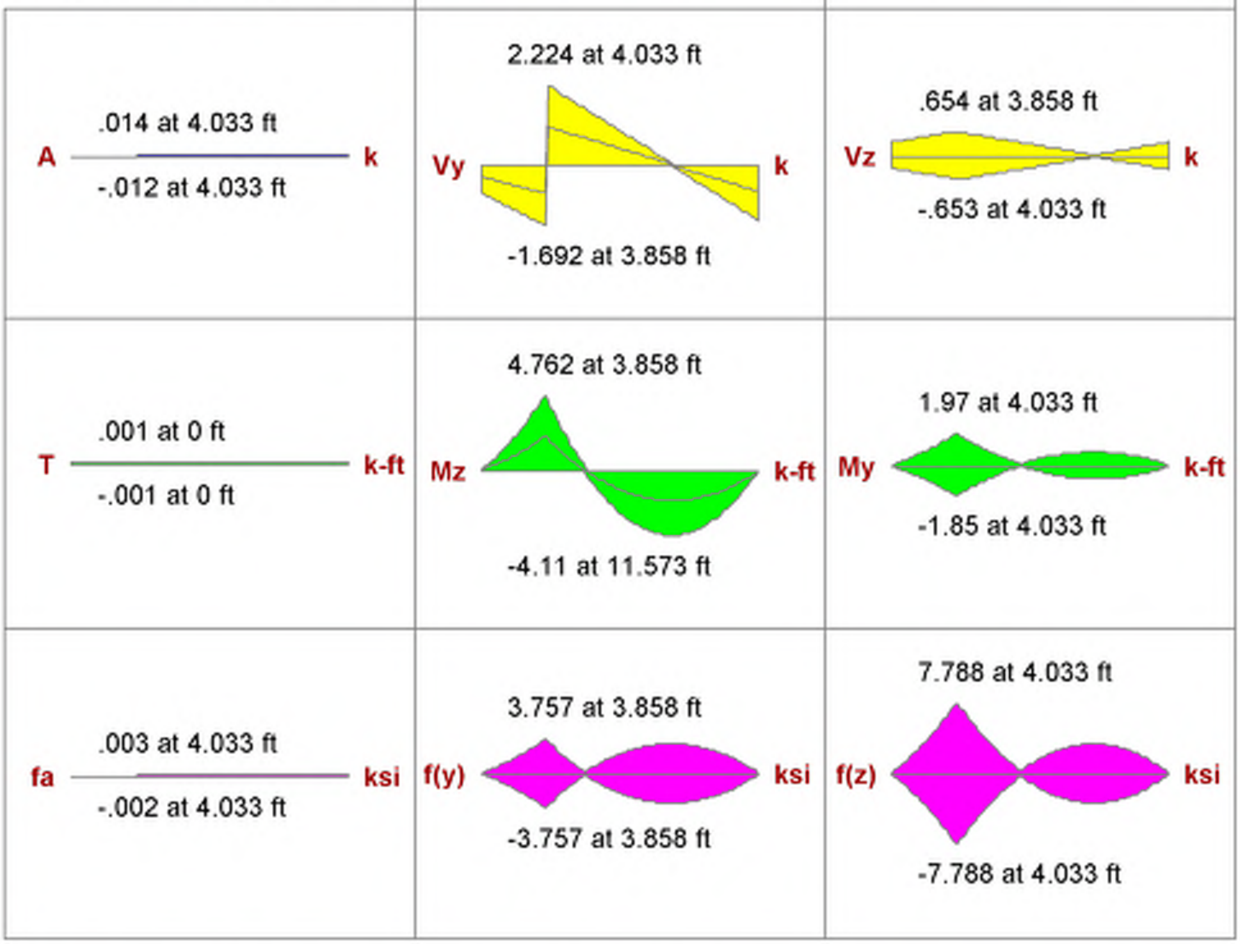
Max Bending Check	**0.067 (LC 23)**	Max Shear Check	**0.010 (y) (LC 25)**	
Location	**5.962 ft**	Location	**12.8 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/7188**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=.952**

			y-y	z-z
Fy	**50 ksi**	Lb	**2.667 ft**	**16.833 ft**
phi*Pnc	**246.774 k**	KL/r	**37.74**	**41.169**
phi*Pnt	**291.6 k**			
phi*Mny	**13.725 k-ft**	L Comp Flange	**16.833 ft**	
phi*Mnz	**37.805 k-ft**	L-torque	**16.833 ft**	
phi*Vny	**95.94 k**	Tau_b	**1**	
phi*Vnz	**92.489 k**			
Cb	**1.326**			

Beam: *M5*

Shape: **W8x18**
Material: **A992**
Length: **16.833 ft**
I Joint: **N42**
J Joint: **N41**
Envelope
Code Check: **0.234 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.234 (LC 7)**	Max Shear Check	**0.041 (y) (LC 7)**
Location	**3.858 ft**	Location	**4.033 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/394**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**16.833 ft**	**16.833 ft**
phi*Pnc	**44.128 k**	KL/r	**164.099**	**58.883**
phi*Pnt	**236.7 k**			
phi*Mny	**17.475 k-ft**	L Comp Flange	**16.833 ft**	
phi*Mnz	**38.627 k-ft**	L-torque	**16.833 ft**	
phi*Vny	**56.166 k**	Tau_b	**1**	
phi*Vnz	**93.555 k**			
Cb	**1.307**			

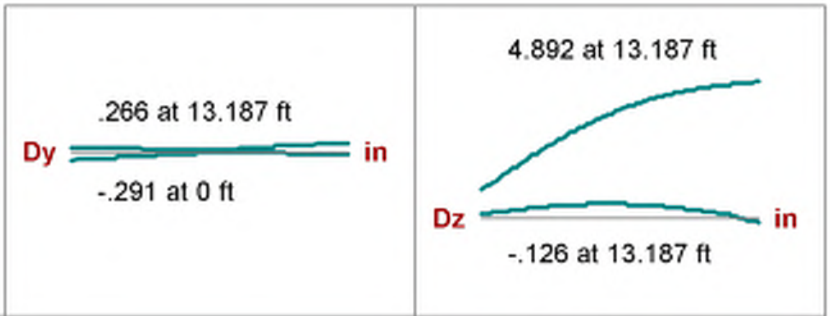
Beam: ***M6***

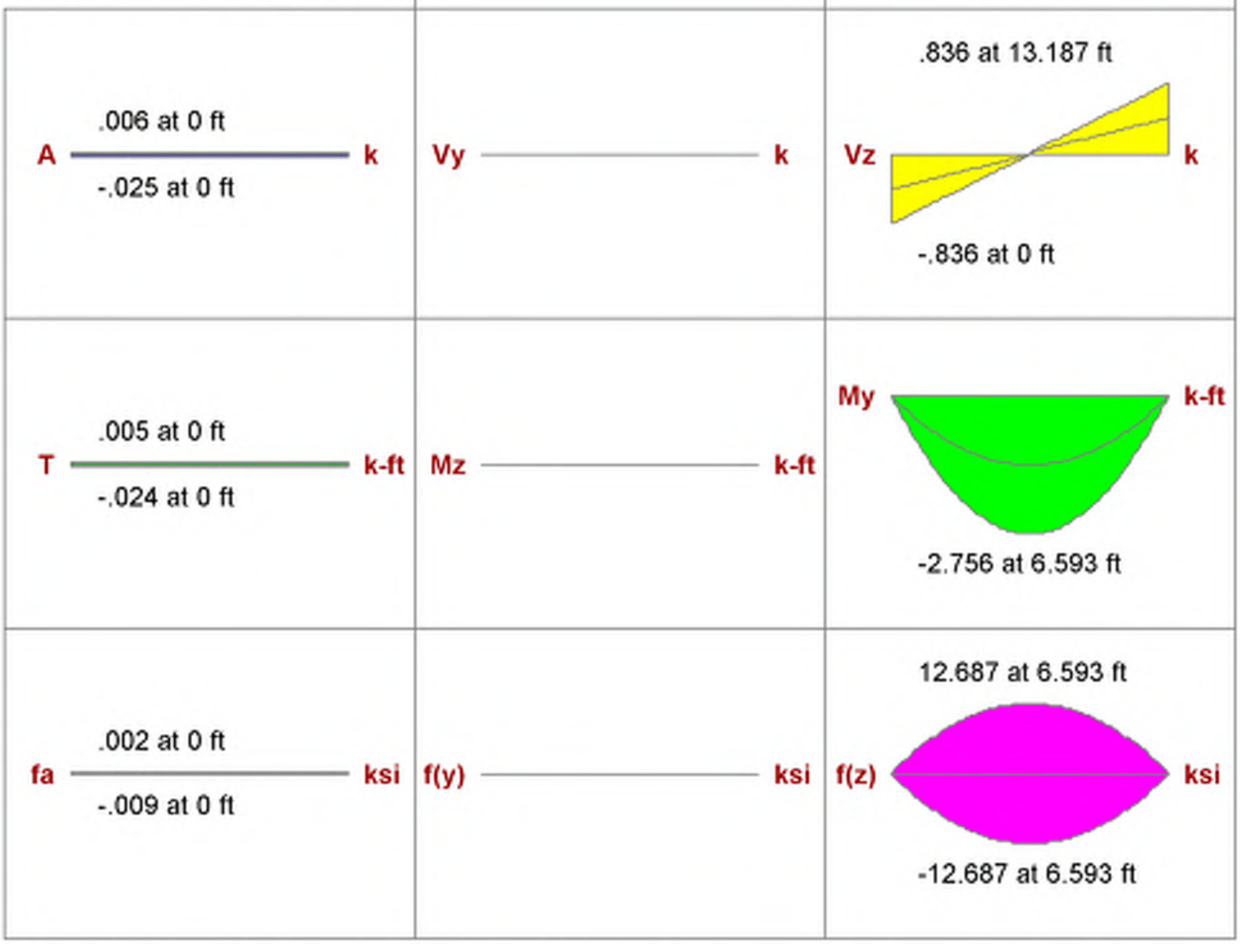
Shape:	**HSS4x3x4**
Material:	**A500 Gr.B Rect**
Length:	**13.187 ft**
I Joint:	**N96**
J Joint:	**N90**

Envelope

Code Check: **0.256 (LC 9)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.256 (LC 9)**	Max Shear Check	**0.034 (z) (LC 9)**
Location	**6.593 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/166**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

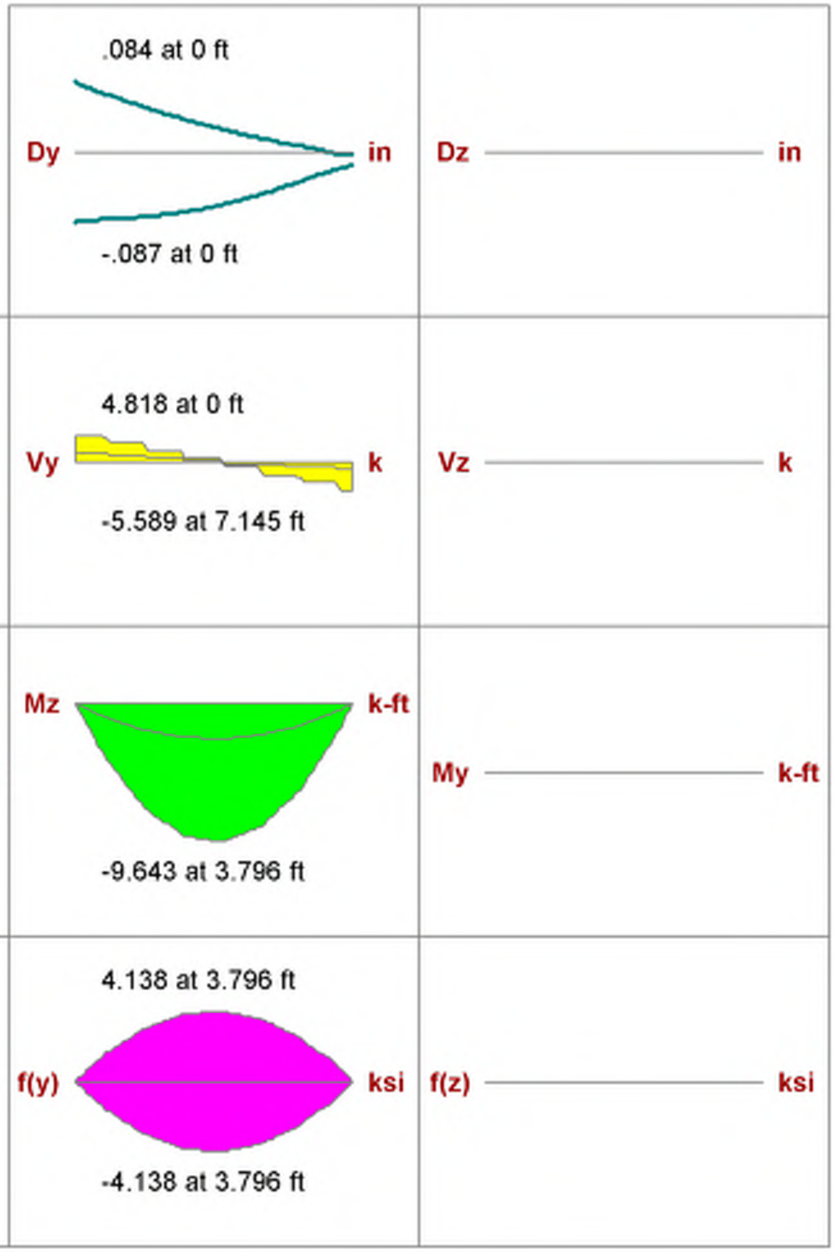
			y-y	z-z
Fy	**46 ksi**	Lb	**13.187 ft**	**13.187 ft**
phi*Pnc	**35.275 k**	KL/r	**136.517**	**108.852**
phi*Pnt	**120.474 k**			
phi*Mny	**10.764 k-ft**	L Comp Flange	**13.187 ft**	
phi*Mnz	**13.144 k-ft**	L-torque	**13.187 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**9.953 k-ft**			
Cb	**1**			

Beam:	***M7***
Shape:	**W10x26**
Material:	**A992**
Length:	**7.145 ft**
I Joint:	**N119**
J Joint:	**N115**

Envelope

Code Check: **0.095 (LC 23)**

Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

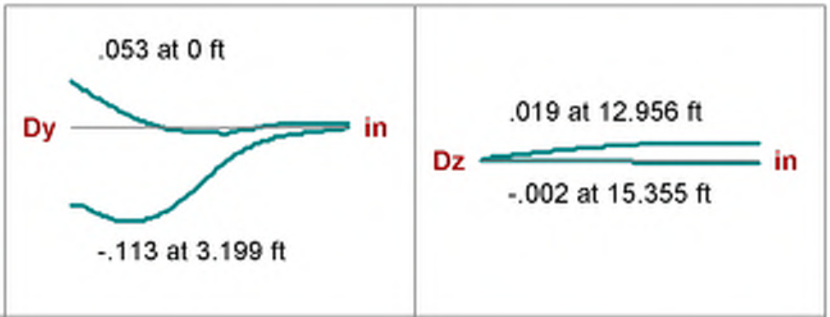
Direct Analysis Method

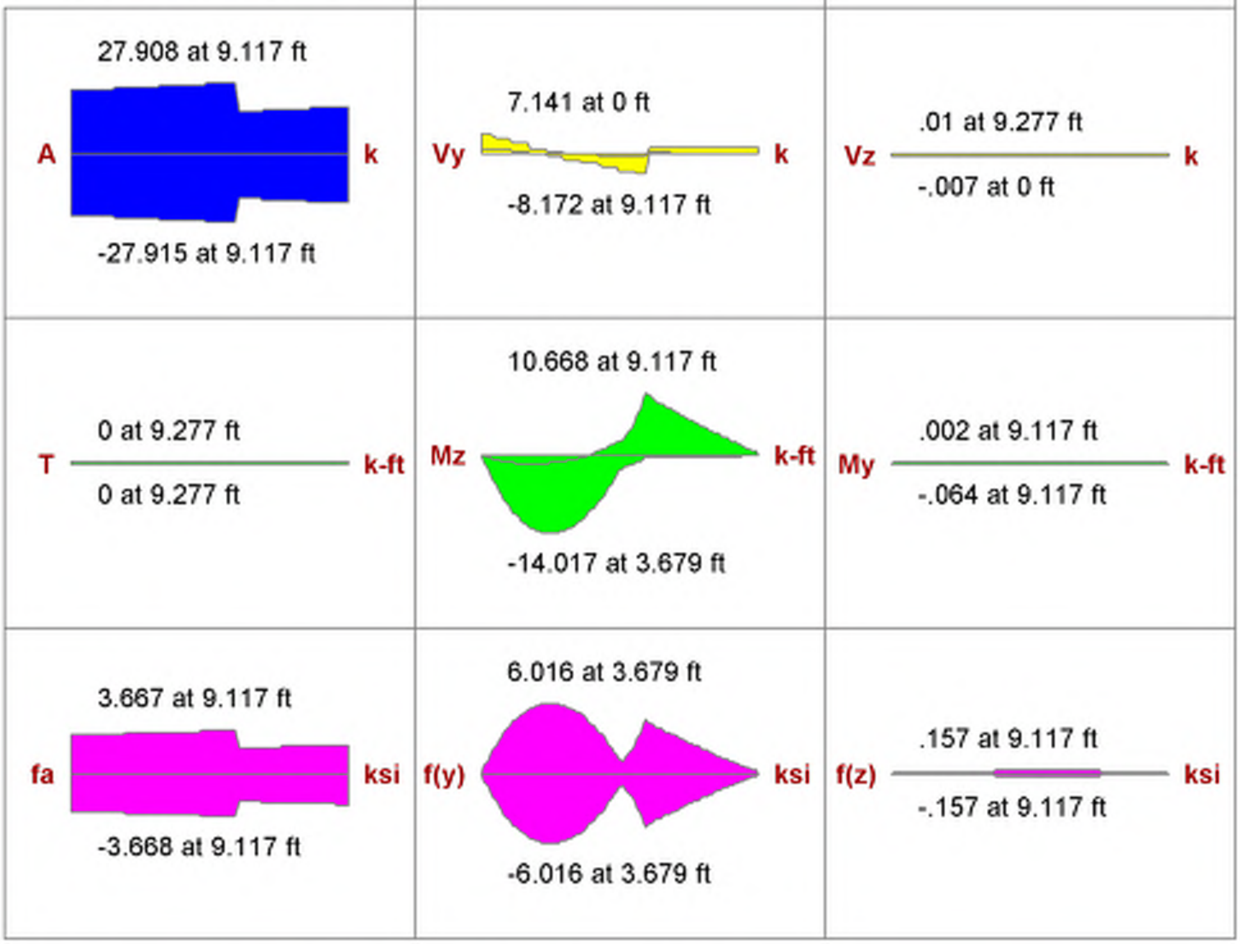
Max Bending Check	**0.095 (LC 23)**	Max Shear Check	**0.070 (y) (LC 25)**	
Location	**3.796 ft**	Location	**7.145 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/898**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**7.145 ft**	**7.145 ft**
phi*Pnc	**256.216 k**	KL/r	**62.989**	**19.71**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**7.145 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**7.145 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.142**			

Beam: *M8*

Shape: **W10x26**
Material: **A992**
Length: **15.355 ft**
I Joint: **N114**
J Joint: **N116**
Envelope
Code Check: **0.355 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.355 (LC 7)**	Max Shear Check	**0.102 (y) (LC 23)**
Location	**9.117 ft**	Location	**9.117 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/1956**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**15.355 ft**	**15.355 ft**
phi*Pnc	**93.82 k**	KL/r	**135.367**	**42.359**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**15.355 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**15.355 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.678**			

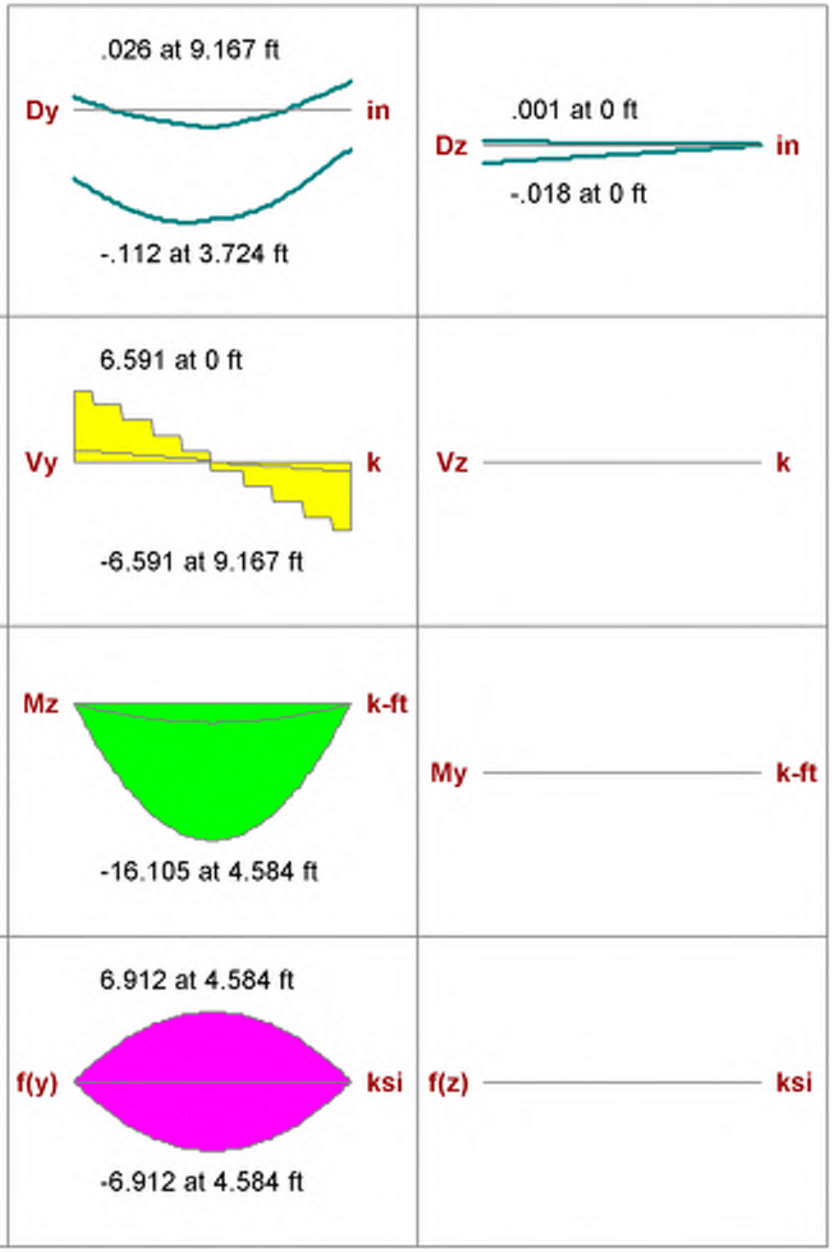
Beam: ***M9***

Shape:	**W10x26**
Material:	**A992**
Length:	**9.167 ft**
I Joint:	**N112**
J Joint:	**N118**

Envelope

Code Check: **0.152 (LC 23)**

Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.152 (LC 23)**	Max Shear Check	**0.086 (y) (LC 25)**
Location	**4.584 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/1523**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**9.167 ft**	**9.167 ft**
phi*Pnc	**212.426 k**	KL/r	**80.815**	**25.288**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**9.167 ft**	
phi*Mnz	**112.414 k-ft**	L-torque	**9.167 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.142**			

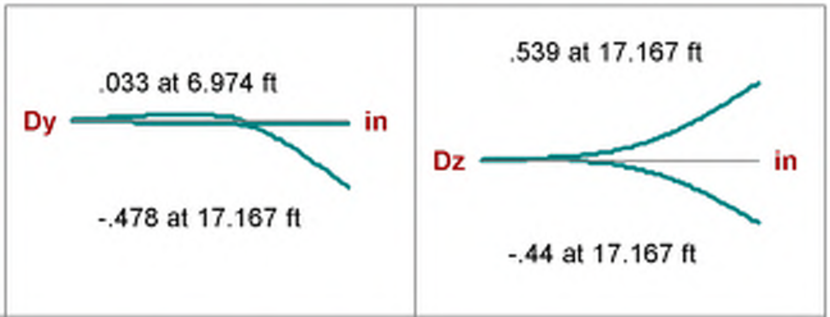
Beam: ***M10***

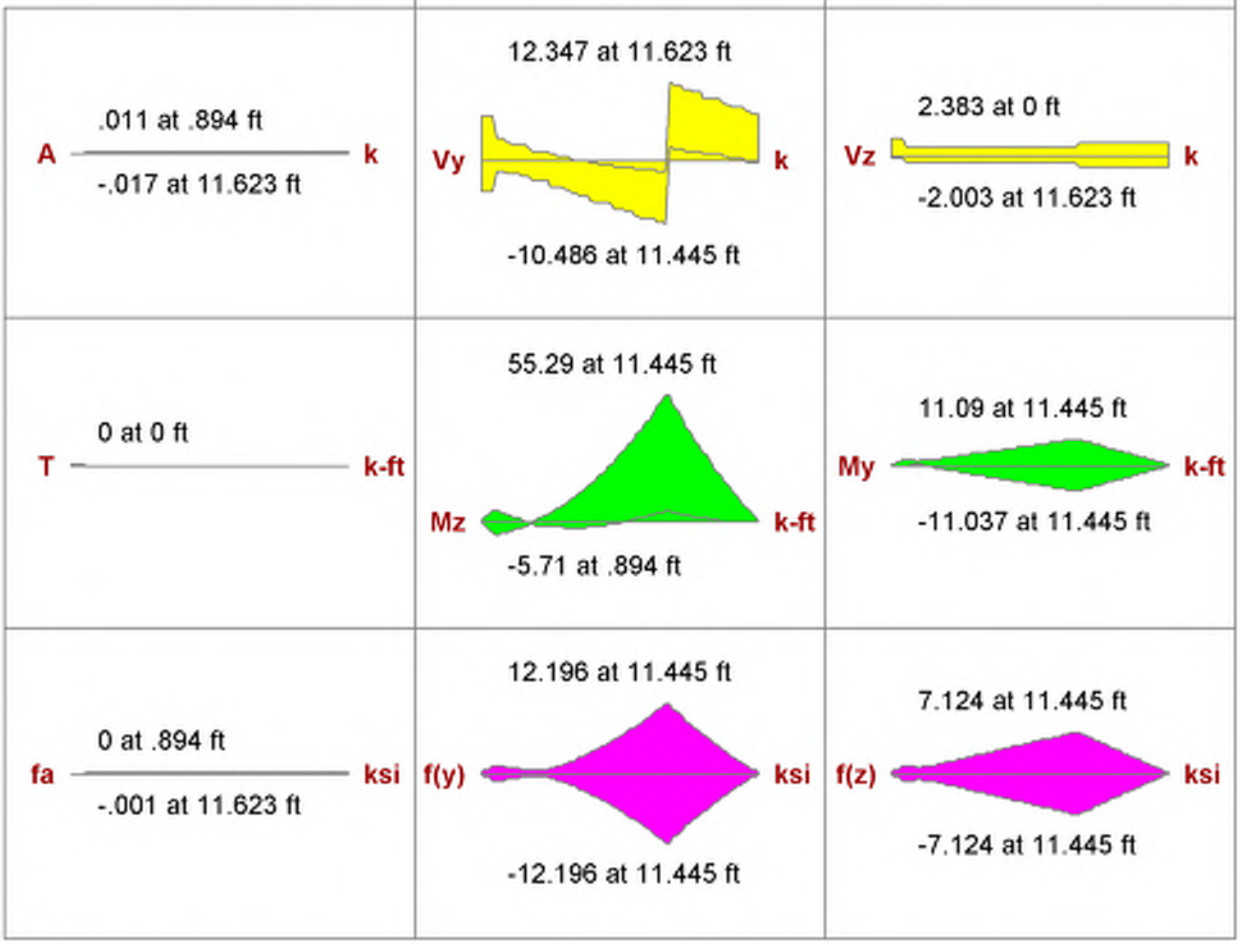
Shape:	**W10x49**
Material:	**A992**
Length:	**17.167 ft**
I Joint:	**N107**
J Joint:	**N109**

Envelope

Code Check: **0.348 (LC 7)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

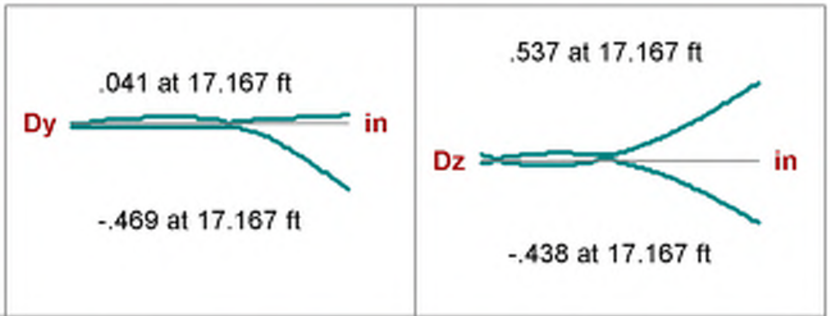
Direct Analysis Method

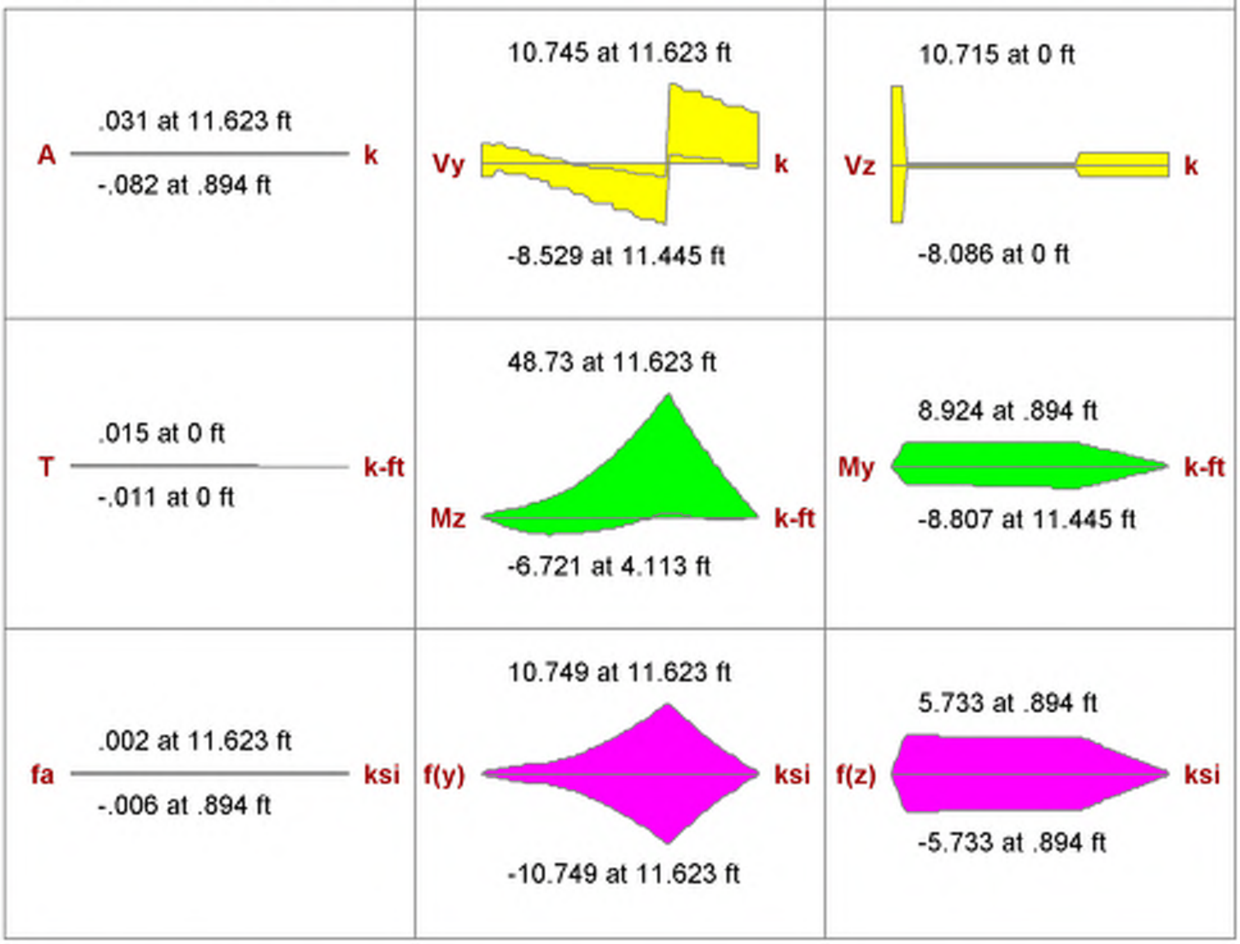
Max Bending Check	**0.348 (LC 7)**	Max Shear Check	**0.121 (y) (LC 7)**
Location	**11.445 ft**	Location	**11.623 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/382**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**17.167 ft**	**17.167 ft**
phi*Pnc	**401.616 k**	KL/r	**80.888**	**47.399**
phi*Pnt	**648 k**			
phi*Mny	**106.125 k-ft**	L Comp Flange	**17.167 ft**	
phi*Mnz	**226.5 k-ft**	L-torque	**17.167 ft**	
phi*Vny	**102 k**	Tau_b	**1**	
phi*Vnz	**302.4 k**			
Cb	**1.816**			

Beam: ***M11***

Shape: **W10x49**
Material: **A992**
Length: **17.167 ft**
I Joint: **N111**
J Joint: **N113**
Envelope
Code Check: **0.296 (LC 9)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.296 (LC 9)**	Max Shear Check	**0.105 (y) (LC 9)**
Location	**11.623 ft**	Location	**11.623 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/402**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**17.167 ft**	**17.167 ft**
phi*Pnc	**401.616 k**	KL/r	**80.888**	**47.399**
phi*Pnt	**648 k**			
phi*Mny	**106.125 k-ft**	L Comp Flange	**17.167 ft**	
phi*Mnz	**226.5 k-ft**	L-torque	**17.167 ft**	
phi*Vny	**102 k**	Tau_b	**1**	
phi*Vnz	**302.4 k**			
Cb	**1.712**			

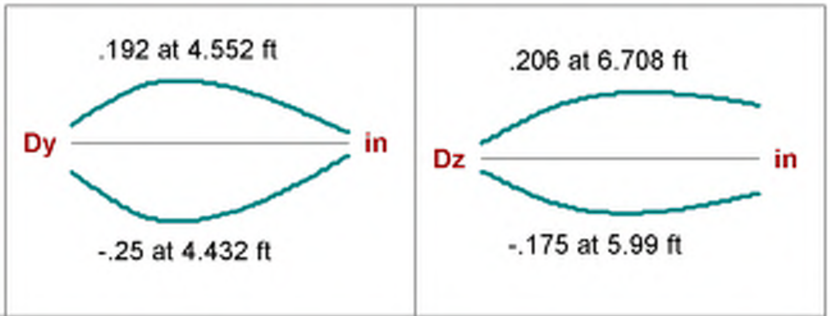
Beam: ***M12***

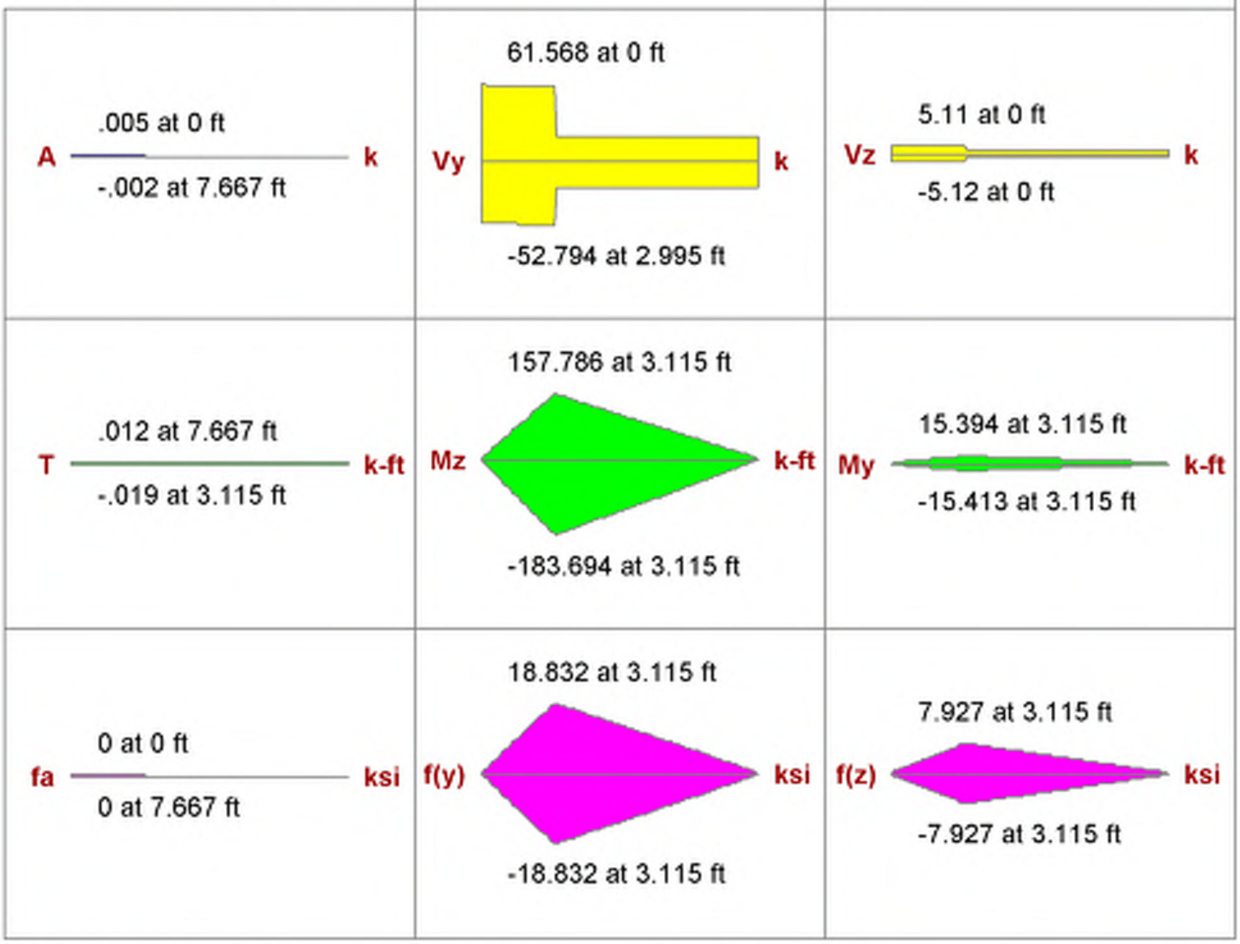
Shape:	**W16x67**
Material:	**A992**
Length:	**11.5 ft**
I Joint:	**N114**
J Joint:	**N118**

Envelope

Code Check: **0.492 (LC 7)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

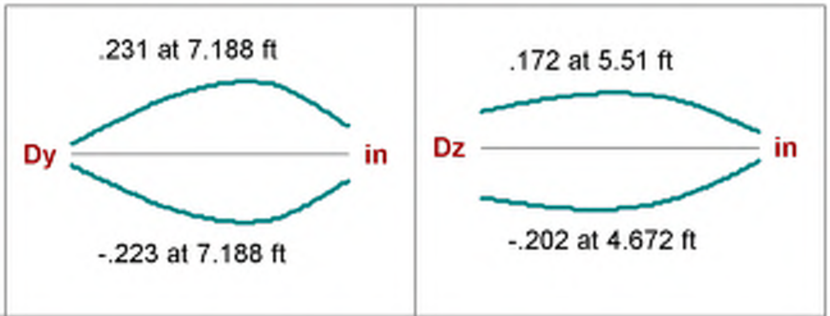
Direct Analysis Method

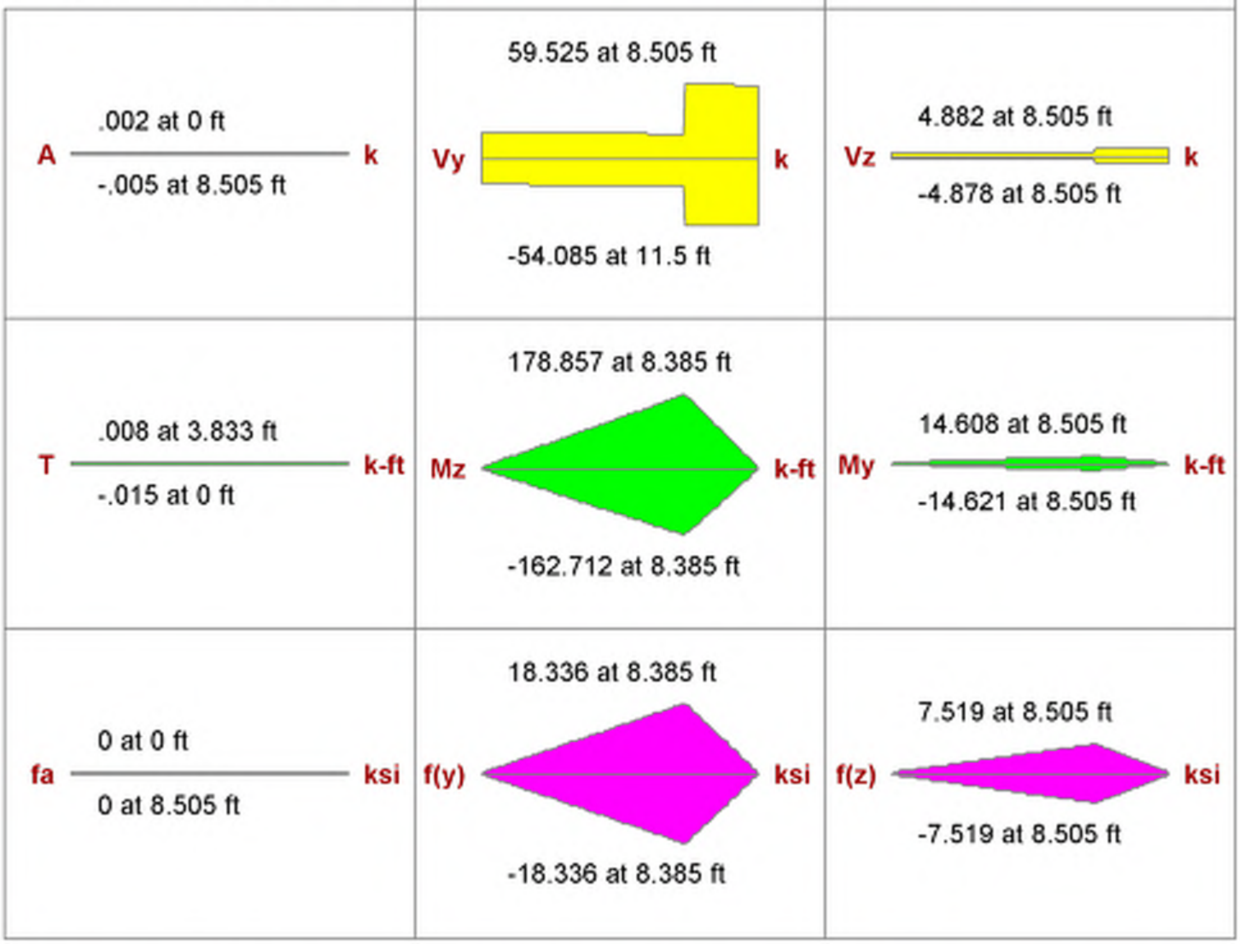
Max Bending Check	**0.492 (LC 7)**	Max Shear Check	**0.320 (y) (LC 7)**	
Location	**3.115 ft**	Location	**0 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/778**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**11.5 ft**	**11.5 ft**
phi*Pnc	**701.239 k**	KL/r	**56.006**	**19.78**
phi*Pnt	**882 k**			
phi*Mny	**133.125 k-ft**	L Comp Flange	**11.5 ft**	
phi*Mnz	**487.5 k-ft**	L-torque	**11.5 ft**	
phi*Vny	**193.155 k**	Tau_b	**1**	
phi*Vnz	**366.282 k**			
Cb	**1.362**			

Beam: ***M13***

Shape: **W16x67**
Material: **A992**
Length: **11.5 ft**
I Joint: **N117**
J Joint: **N119**
Envelope
Code Check: **0.477 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.477 (LC 7)**	Max Shear Check	**0.309 (y) (LC 7)**	
Location	**8.385 ft**	Location	**8.505 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/810**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**11.5 ft**	**11.5 ft**
phi*Pnc	**701.239 k**	KL/r	**56.006**	**19.78**
phi*Pnt	**882 k**			
phi*Mny	**133.125 k-ft**	L Comp Flange	**11.5 ft**	
phi*Mnz	**487.5 k-ft**	L-torque	**11.5 ft**	
phi*Vny	**193.155 k**	Tau_b	**1**	
phi*Vnz	**366.282 k**			
Cb	**1.376**			

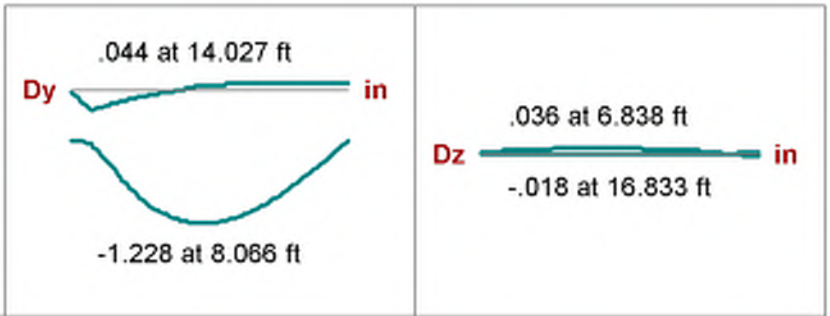
Beam: ***M14***

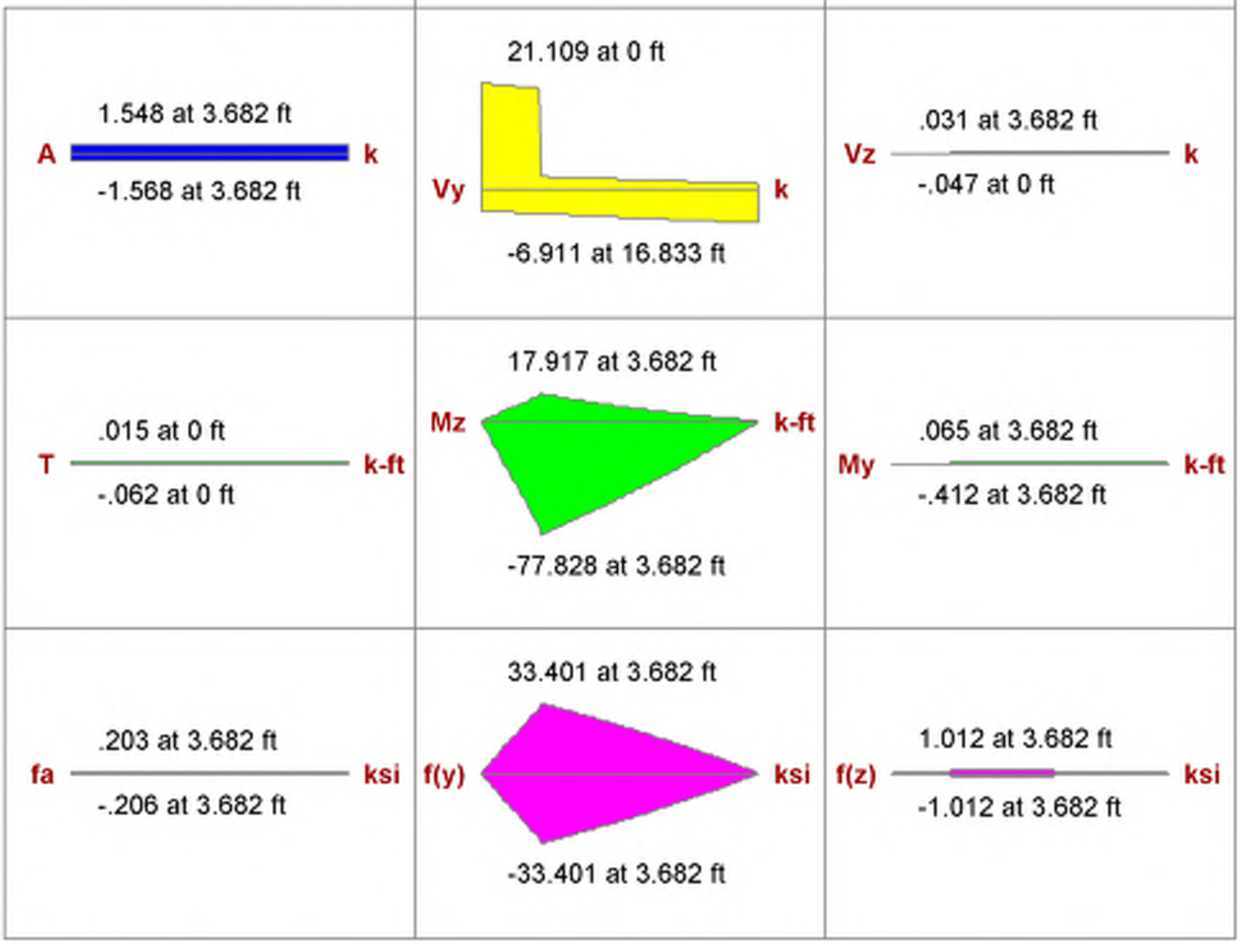
Shape:	**W10x26**
Material:	**A992**
Length:	**16.833 ft**
I Joint:	**N109**
J Joint:	**N113**

Envelope

Code Check: **0.946 (LC 9)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

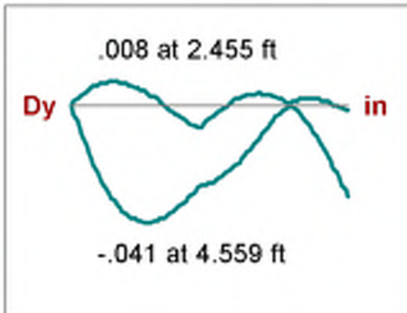
Direct Analysis Method

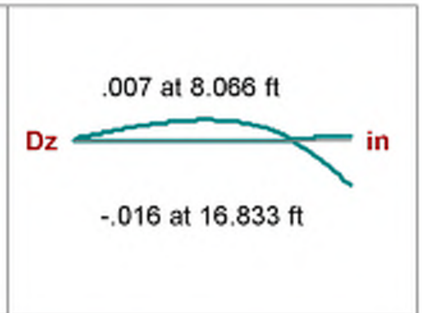
Max Bending Check	**0.946 (LC 9)**	Max Shear Check	**0.267 (y) (LC 9)**	
Location	**3.682 ft**	Location	**0 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/217**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

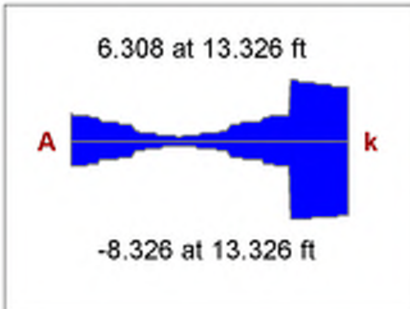
			y-y	z-z
Fy	**50 ksi**	Lb	**16.833 ft**	**16.833 ft**
phi*Pnc	**78.068 k**	KL/r	**148.397**	**46.436**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**16.833 ft**	
phi*Mnz	**84.473 k-ft**	L-torque	**16.833 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.361**			

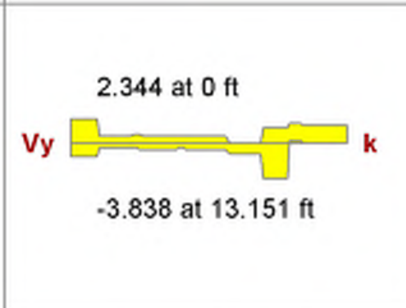
Beam: *M15*

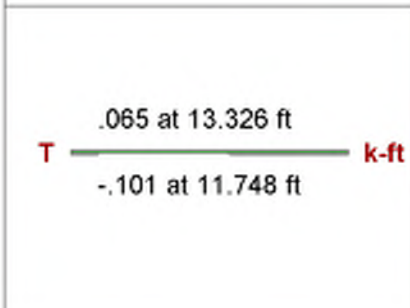
Shape: **3-1.75X11.875FS**
Material: **2.0E Microllam LVL**
Length: **16.833 ft**
I Joint: **N122**
J Joint: **N123**
Envelope
Code Check: **0.292 (LC 27)**
Report Based On 97 Sections

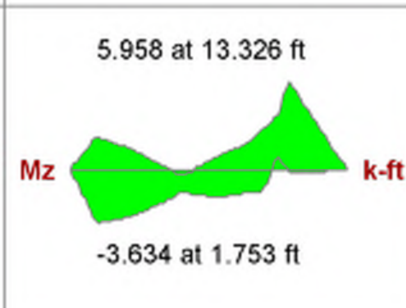


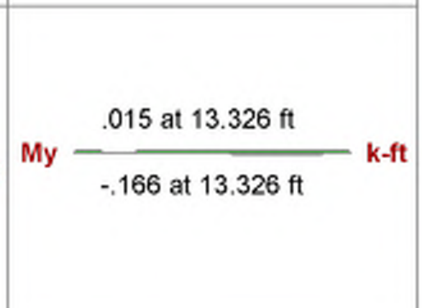


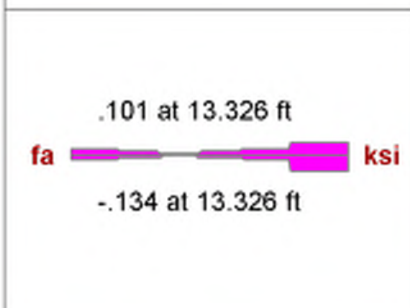


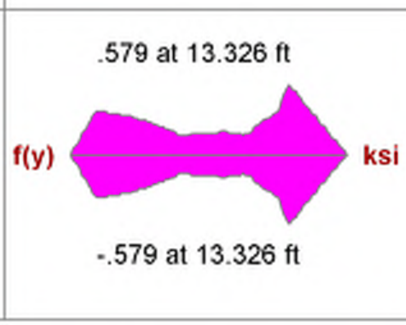


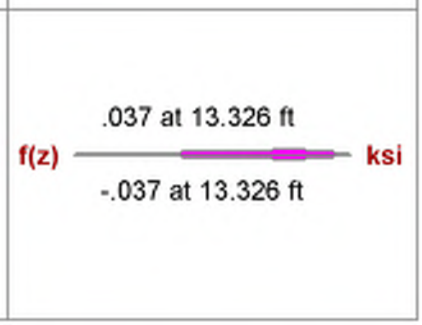












AWC NDS-15: ASD Code Check

Max Bending Check	**0.292 (LC 27)**	Max Shear Check	**0.228 (y) (LC 25)**
Location	**13.326 ft**	Location	**13.151 ft**
Equation	**3.6.3**	Max Defl Ratio	**L/6118**

CD	**1.6**	RB	**9.329**	CL	**.981**		
Cr	**1**	Cfu	**1**	CP	**.086**	Kf	**.6**

	(ksi)	Cm	Ct	CF
Fc'	**.346**	**1**	**1**	**1**
Ft'	**2.488**	**1**	**1**	**1**
Fb1'	**4.081**	**1**	**1**	**1**
Fb2'	**4.16**	**1**	**1**	**1**
Fv'	**.456**	**1**	**1**	
E'	**2000**	**1**	**1**	

	y-y	z-z
Lb	**16.833 ft**	**16.833 ft**
le/d	**38.475**	**17.01**
Sway	**No**	**No**

Le-Bending Top **16.833 ft**
Le-Bending Bot **16.833 ft**

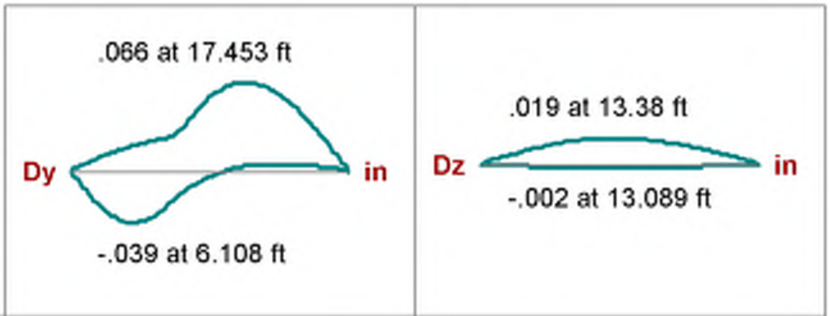
Column: ***M16***

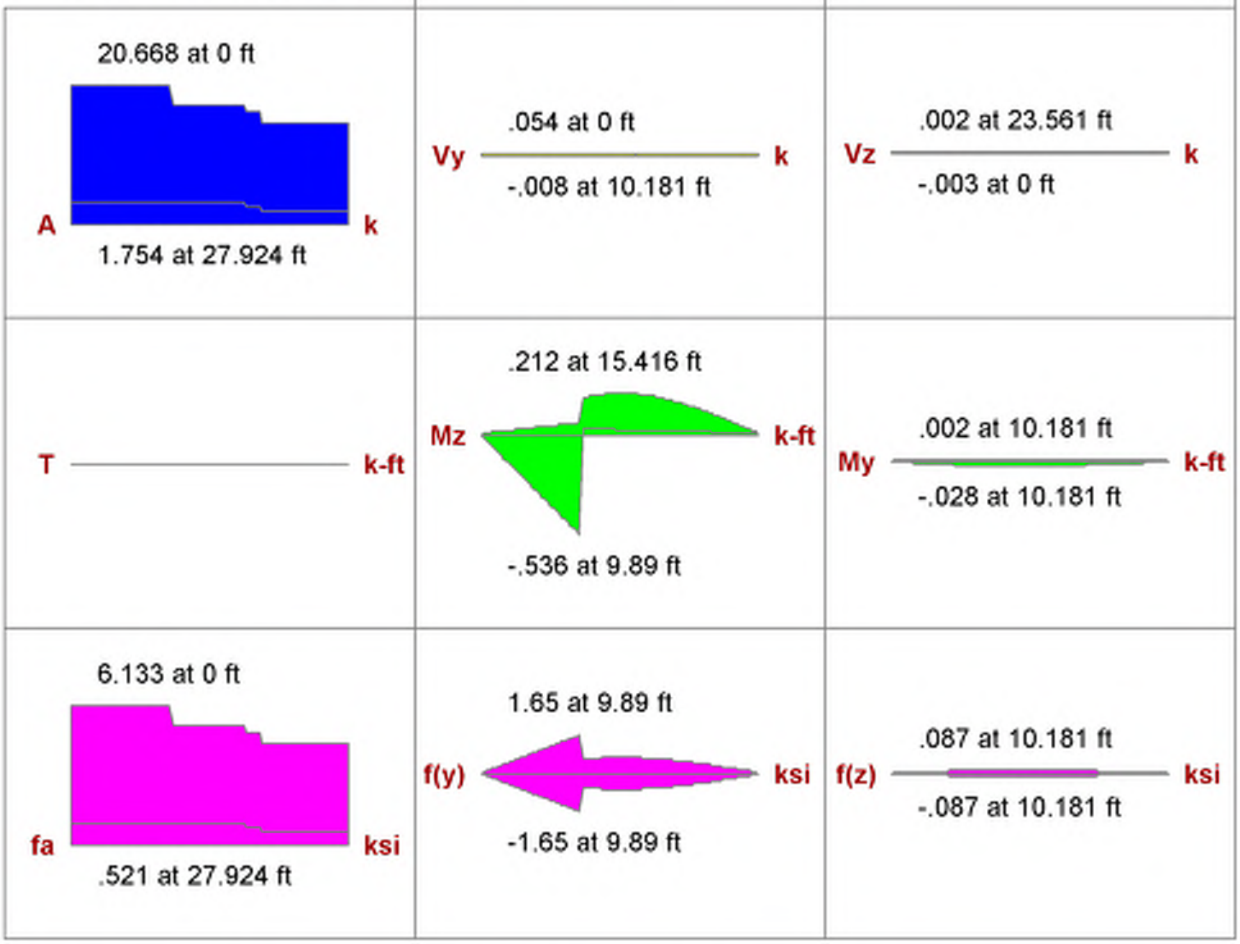
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**27.924 ft**
I Joint:	**N124**
J Joint:	**N6**

Envelope

Code Check: **0.507 (LC 25)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

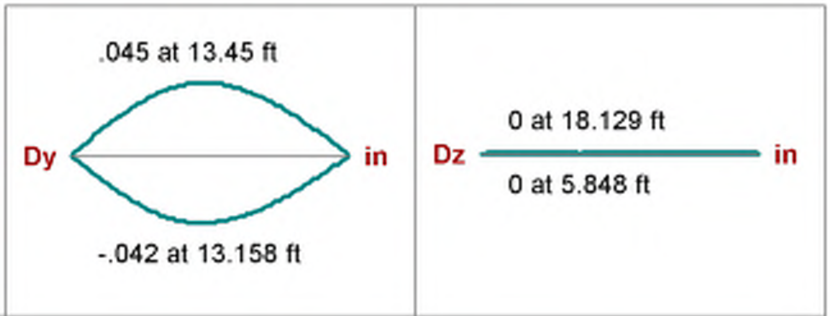
Direct Analysis Method

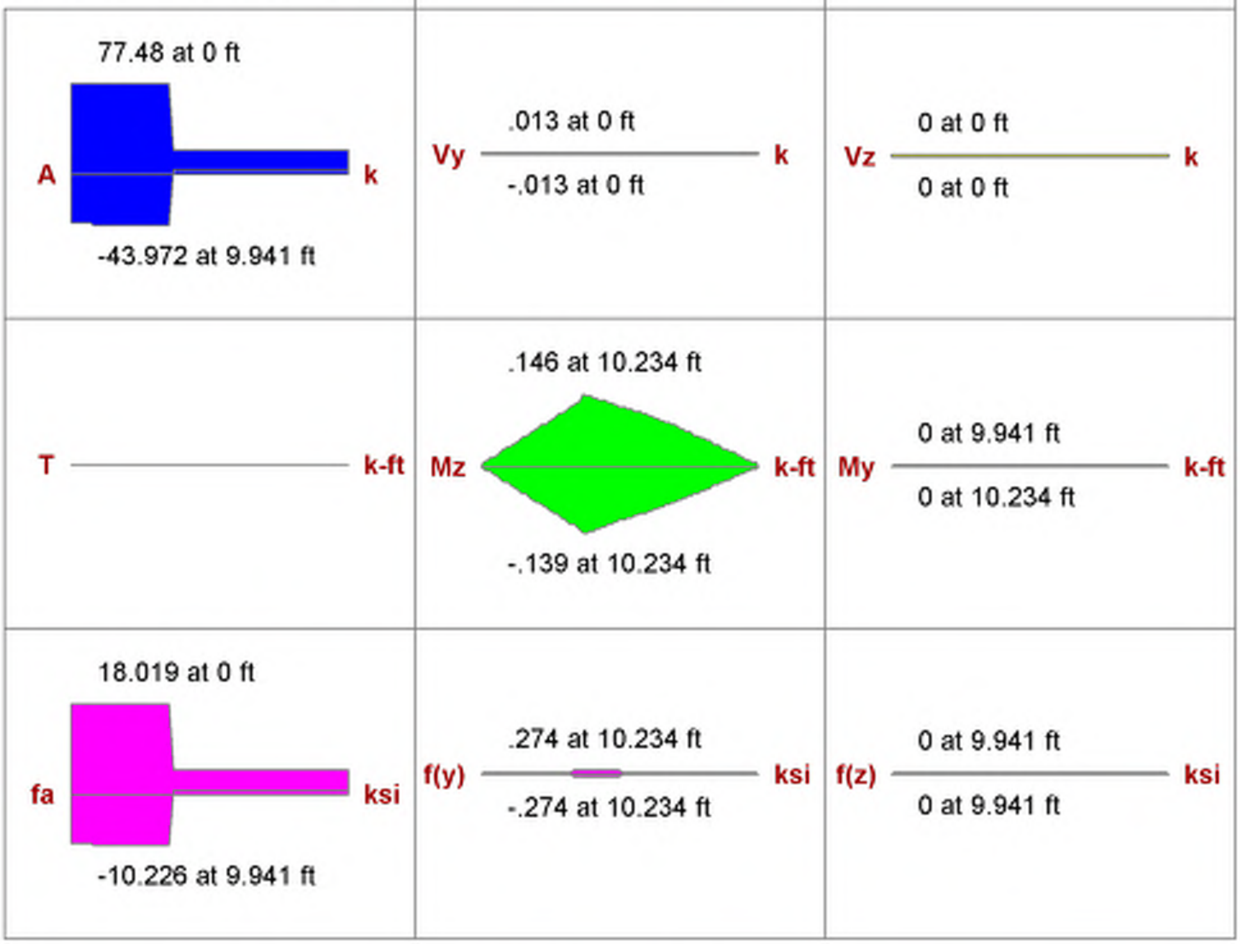
Max Bending Check	**0.507 (LC 25)**	Max Shear Check	**0.001 (y) (LC 23)**
Location	**9.89 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/5048**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**17 ft**
phi*Pnc	**42.342 k**	KL/r	**78.877**	**134.09**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**1 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**27.924 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: ***M17***

Shape: **HSS5x5x4**
Material: **A500 Gr.B Rect**
Length: **28.07 ft**
I Joint: **N126**
J Joint: **N14**
Envelope
Code Check: **0.439 (LC 7)**
Report Based On 97 Sections





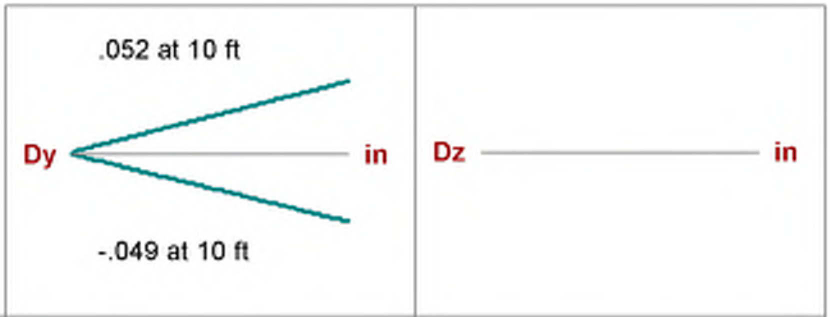
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

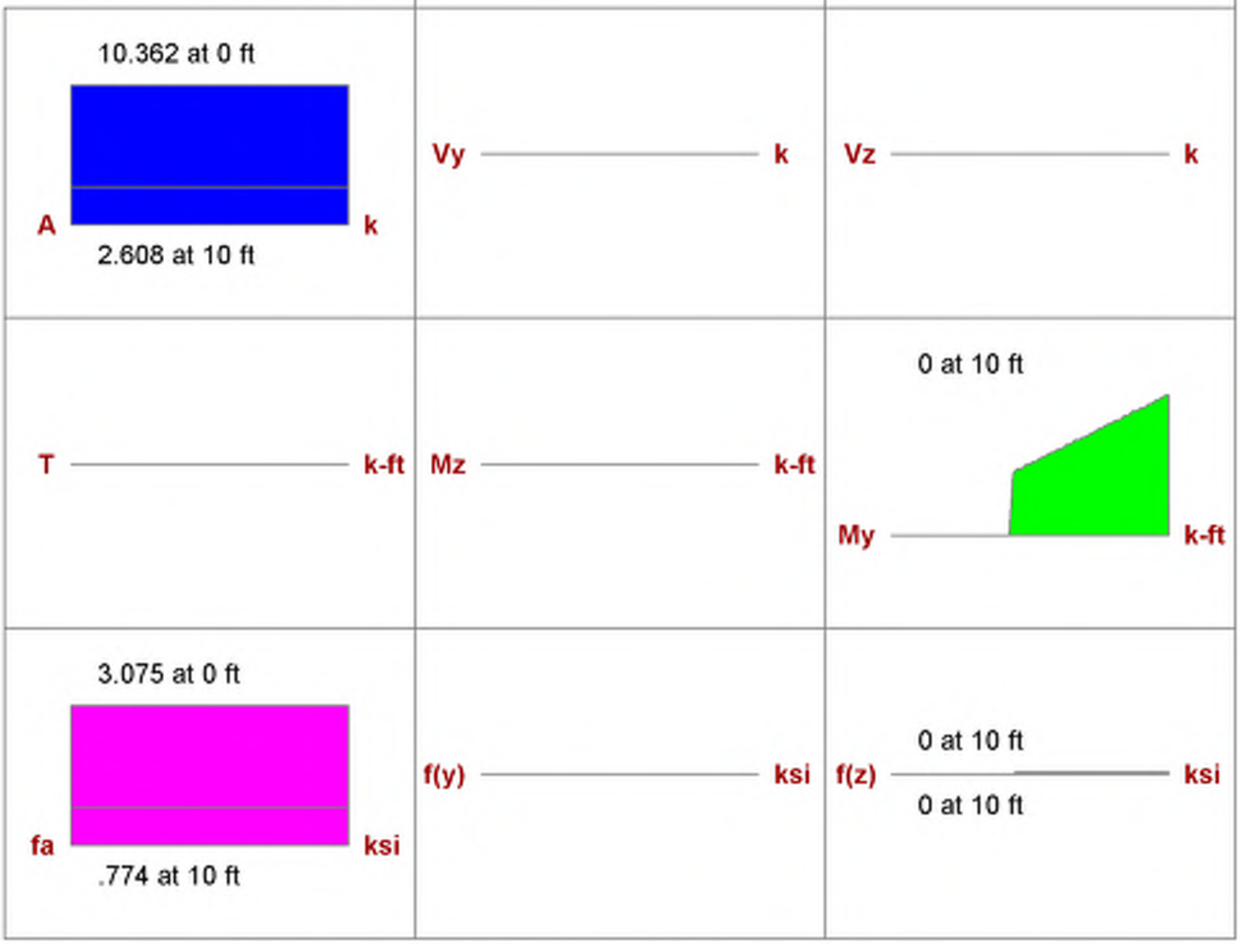
Max Bending Check	**0.439 (LC 7)**	Max Shear Check	**0.000 (y) (LC 13)**
Location	**9.941 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/7504**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**1 ft**	**1 ft**
phi*Pnc	**177.557 k**	KL/r	**6.221**	**6.221**
phi*Pnt	**178.02 k**			
phi*Mny	**26.255 k-ft**	L Comp Flange	**28.07 ft**	
phi*Mnz	**26.255 k-ft**	L-torque	**28.07 ft**	
phi*Vny	**49.786 k**	Tau_b	**1**	
phi*Vnz	**49.786 k**			
phi*Tn	**21.819 k-ft**			
Cb	**1**			

Column: ***M18***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N127**
J Joint: **N115**
Envelope
Code Check: **0.113 (LC 25)**
Report Based On 97 Sections





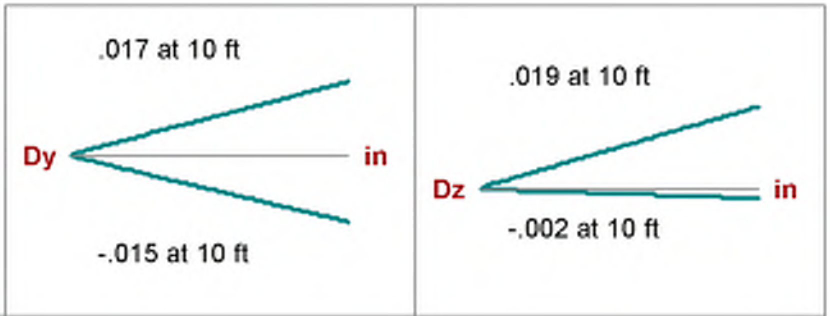
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

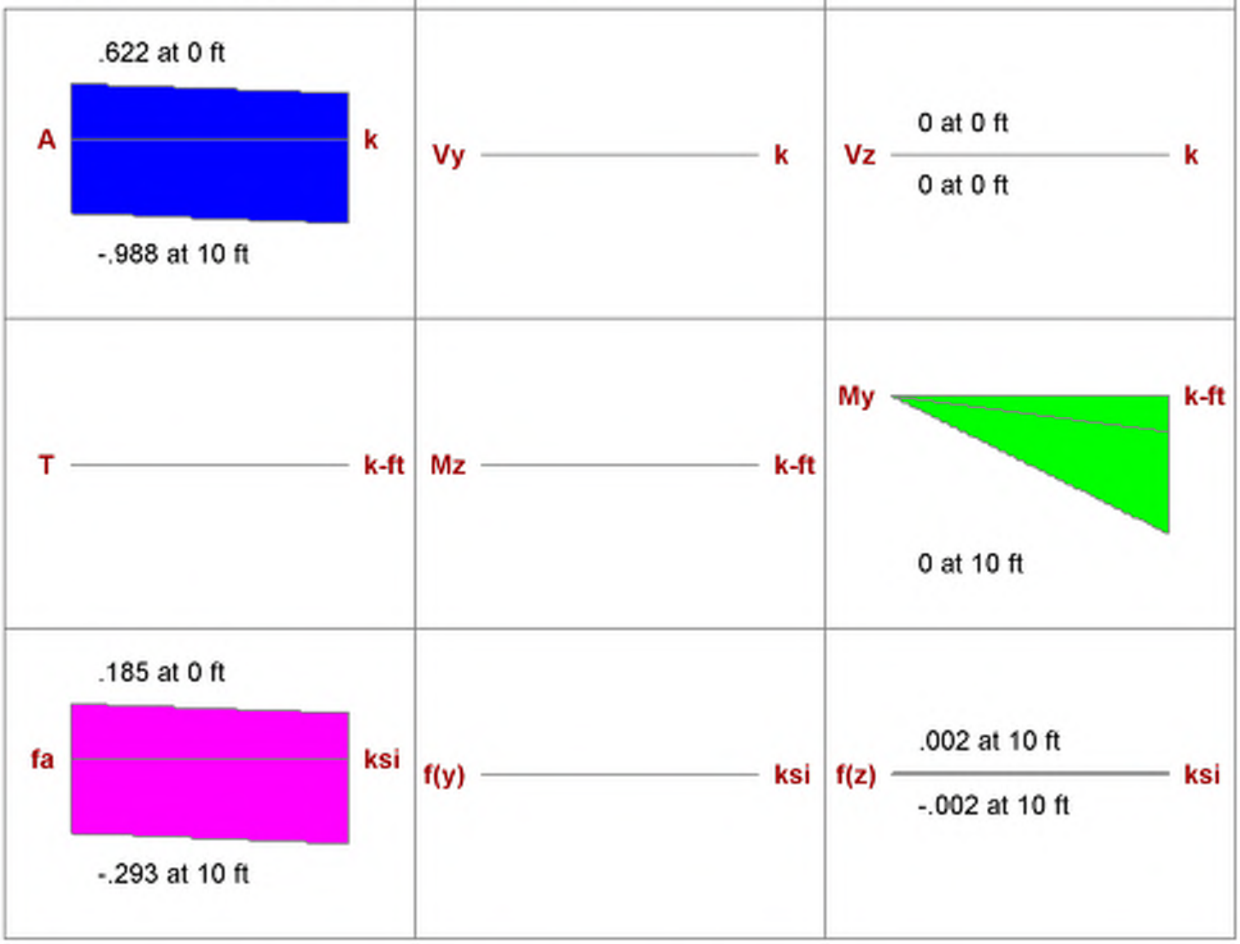
Max Bending Check	**0.113 (LC 25)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: ***M19***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N128**
J Joint: **N116**
Envelope
Code Check: **0.007 (LC 13)**
Report Based On 97 Sections





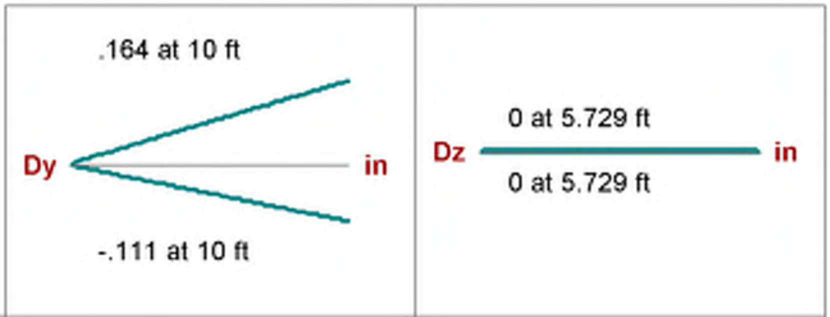
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

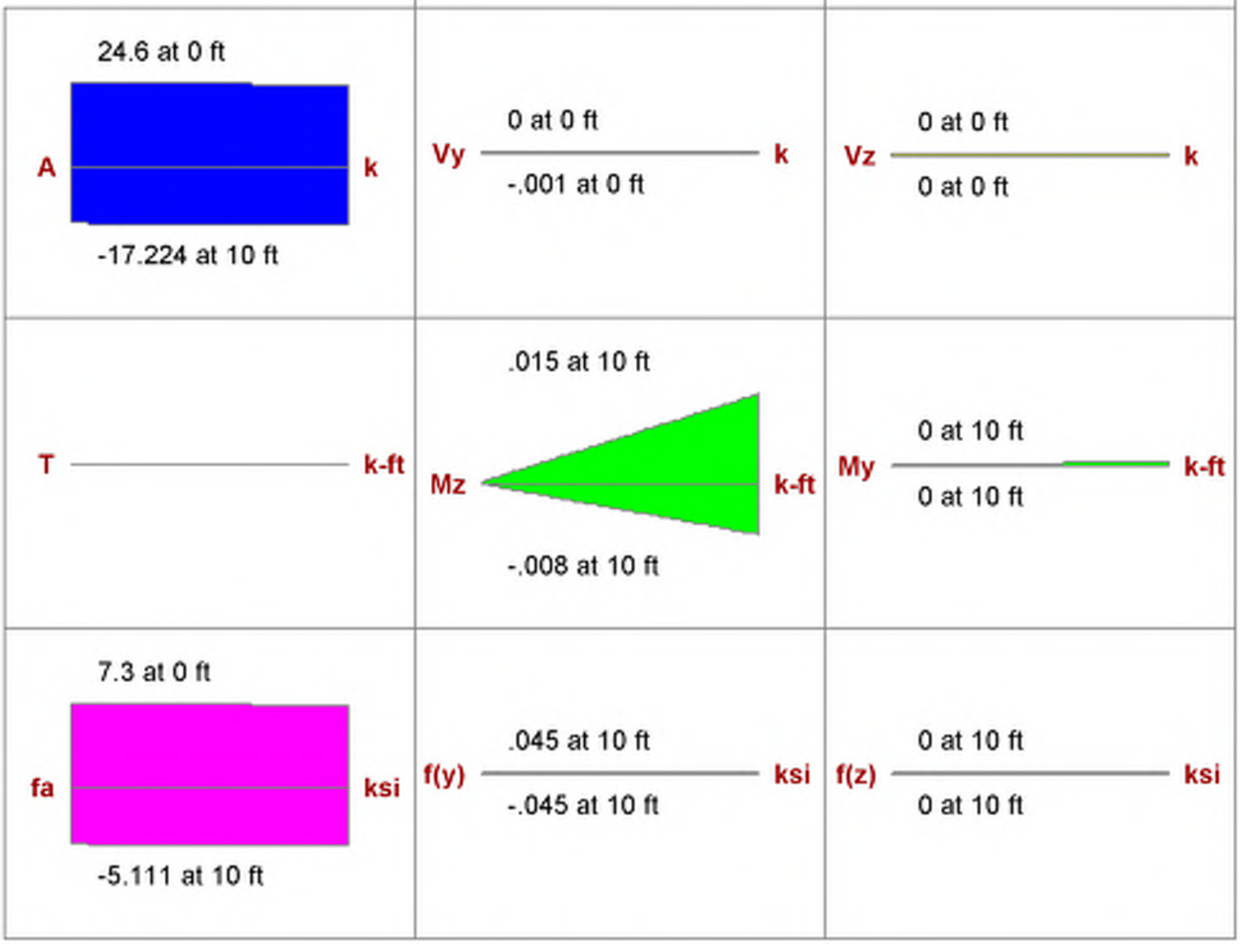
Max Bending Check	**0.007 (LC 13)**	Max Shear Check	**0.000 (z) (LC 23)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: ***M20***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N129**
J Joint: **N117**
Envelope
Code Check: **0.268 (LC 9)**
Report Based On 97 Sections





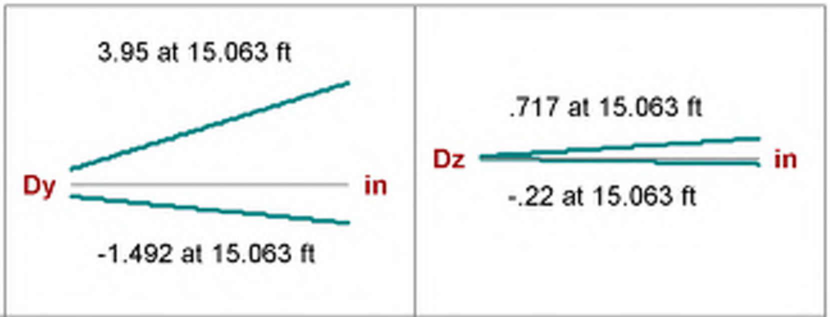
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

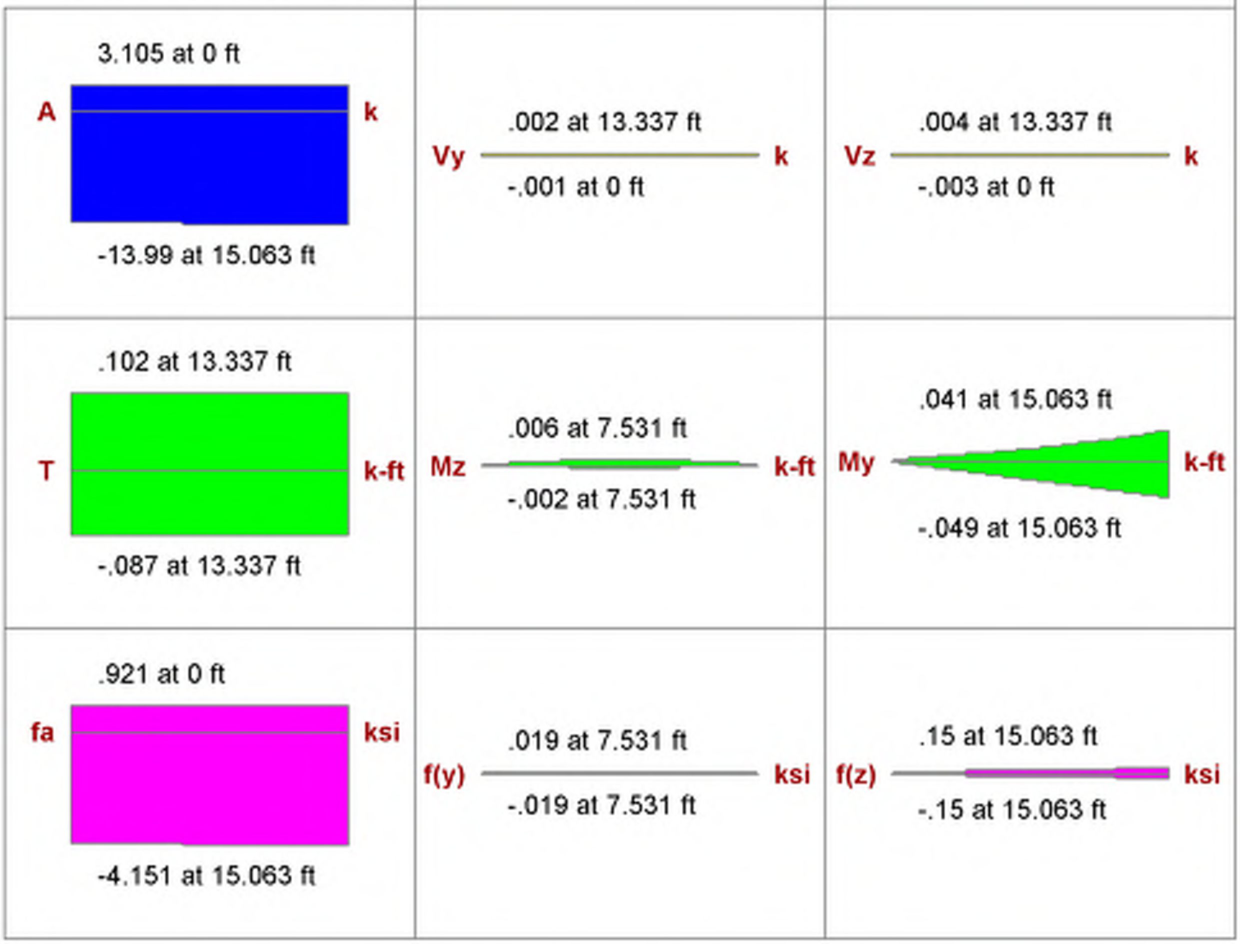
Max Bending Check	**0.268 (LC 9)**	Max Shear Check	**0.000 (y) (LC 9)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/7218**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.667**			

Column: ***M21***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **15.063 ft**
I Joint: **N109**
J Joint: **N4**
Envelope
Code Check: **0.058 (LC 11)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.058 (LC 11)**	Max Shear Check	**0.008 (z) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/252**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**15.063 ft**	**15.063 ft**
phi*Pnc	**53.932 k**	KL/r	**118.812**	**118.812**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**15.063 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**15.063 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.187**			

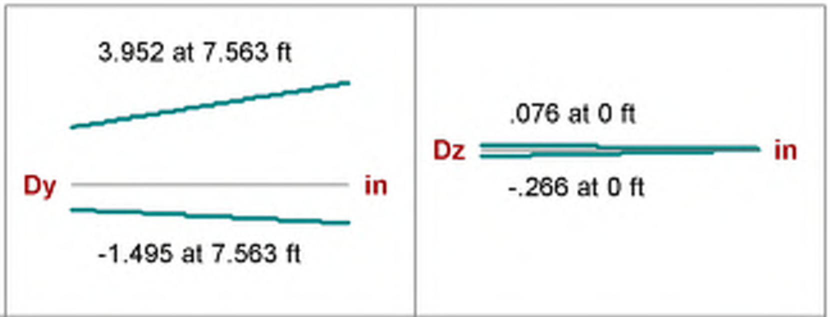
Column: ***M22***

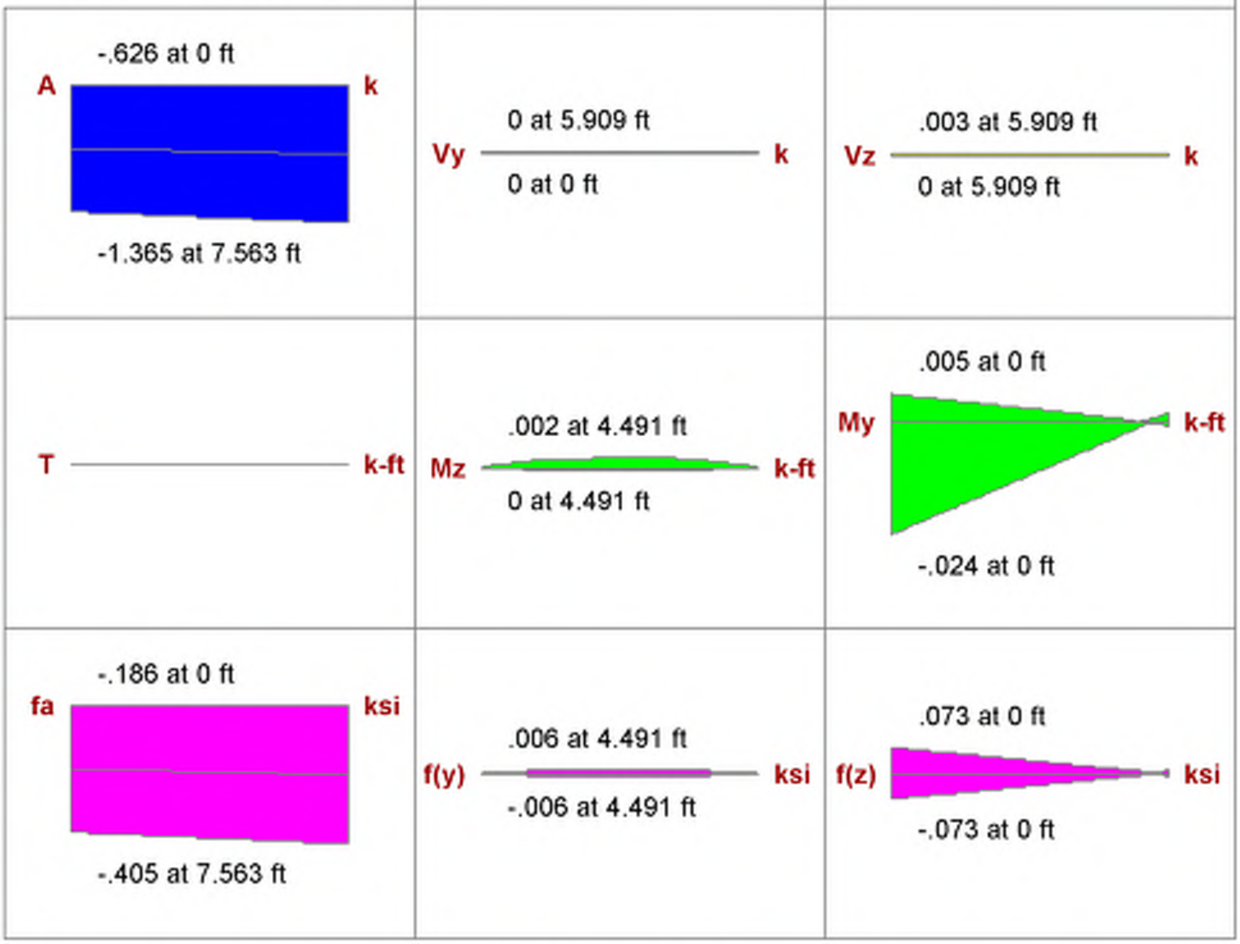
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**7.563 ft**
I Joint:	**N90**
J Joint:	**N7**

Envelope

Code Check: **0.006 (LC 9)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

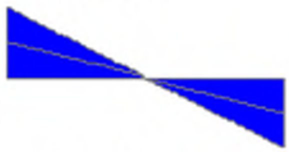
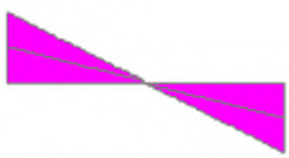
Direct Analysis Method

Max Bending Check	**0.006 (LC 9)**	Max Shear Check	**0.000 (z) (LC 9)**
Location	**0 ft**	Location	**5.909 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/341**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**7.563 ft**	**7.563 ft**
phi*Pnc	**109.816 k**	KL/r	**59.654**	**59.654**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**7.563 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**7.563 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.18**			

Column: ***M23***

Shape: **HSS5x5x5**
Material: **A500 Gr.B Rect**
Length: **9 ft**
I Joint: **N133**
J Joint: **N76**
Envelope
Code Check: **0.000 (LC 8)**
Report Based On 97 Sections

	Dy — in	Dz — in
A (k): .104 at 0 ft  -.104 at 9 ft	Vy — k	Vz — k
T — k-ft	Mz — k-ft	My — k-ft
fa (ksi): .02 at 0 ft  -.02 at 9 ft	f(y) — ksi	f(z) — ksi

AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.000 (LC 8)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**9 ft**	**9 ft**
phi*Pnc	**175.247 k**	KL/r	**56.825**	**56.825**
phi*Pnt	**217.764 k**			
phi*Mny	**31.602 k-ft**	L Comp Flange	**9 ft**	
phi*Mnz	**31.602 k-ft**	L-torque	**9 ft**	
phi*Vny	**59.664 k**	Tau_b	**1**	
phi*Vnz	**59.664 k**			
phi*Tn	**26.518 k-ft**			
Cb	**1**			

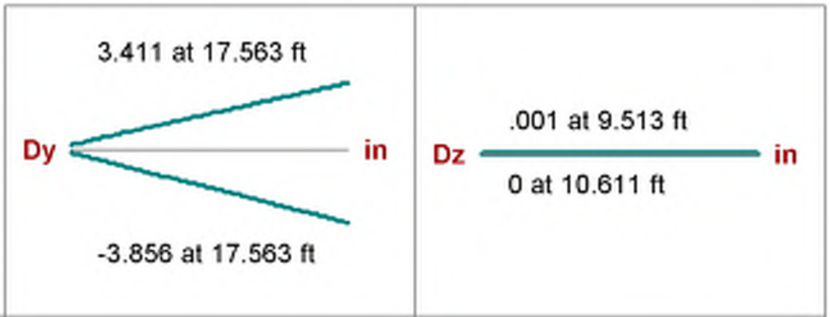
Column: ***M24***

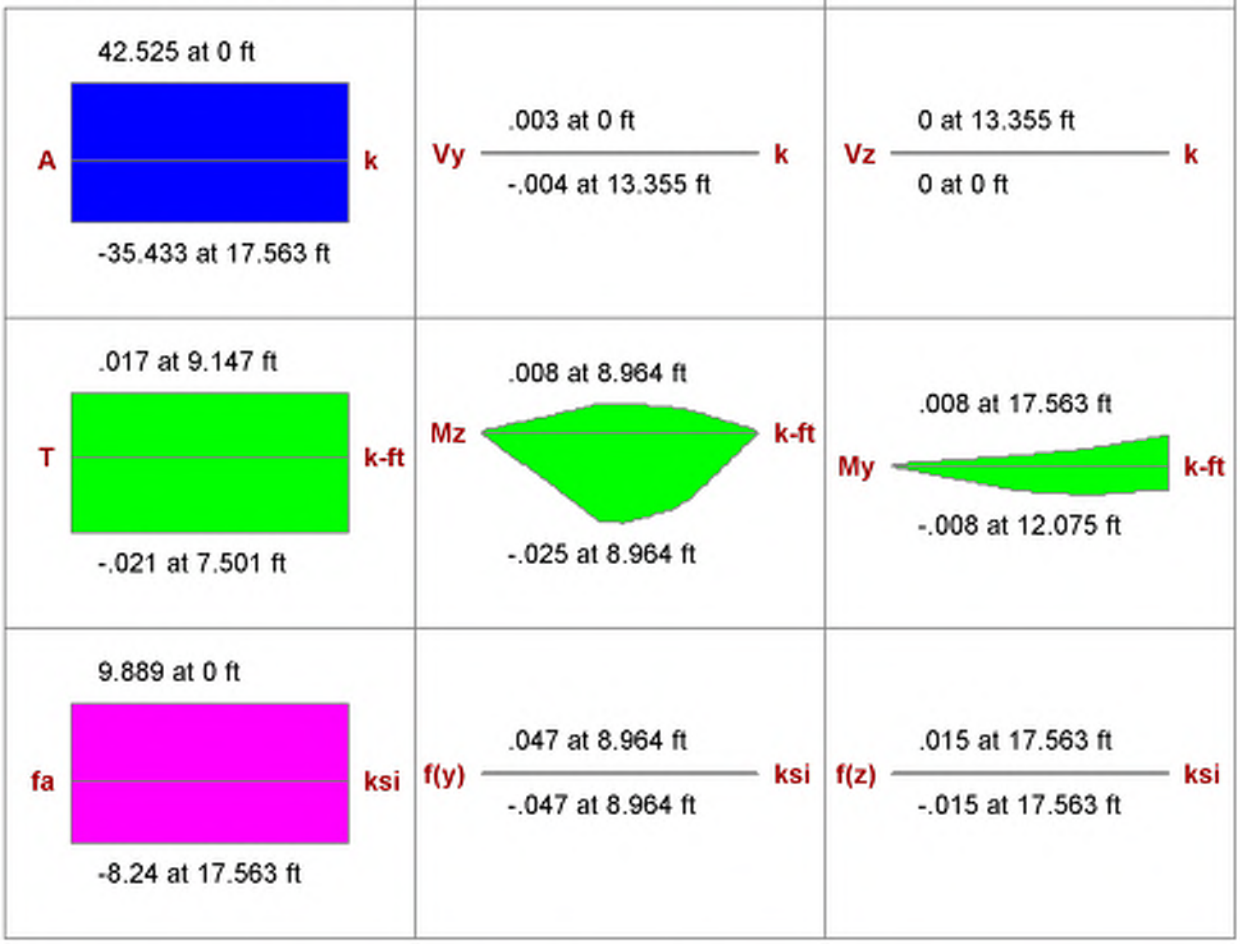
Shape:	**HSS5x5x4**
Material:	**A500 Gr.B Rect**
Length:	**17.563 ft**
I Joint:	**N134**
J Joint:	**N16**

Envelope

Code Check: **0.533 (LC 7)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

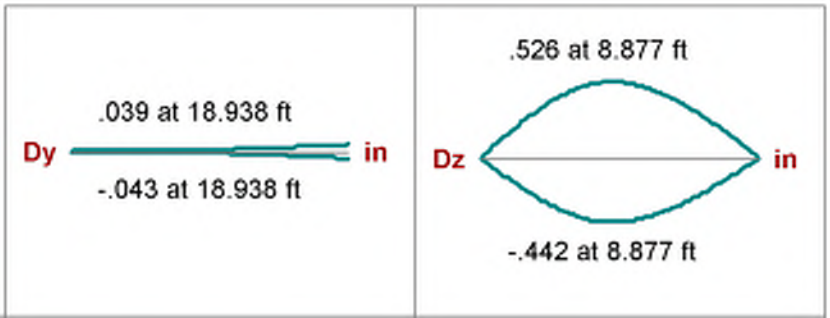
Direct Analysis Method

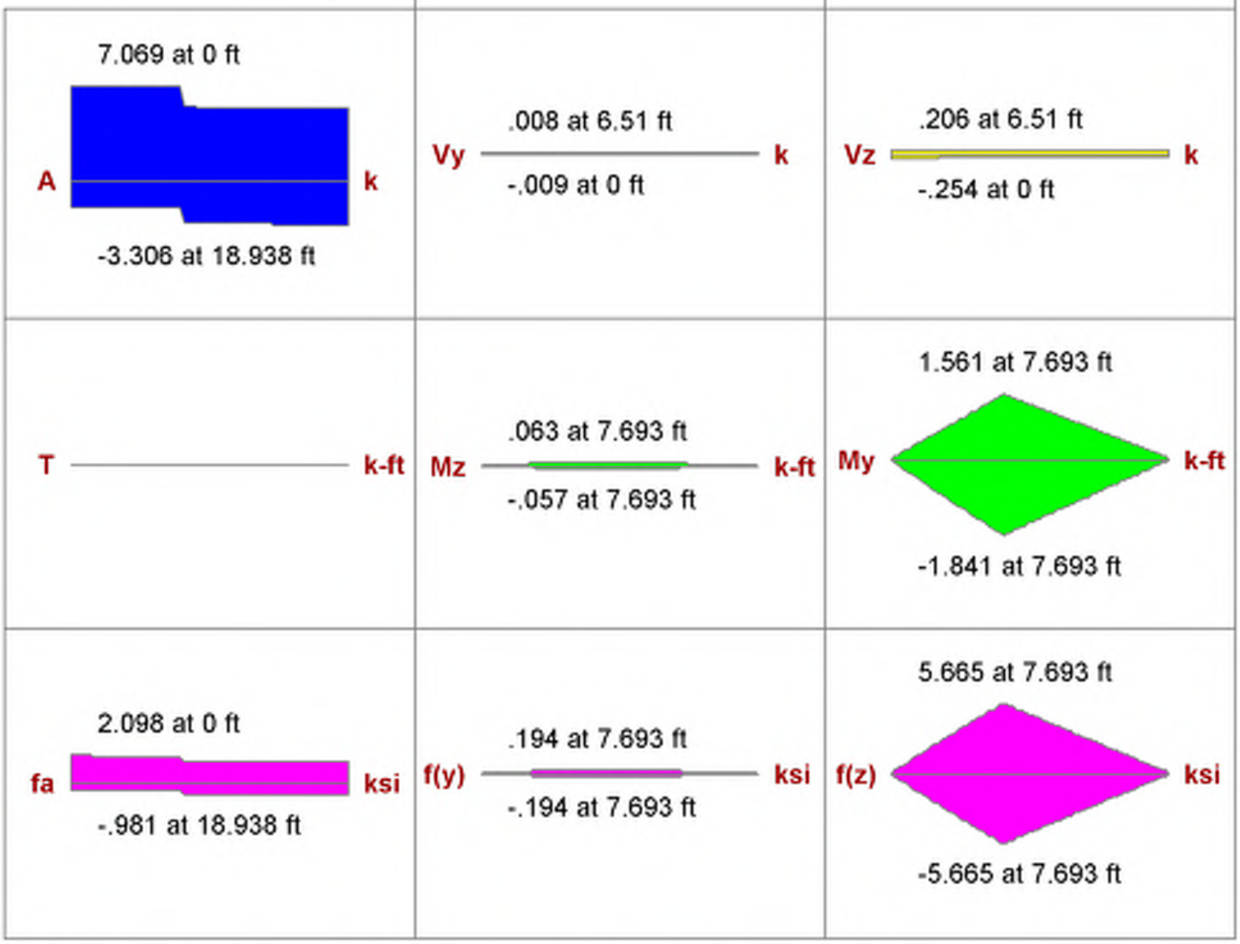
Max Bending Check	**0.533 (LC 7)**	Max Shear Check	**0.001 (y) (LC 9)**
Location	**0 ft**	Location	**13.355 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**17.563 ft**	**17.563 ft**
phi*Pnc	**79.75 k**	KL/r	**109.258**	**109.258**
phi*Pnt	**178.02 k**			
phi*Mny	**26.255 k-ft**	L Comp Flange	**17.563 ft**	
phi*Mnz	**26.255 k-ft**	L-torque	**17.563 ft**	
phi*Vny	**49.786 k**	Tau_b	**1**	
phi*Vnz	**49.786 k**			
phi*Tn	**21.819 k-ft**			
Cb	**1.203**			

Column: ***M25***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **18.938 ft**
I Joint: **N135**
J Joint: **N17**
Envelope
Code Check: **0.307 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.307 (LC 7)**	Max Shear Check	**0.007 (z) (LC 7)**
Location	**7.496 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/432**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**18.938 ft**	**18.938 ft**
phi*Pnc	**34.121 k**	KL/r	**149.374**	**149.374**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**18.938 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**18.938 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.383**			

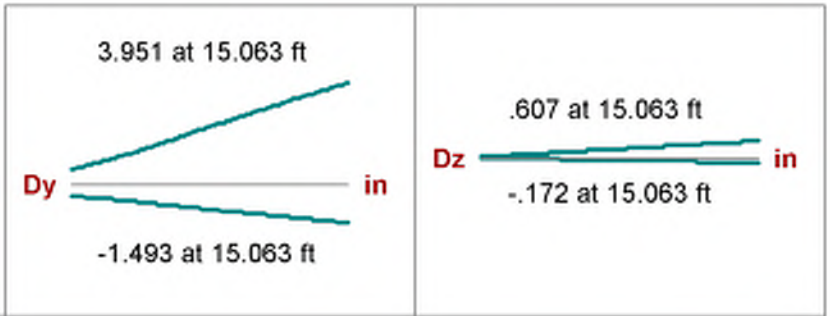
Column: ***M26***

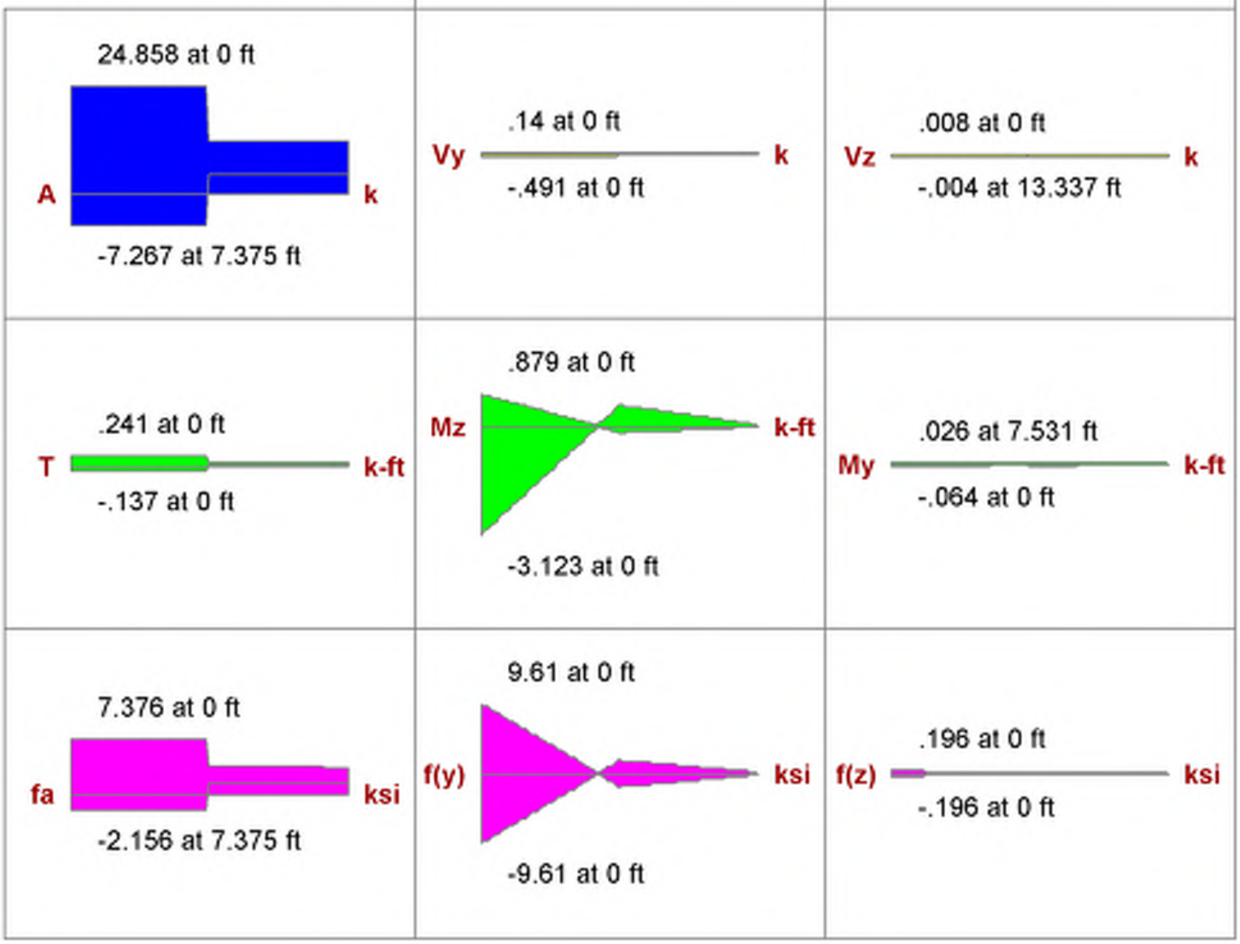
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**15.063 ft**
I Joint:	**N136**
J Joint:	**N19**

Envelope

Code Check: **0.633 (LC 9)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

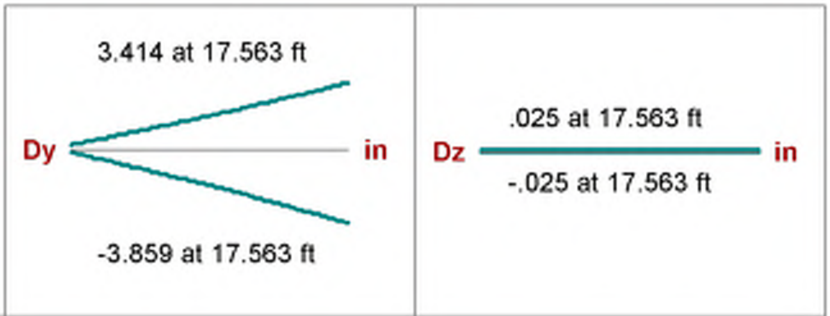
Direct Analysis Method

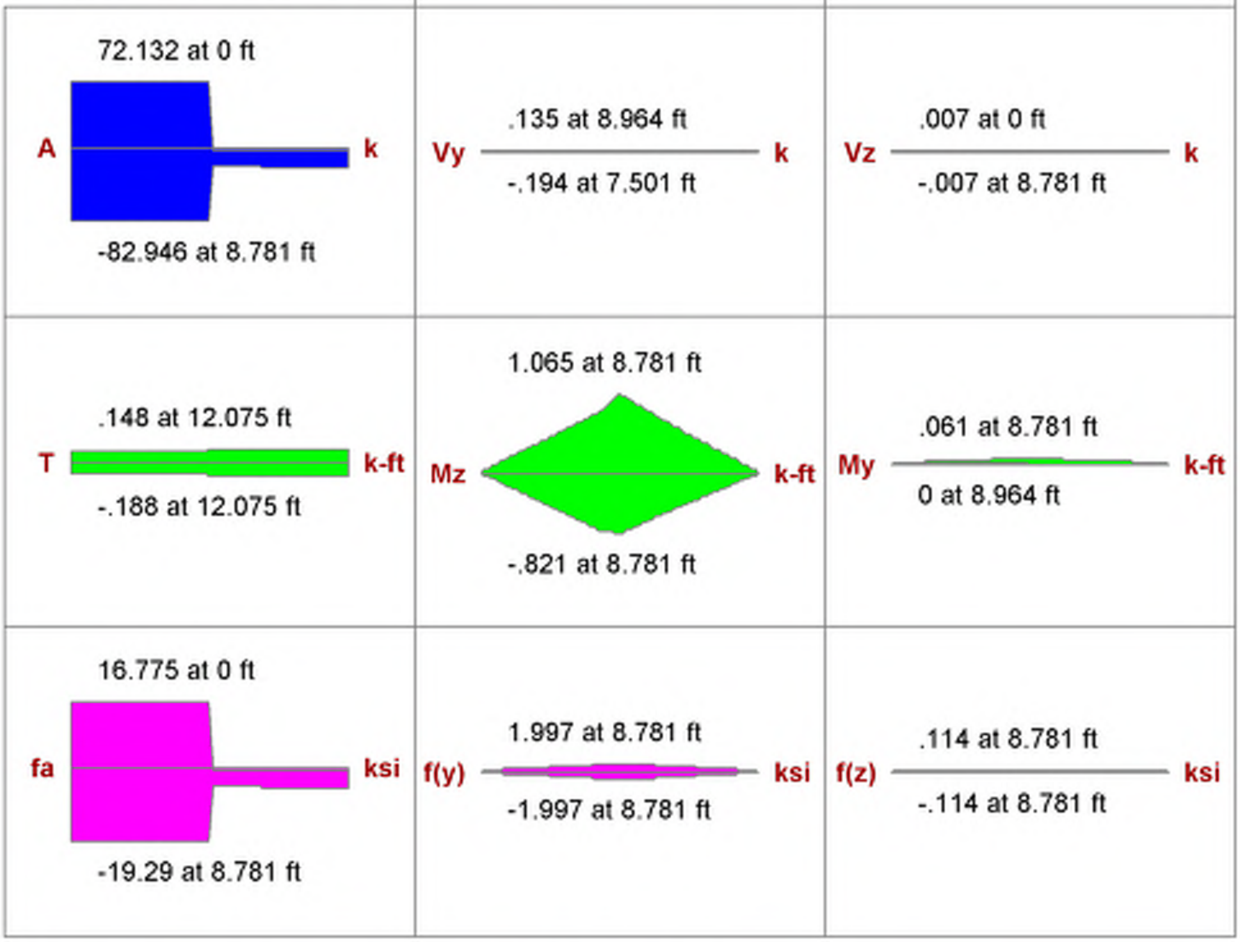
Max Bending Check	**0.633 (LC 9)**	Max Shear Check	**0.030 (y) (LC 9)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/53**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**15.063 ft**	**15.063 ft**
phi*Pnc	**53.932 k**	KL/r	**118.812**	**118.812**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**15.063 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**15.063 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**2.647**			

Column: **M27**

Shape: **HSS5x5x4**
Material: **A500 Gr.B Rect**
Length: **17.563 ft**
I Joint: **N137**
J Joint: **N20**
Envelope
Code Check: **0.928 (LC 13)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.928 (LC 13)**	Max Shear Check	**0.010 (y) (LC 9)**
Location	**8.781 ft**	Location	**8.781 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/57**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**17.5 ft**	**17.5 ft**
phi*Pnc	**80.21 k**	KL/r	**108.866**	**108.866**
phi*Pnt	**178.02 k**			
phi*Mny	**26.255 k-ft**	L Comp Flange	**17.563 ft**	
phi*Mnz	**26.255 k-ft**	L-torque	**17.563 ft**	
phi*Vny	**49.786 k**	Tau_b	**1**	
phi*Vnz	**49.786 k**			
phi*Tn	**21.819 k-ft**			
Cb	**1**			

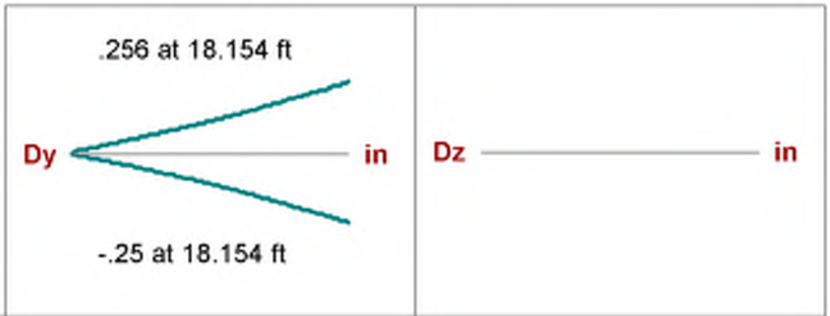
Column: ***M28***

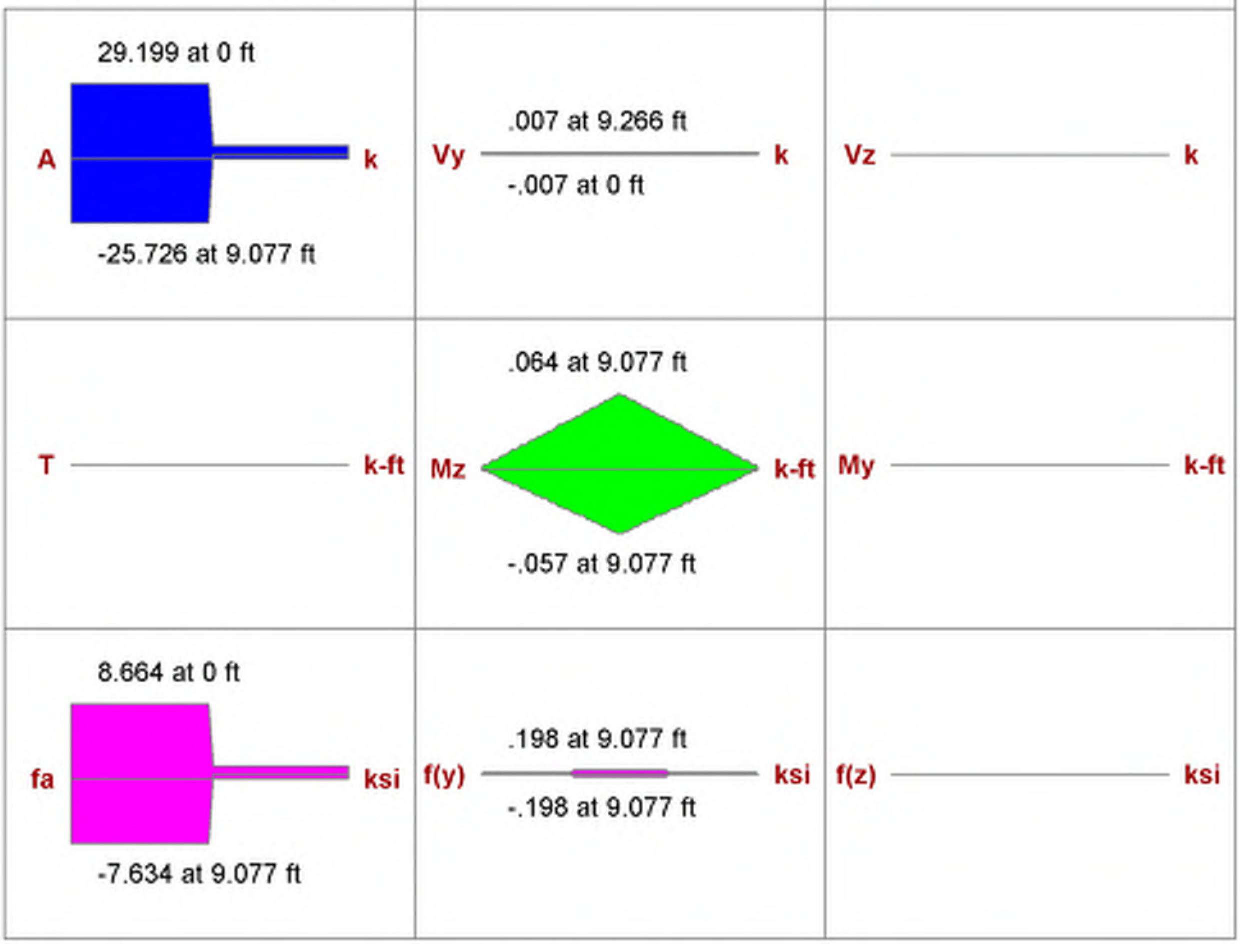
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**18.154 ft**
I Joint:	**N139**
J Joint:	**N8**

Envelope

Code Check: **0.786 (LC 9)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

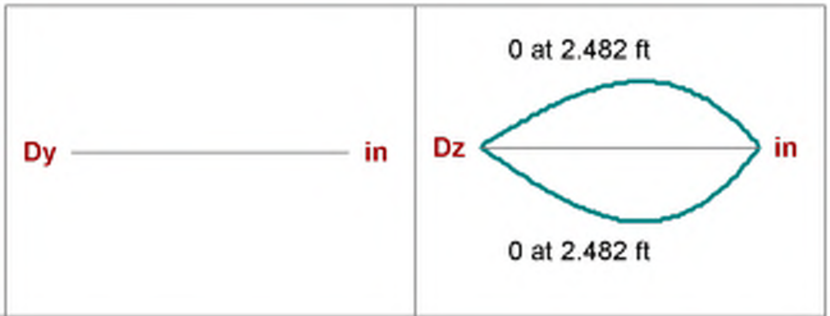
Direct Analysis Method

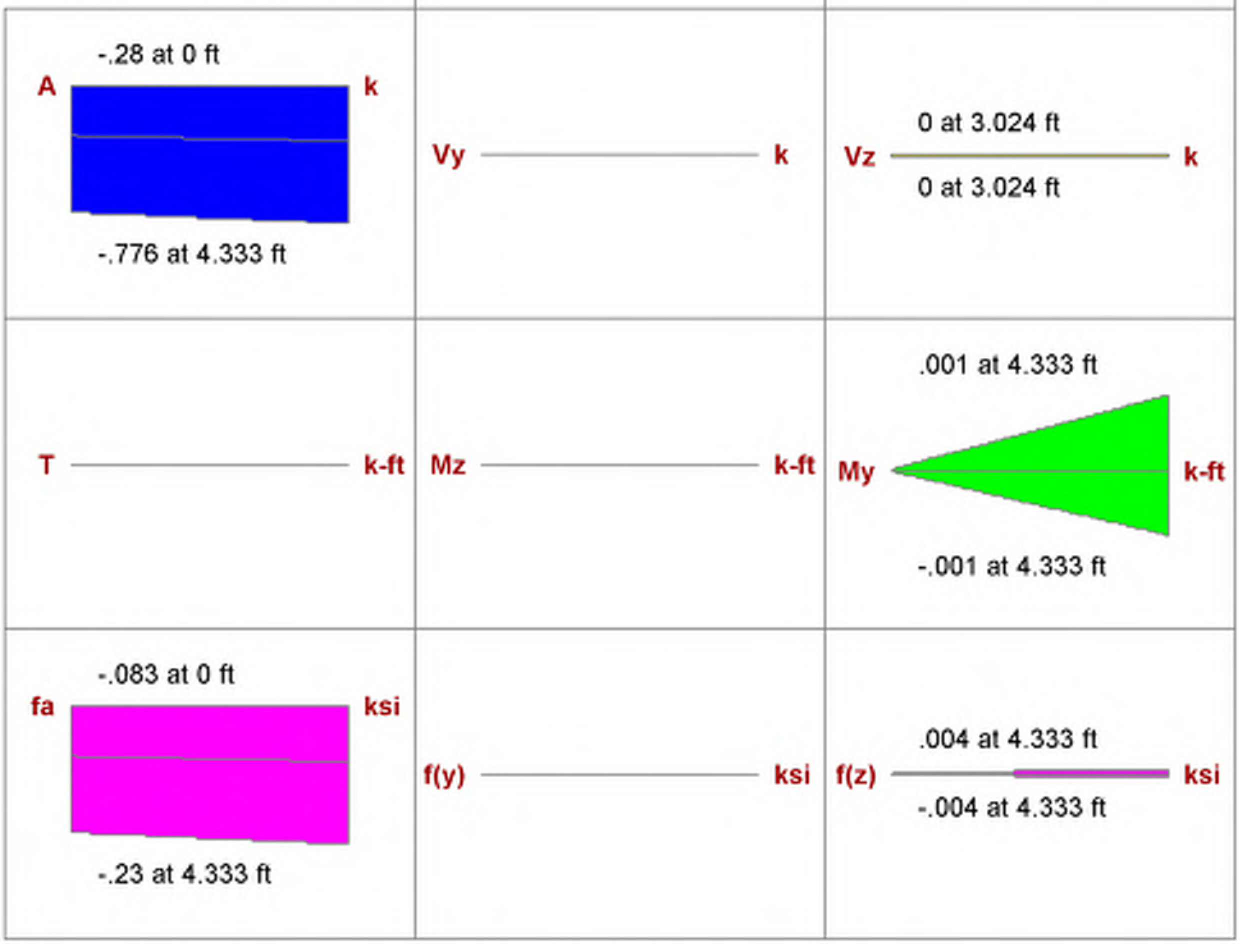
Max Bending Check	**0.786 (LC 9)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/851**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**18.154 ft**	**18.154 ft**
phi*Pnc	**37.13 k**	KL/r	**143.193**	**143.193**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**18.154 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**18.154 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.316**			

Column: ***M29***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **4.333 ft**
I Joint: **N142**
J Joint: **N42**
Envelope
Code Check: **0.003 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

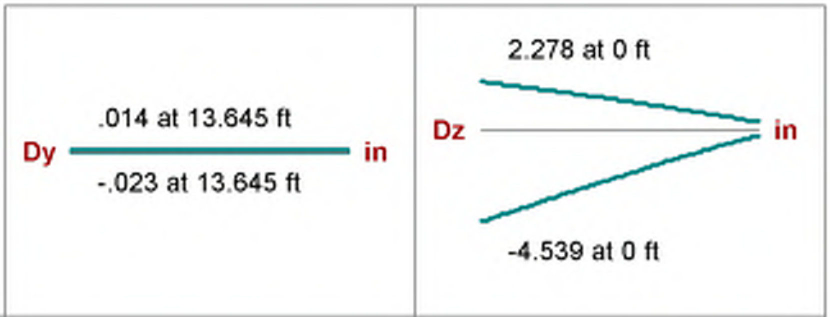
Direct Analysis Method

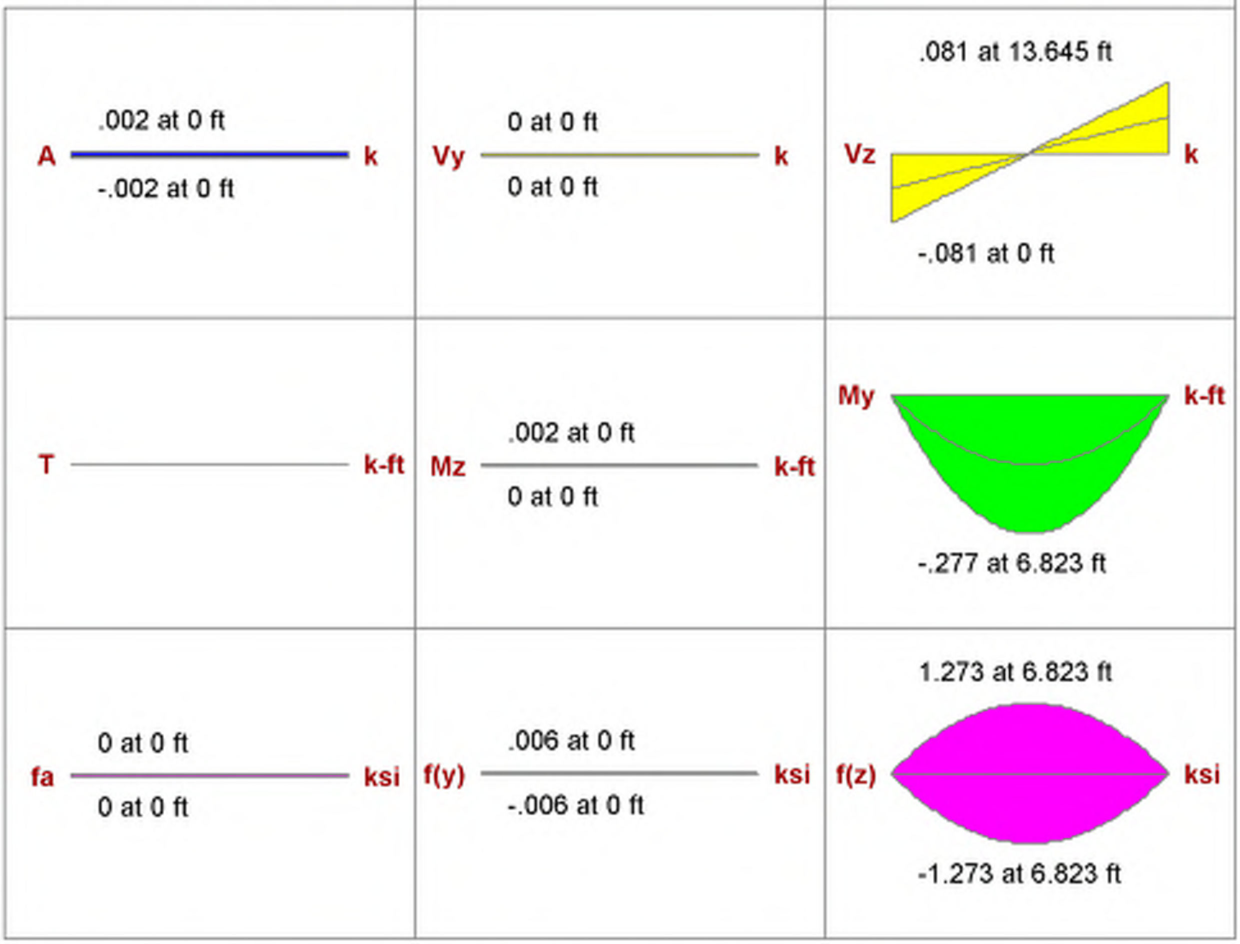
Max Bending Check	**0.003 (LC 7)**	Max Shear Check	**0.000 (z) (LC 7)**
Location	**4.333 ft**	Location	**3.024 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**4.333 ft**	**4.333 ft**
phi*Pnc	**128.975 k**	KL/r	**34.177**	**34.177**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**4.333 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**4.333 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Beam: ***M30***

Shape: **HSS4x3x4**
Material: **A992**
Length: **13.645 ft**
I Joint: **N151**
J Joint: **N1**
Envelope
Code Check: **0.024 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

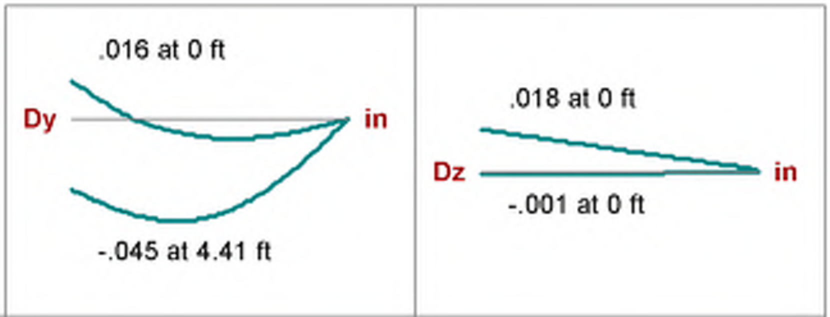
Direct Analysis Method

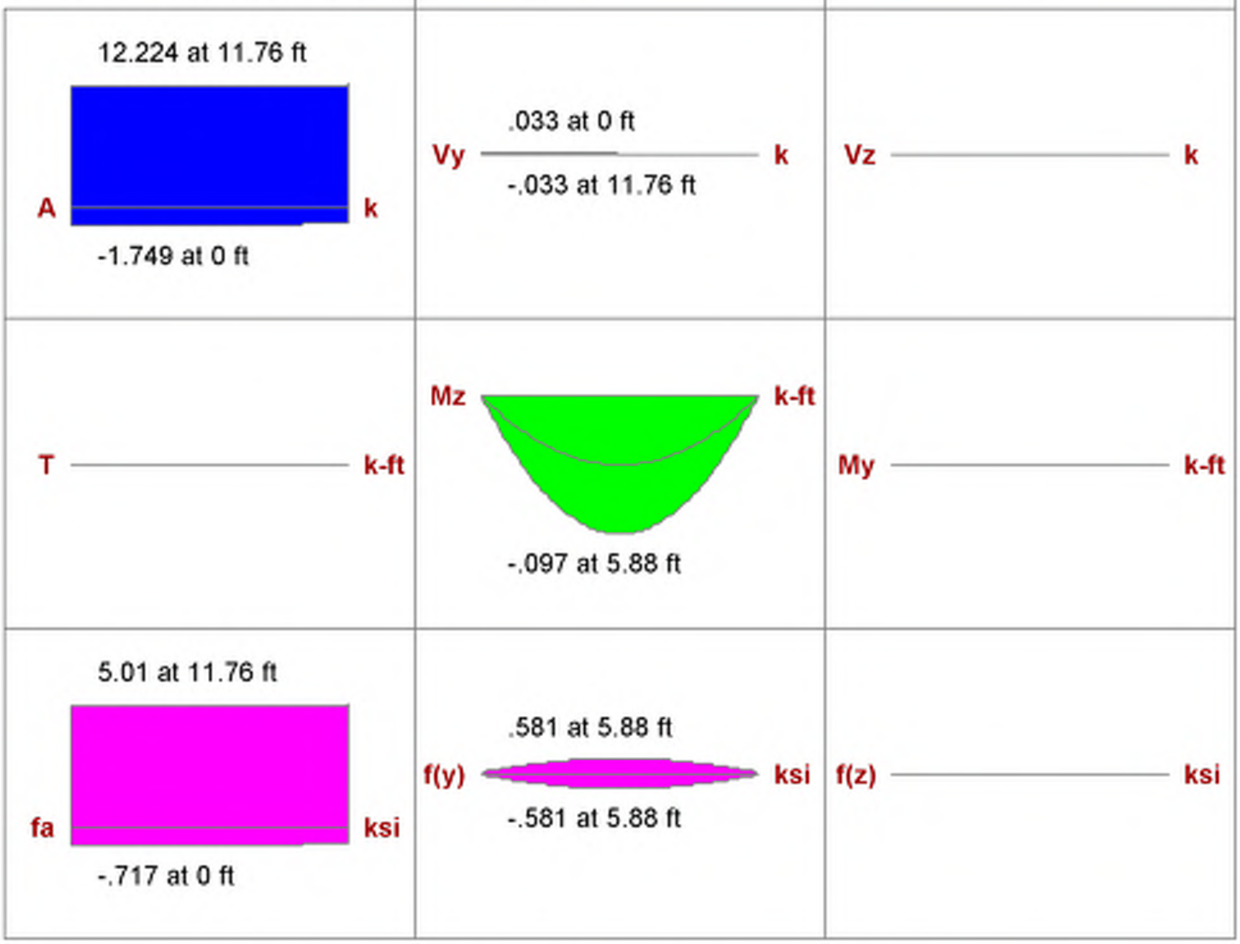
Max Bending Check	**0.024 (LC 7)**	Max Shear Check	**0.003 (z) (LC 9)**
Location	**6.823 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/38**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**13.645 ft**	**13.645 ft**
phi*Pnc	**32.946 k**	KL/r	**141.258**	**112.632**
phi*Pnt	**130.95 k**			
phi*Mny	**11.7 k-ft**	L Comp Flange	**13.645 ft**	
phi*Mnz	**14.287 k-ft**	L-torque	**13.645 ft**	
phi*Vny	**41.533 k**	Tau_b	**1**	
phi*Vnz	**28.951 k**			
phi*Tn	**10.819 k-ft**			
Cb	**1.667**			

VBrace: ***M31***

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **11.76 ft**
I Joint: **N111**
J Joint: **N128**
Envelope
Code Check: **0.364 (LC 23)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

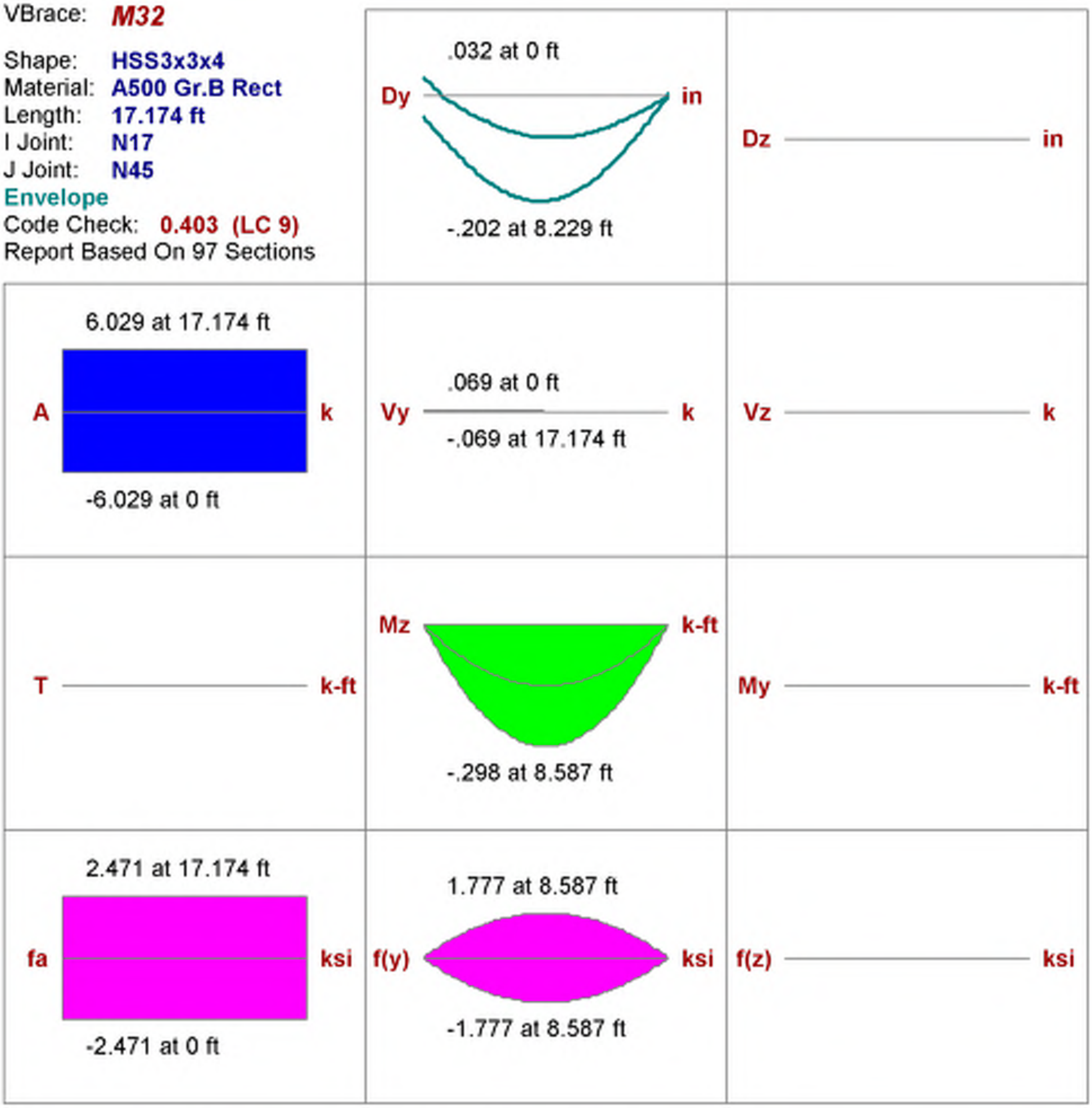
Direct Analysis Method

Max Bending Check	**0.364 (LC 23)**	Max Shear Check	**0.001 (y) (LC 7)**
Location	**6.37 ft**	Location	**11.76 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/5094**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**11.76 ft**	**11.76 ft**
phi*Pnc	**34.26 k**	KL/r	**126.844**	**126.844**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**11.76 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**11.76 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

VBrace: ***M32***

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **17.174 ft**
I Joint: **N17**
J Joint: **N45**
Envelope
Code Check: **0.403 (LC 9)**
Report Based On 97 Sections



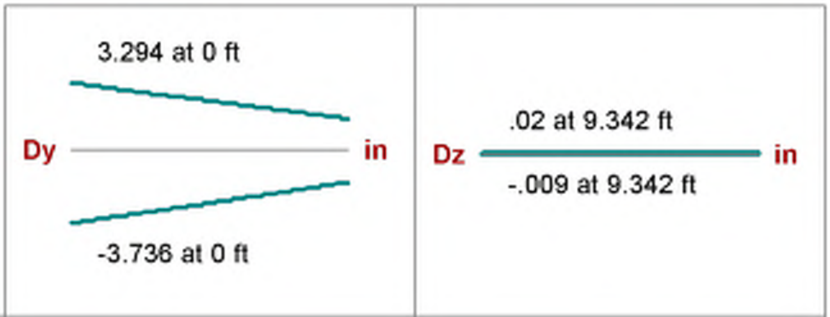
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

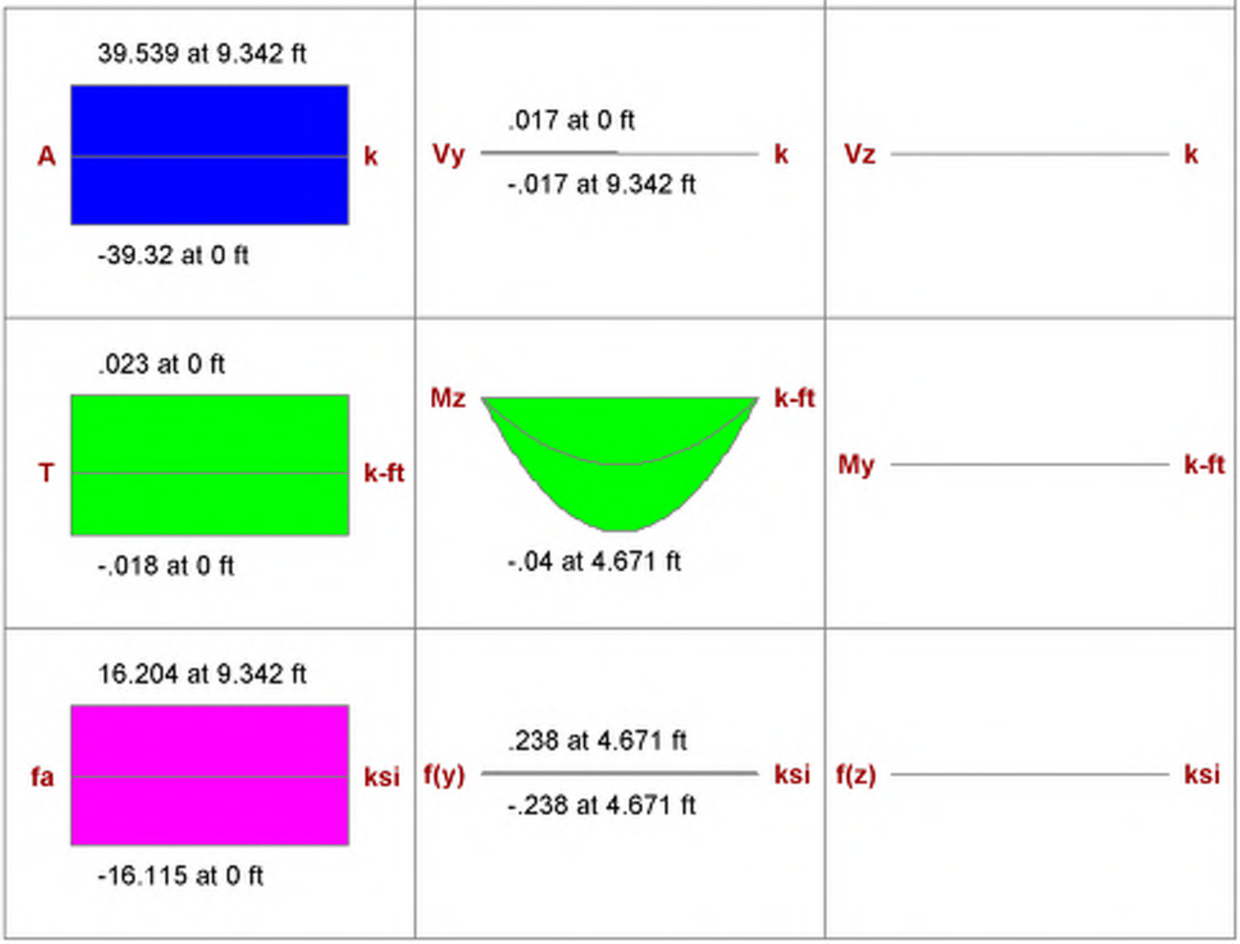
Max Bending Check	**0.403 (LC 9)**	Max Shear Check	**0.003 (y) (LC 7)**
Location	**9.124 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/1140**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**17.174 ft**	**17.174 ft**
phi*Pnc	**16.063 k**	KL/r	**185.248**	**185.248**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**17.174 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**17.174 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

VBrace: ***M33***

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **9.342 ft**
I Joint: **N16**
J Joint: **N152**
Envelope
Code Check: **0.777 (LC 13)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.777 (LC 13)**	Max Shear Check	**0.004 (y) (LC 9)**
Location	**5.158 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/62**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**9.342 ft**	**9.342 ft**
phi*Pnc	**51.02 k**	KL/r	**100.769**	**100.769**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**9.342 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**9.342 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

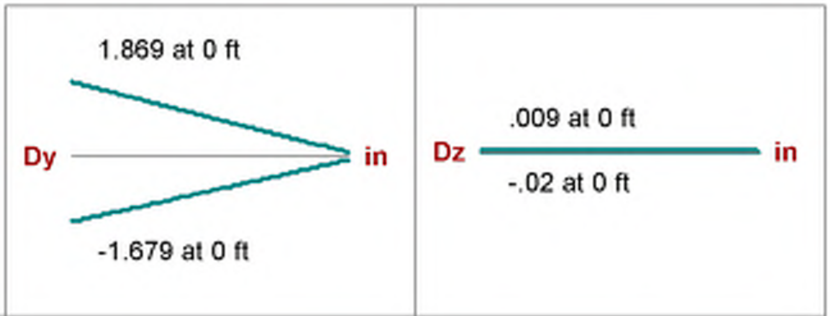
VBrace: ***M34***

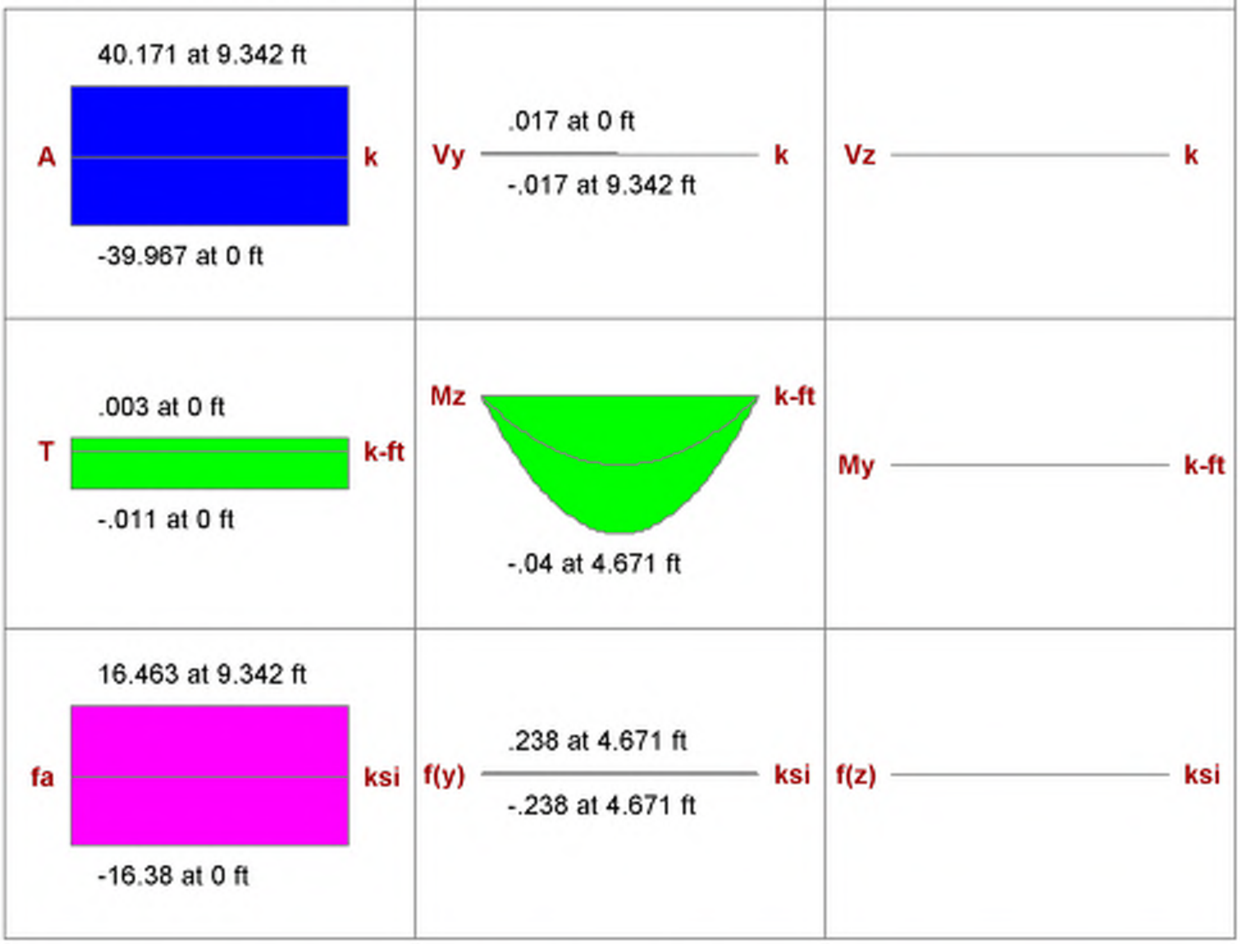
Shape:	**HSS3x3x4**
Material:	**A500 Gr.B Rect**
Length:	**9.342 ft**
I Joint:	**N152**
J Joint:	**N134**

Envelope

Code Check: **0.790 (LC 7)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

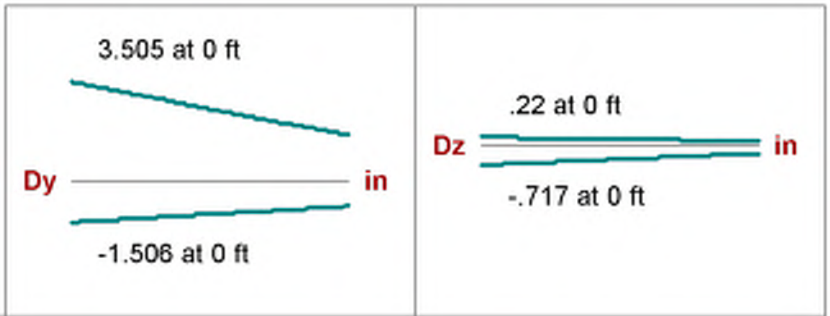
Direct Analysis Method

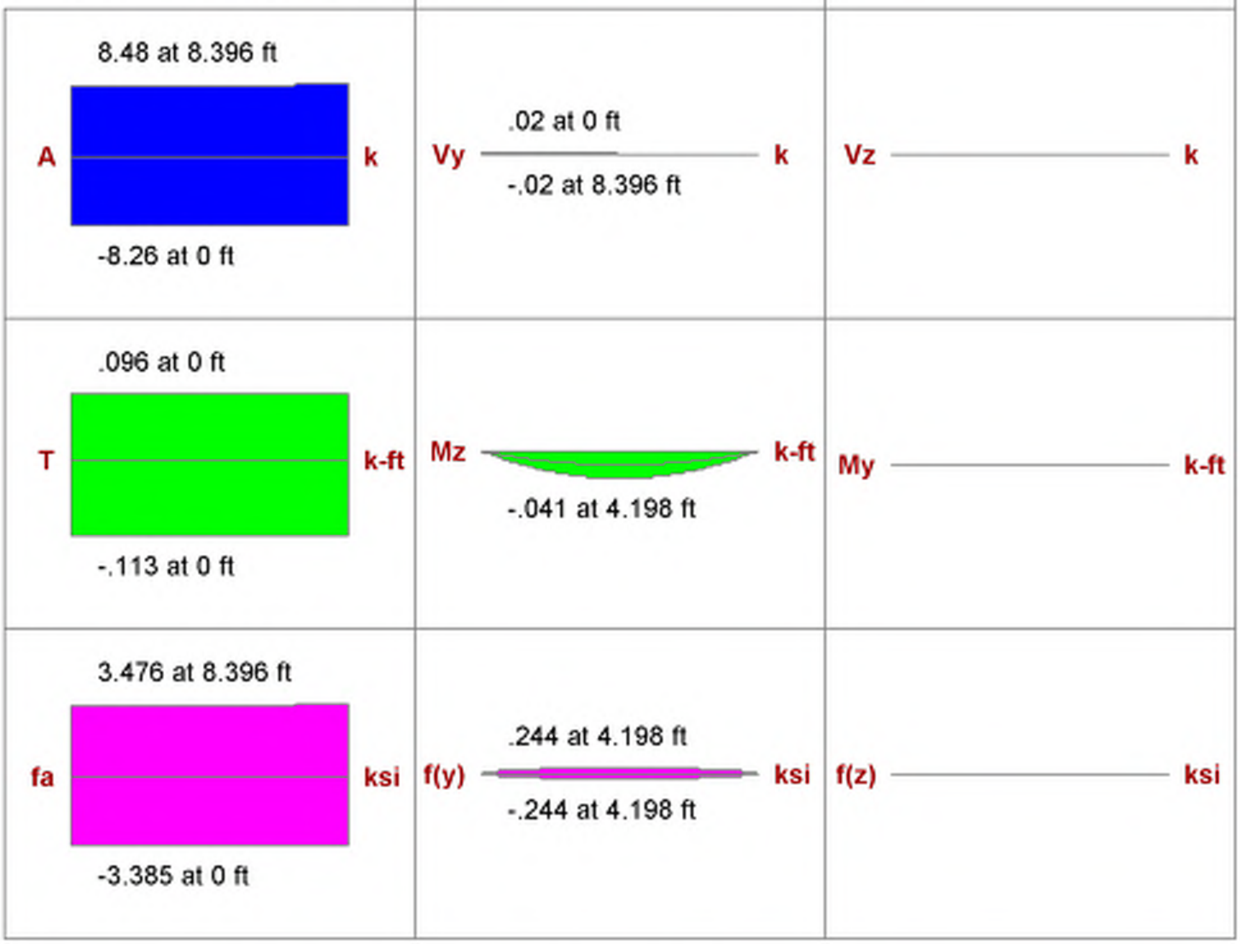
Max Bending Check	**0.790 (LC 7)**	Max Shear Check	**0.002 (y) (LC 9)**
Location	**5.158 ft**	Location	**9.342 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/62**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**9.342 ft**	**9.342 ft**
phi*Pnc	**51.02 k**	KL/r	**100.769**	**100.769**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**9.342 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**9.342 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

VBrace: **M35**

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **8.396 ft**
I Joint: **N4**
J Joint: **N96**
Envelope
Code Check: **0.146 (LC 9)**
Report Based On 97 Sections





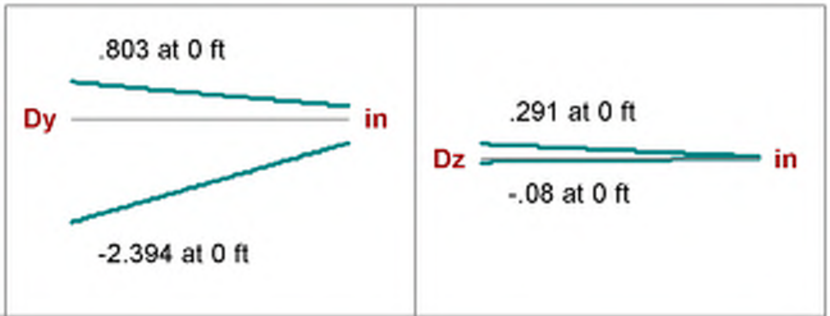
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

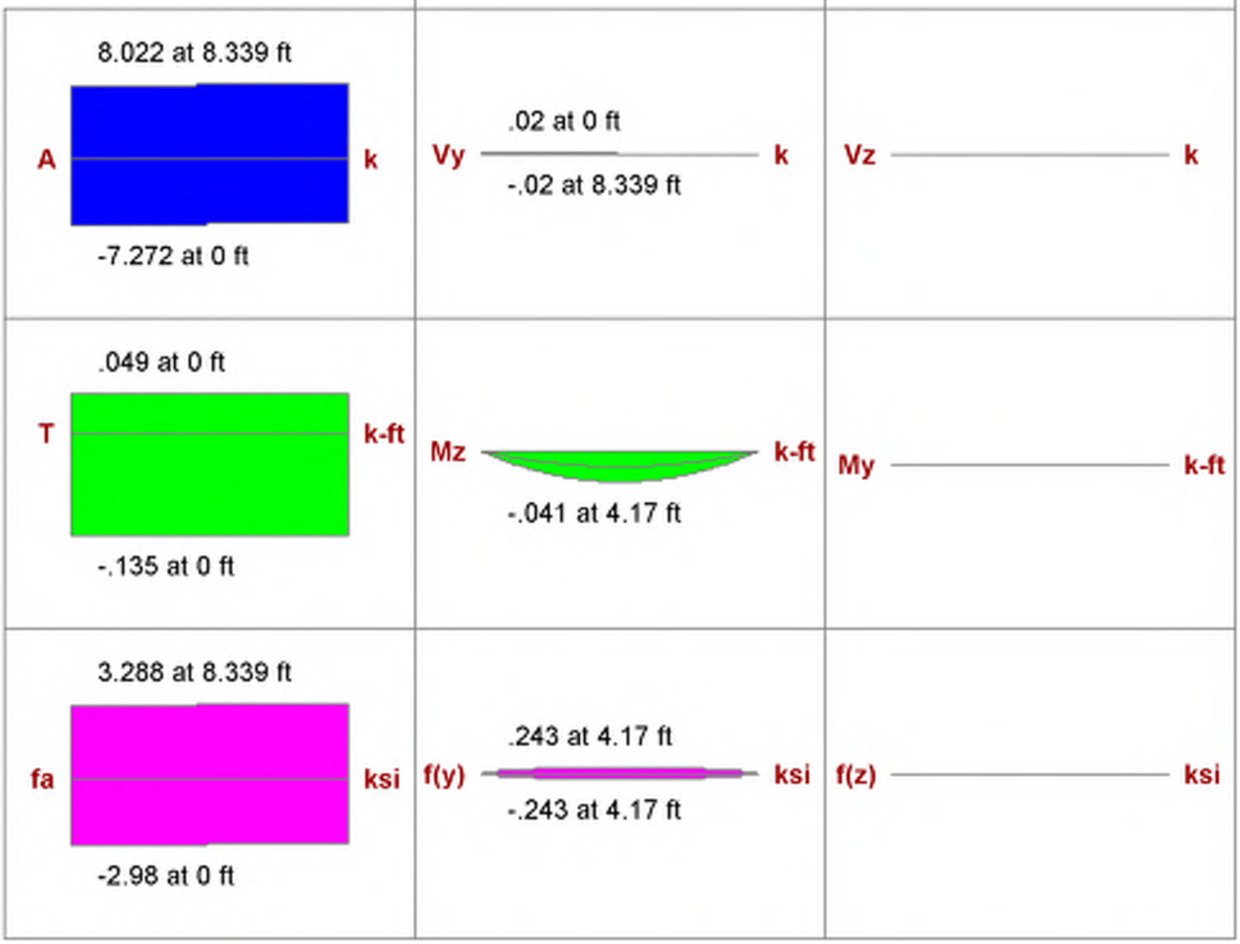
Max Bending Check	**0.146 (LC 9)**	Max Shear Check	**0.016 (y) (LC 7)**
Location	**8.396 ft**	Location	**8.396 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/52**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**8.396 ft**	**8.396 ft**
phi*Pnc	**58.183 k**	KL/r	**90.561**	**90.561**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**8.396 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**8.396 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

VBrace: ***M36***

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **8.339 ft**
I Joint: **N96**
J Joint: **N109**
Envelope
Code Check: **0.137 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

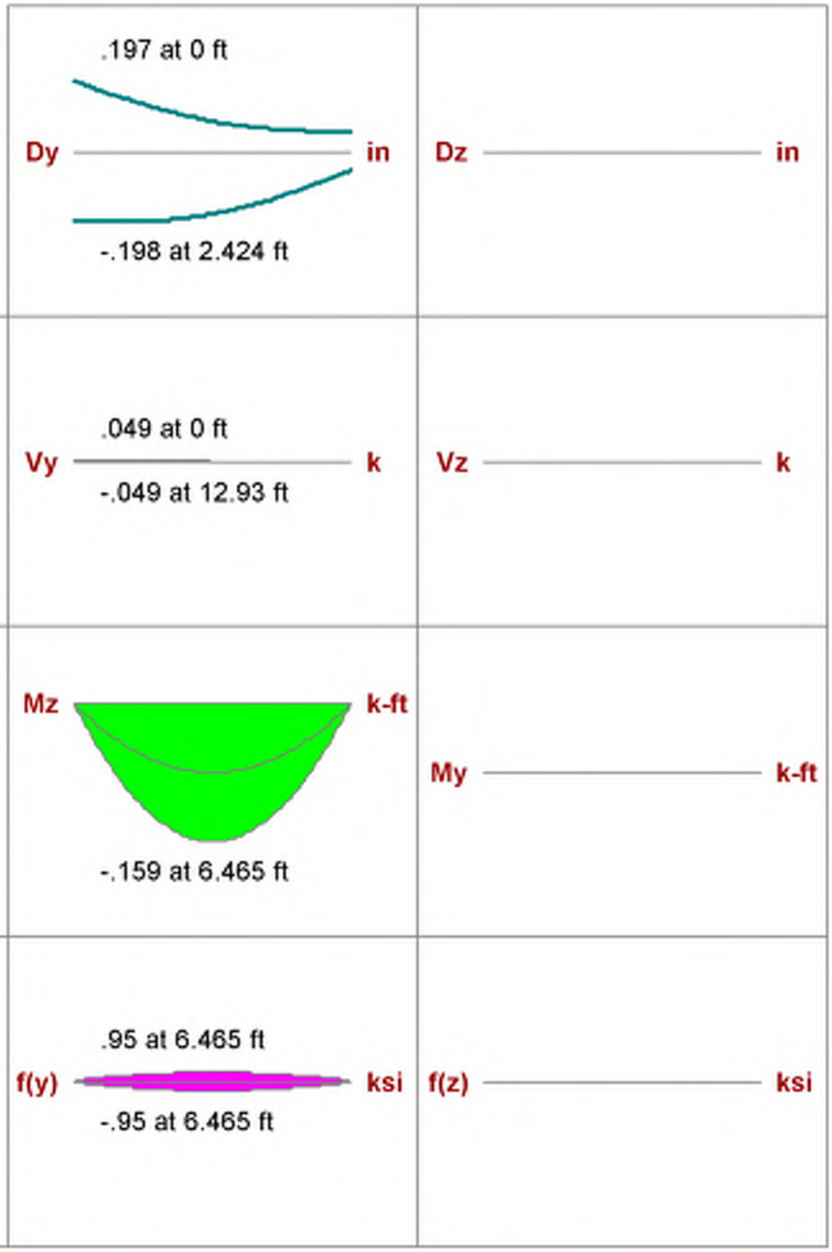
Direct Analysis Method

Max Bending Check	**0.137 (LC 7)**	Max Shear Check	**0.019 (y) (LC 9)**
Location	**8.339 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/177**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**8.339 ft**	**8.339 ft**
phi*Pnc	**58.617 k**	KL/r	**89.95**	**89.95**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**8.339 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**8.339 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

VBrace: ***M37***

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **12.93 ft**
I Joint: **N21**
J Joint: **N153**
Envelope
Code Check: **0.689 (LC 9)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.689 (LC 9)**	Max Shear Check	**0.002 (y) (LC 7)**
Location	**6.734 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/1062**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**12.93 ft**	**12.93 ft**
phi*Pnc	**28.34 k**	KL/r	**139.465**	**139.465**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**12.93 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**12.93 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

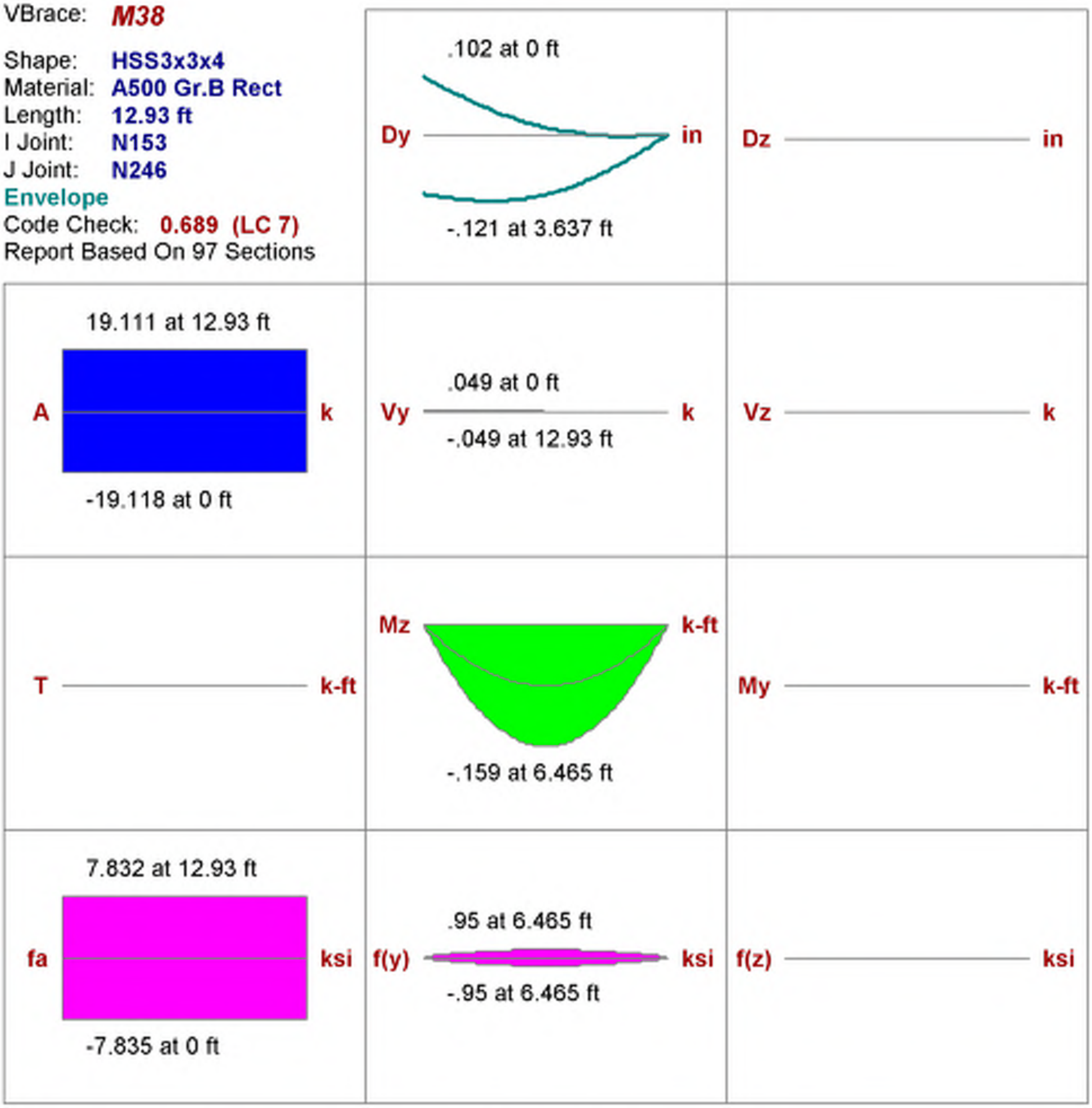
VBrace: ***M38***

Shape:	**HSS3x3x4**
Material:	**A500 Gr.B Rect**
Length:	**12.93 ft**
I Joint:	**N153**
J Joint:	**N246**

Envelope

Code Check: **0.689 (LC 7)**

Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

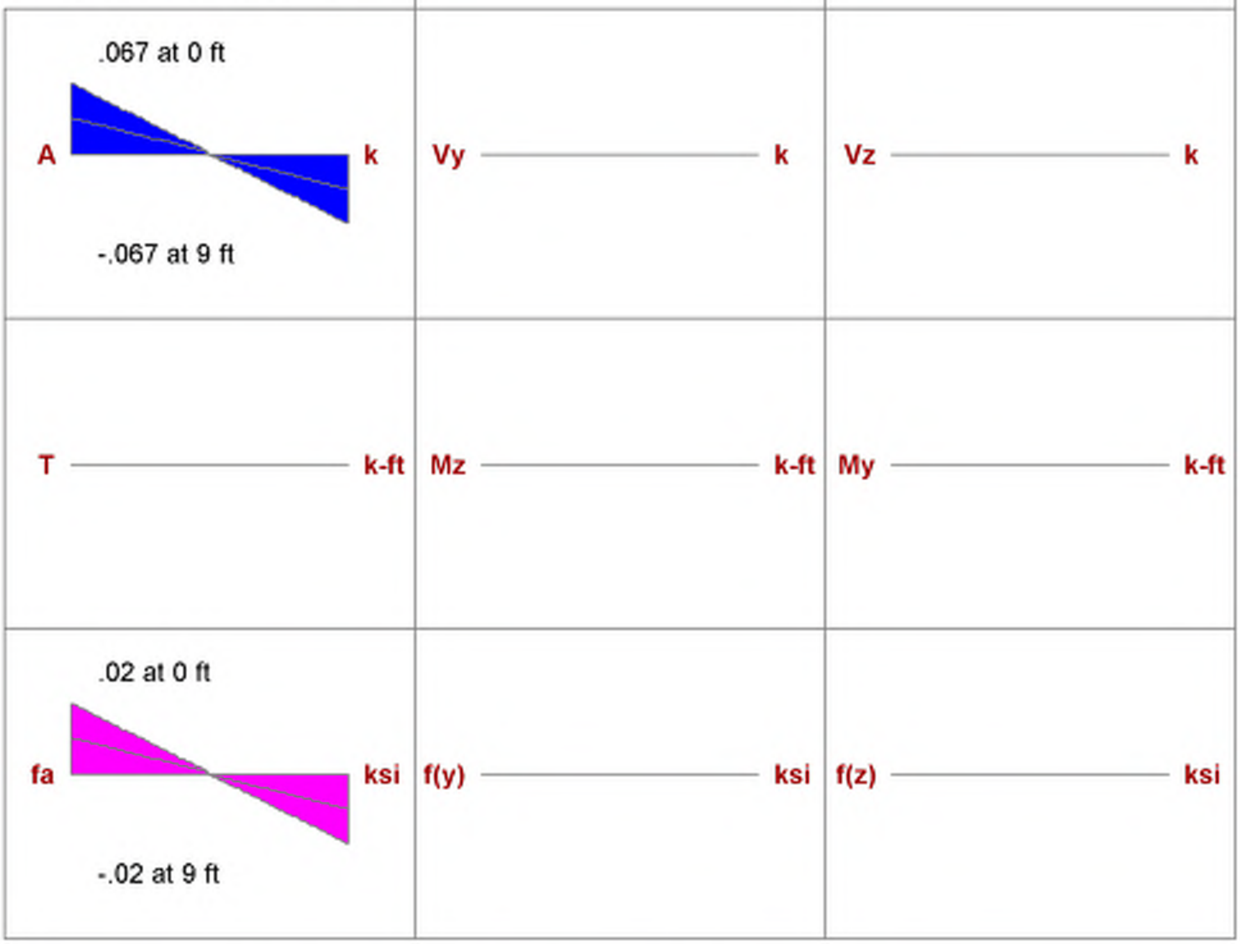
Direct Analysis Method

Max Bending Check	**0.689 (LC 7)**	Max Shear Check	**0.002 (y) (LC 9)**
Location	**6.734 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/1525**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**12.93 ft**	**12.93 ft**
phi*Pnc	**28.34 k**	KL/r	**139.465**	**139.465**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**12.93 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**12.93 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

Column: ***M39***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **9 ft**
I Joint: **N132**
J Joint: **N75**
Envelope
Code Check: **0.000 (LC 10)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

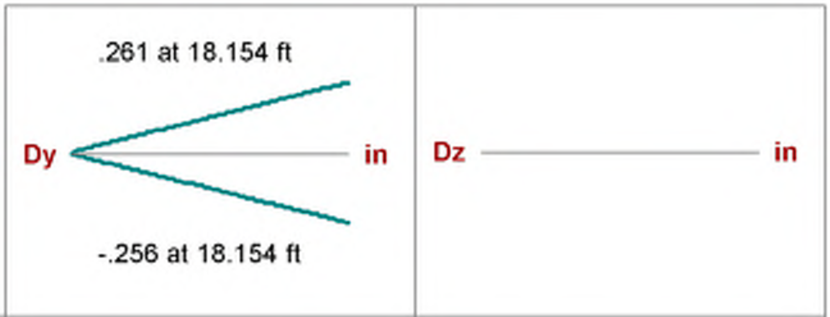
Direct Analysis Method

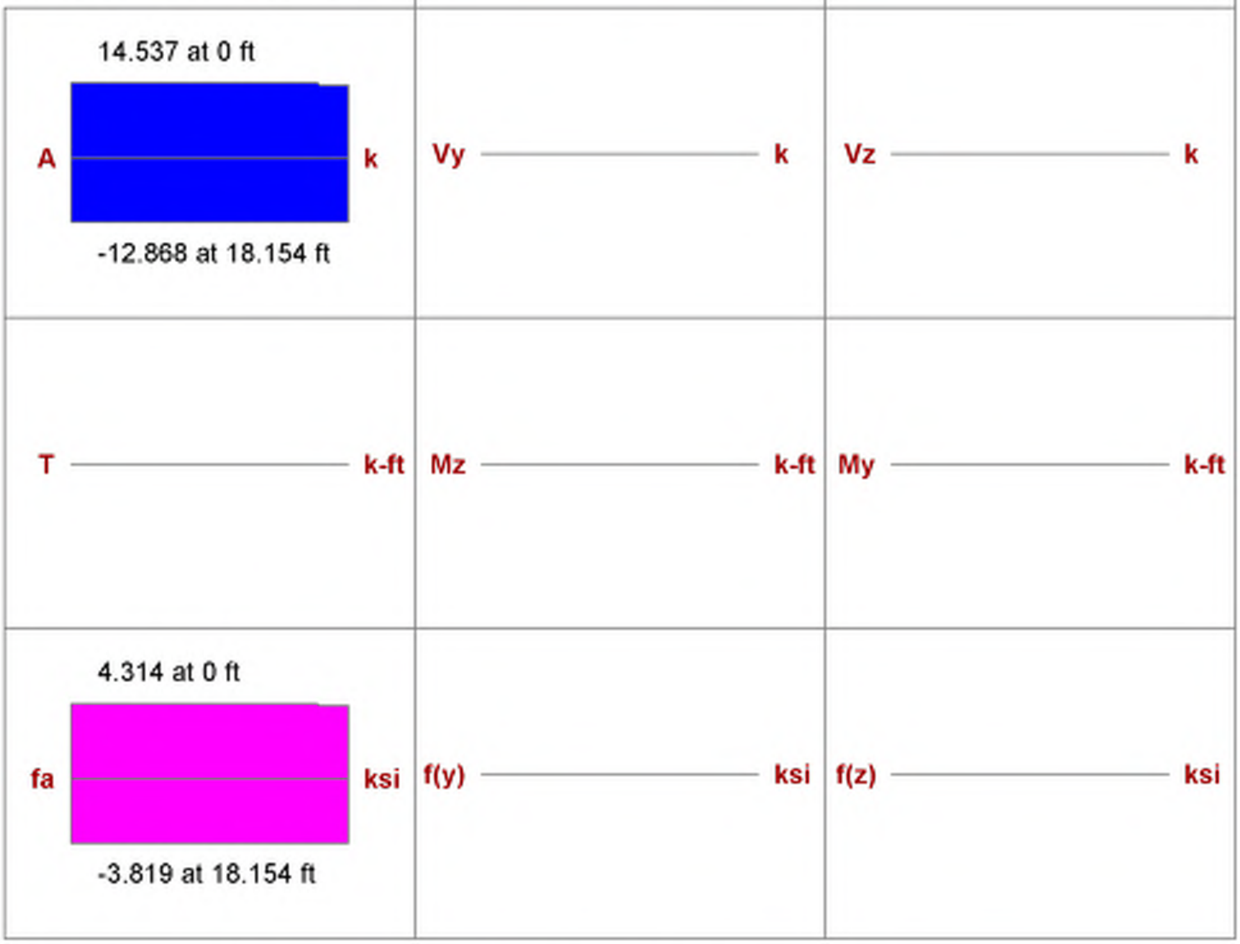
Max Bending Check	**0.000 (LC 10)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**9 ft**	**9 ft**
phi*Pnc	**99.405 k**	KL/r	**70.989**	**70.989**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**9 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**9 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: ***M40***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **18.154 ft**
I Joint: **N246**
J Joint: **N21**
Envelope
Code Check: **0.392 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.392 (LC 7)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**18.154 ft**	**18.154 ft**
phi*Pnc	**37.13 k**	KL/r	**143.193**	**143.193**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**18.154 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**18.154 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

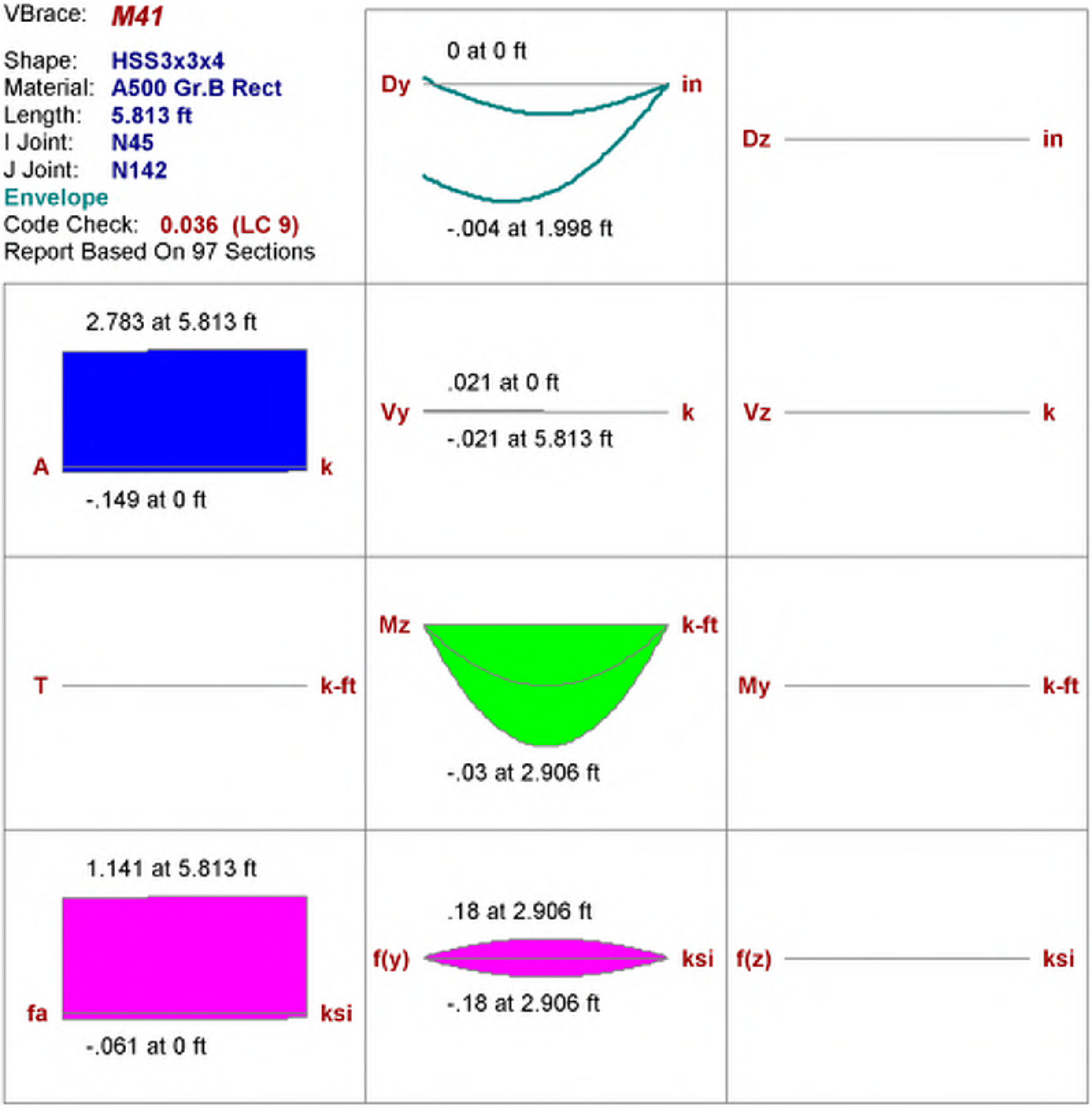
VBrace: ***M41***

Shape:	**HSS3x3x4**
Material:	**A500 Gr.B Rect**
Length:	**5.813 ft**
I Joint:	**N45**
J Joint:	**N142**

Envelope

Code Check: **0.036 (LC 9)**

Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.036 (LC 9)**	Max Shear Check	**0.001 (y) (LC 9)**
Location	**5.813 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**5.813 ft**	**5.813 ft**
phi*Pnc	**77.543 k**	KL/r	**62.7**	**62.7**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**5.813 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**5.813 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

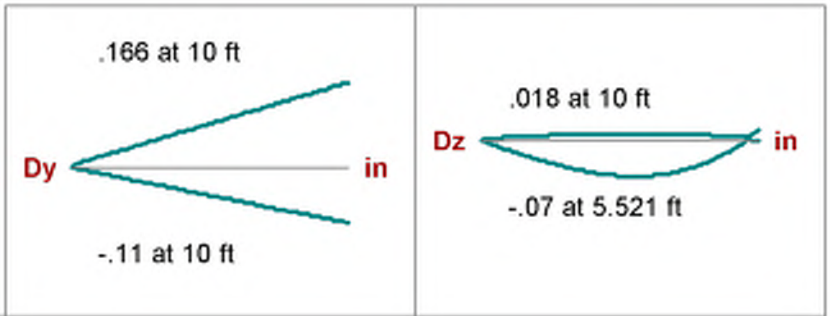
Column: ***M42***

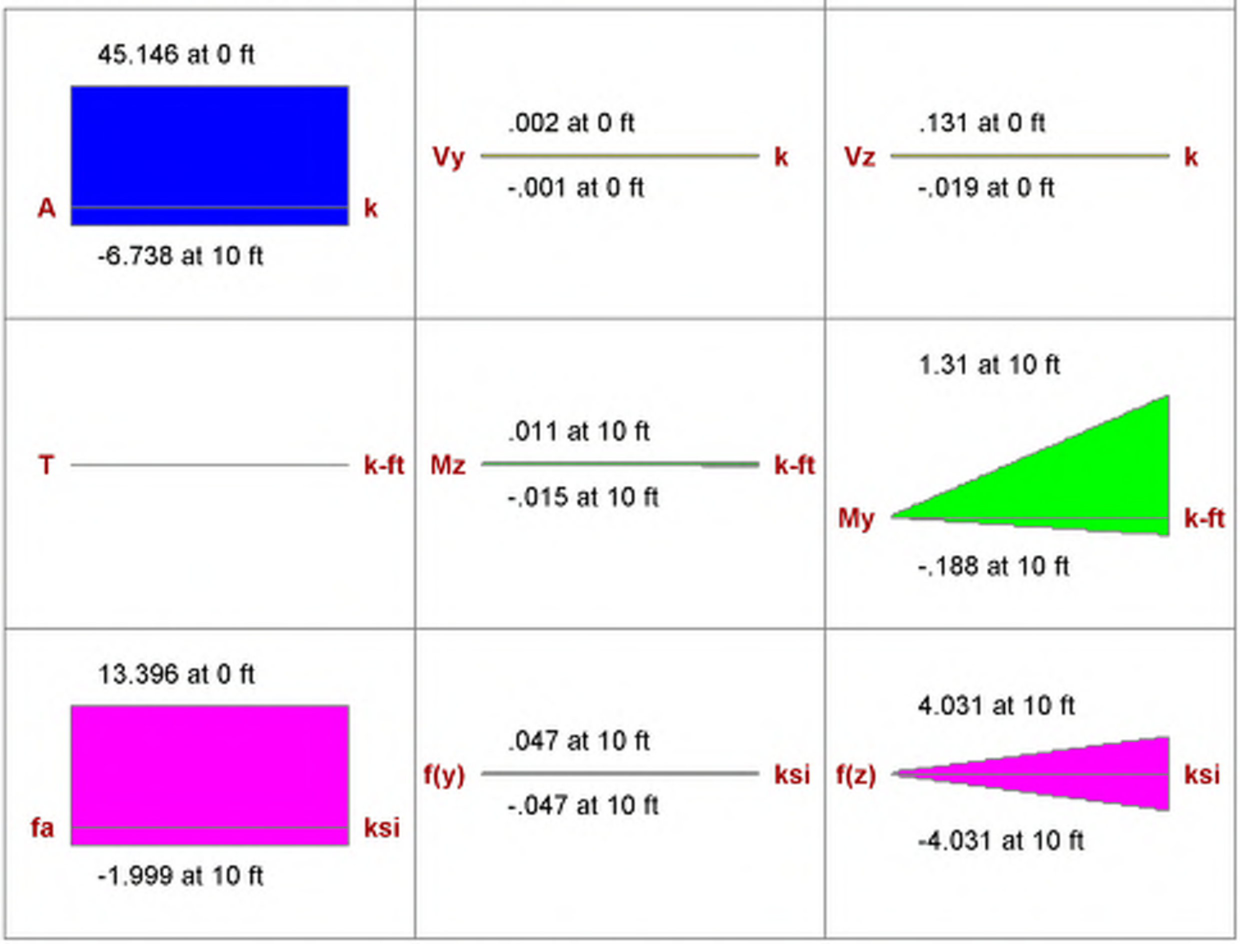
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**10 ft**
I Joint:	**N125**
J Joint:	**N112**

Envelope

Code Check: **0.548 (LC 25)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

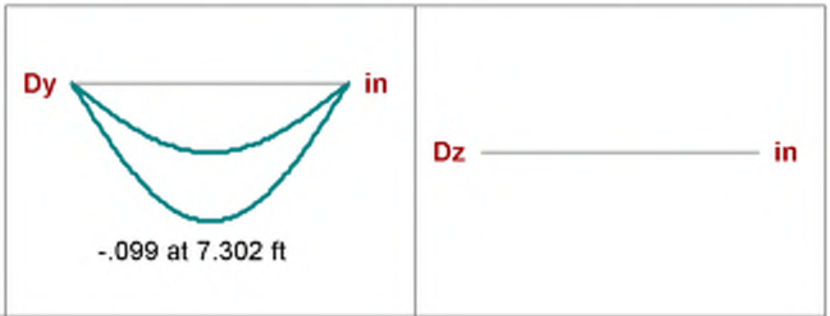
Direct Analysis Method

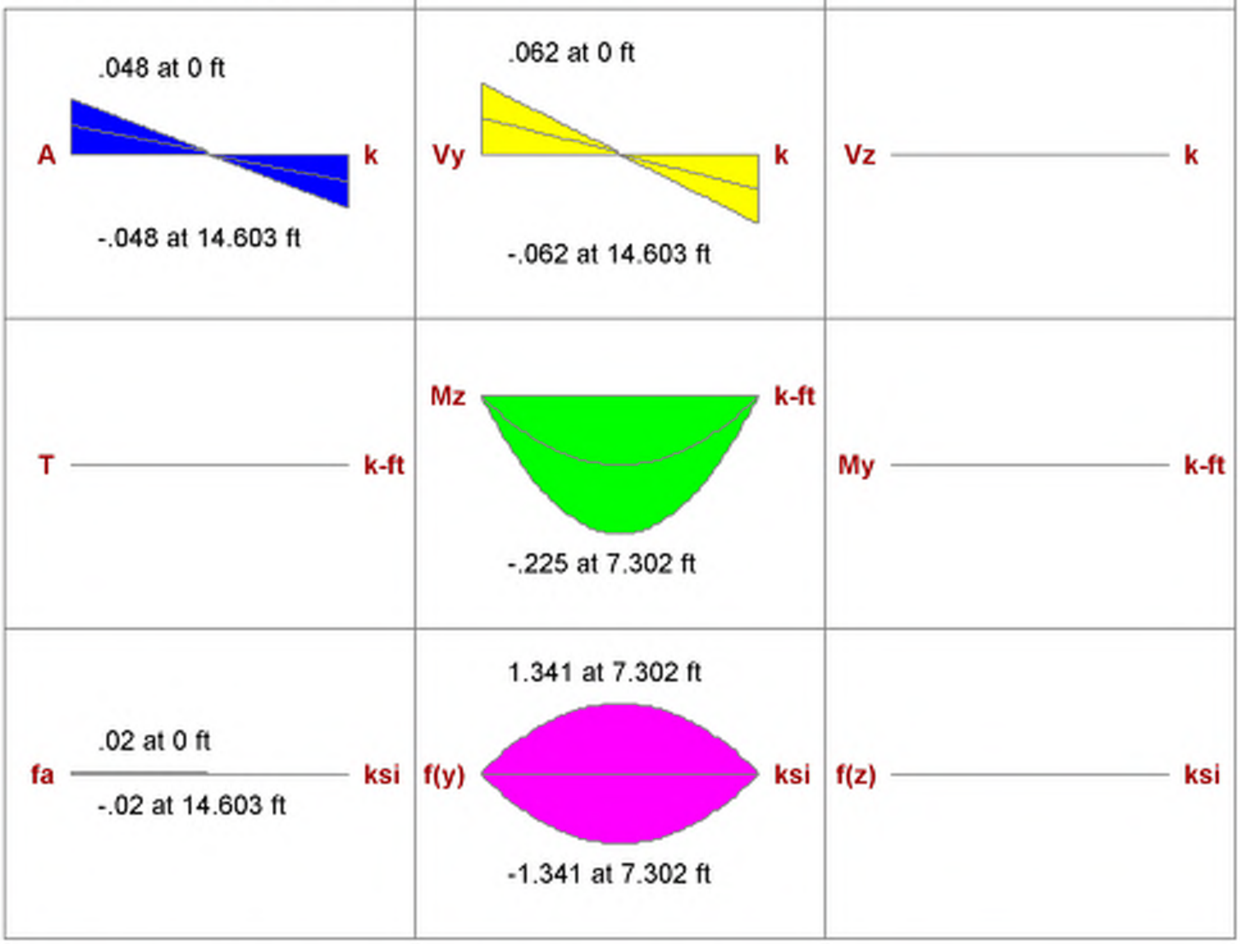
Max Bending Check	**0.548 (LC 25)**	Max Shear Check	**0.003 (z) (LC 9)**
Location	**10 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/978**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.667**			

VBrace: ***M43***

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **14.603 ft**
I Joint: **N132**
J Joint: **N76**
Envelope
Code Check: **0.026 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.026 (LC 7)**	Max Shear Check	**0.002 (y) (LC 7)**
Location	**7.149 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/1777**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**14.603 ft**	**14.603 ft**
phi*Pnc	**22.218 k**	KL/r	**157.513**	**157.513**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**14.603 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**14.603 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

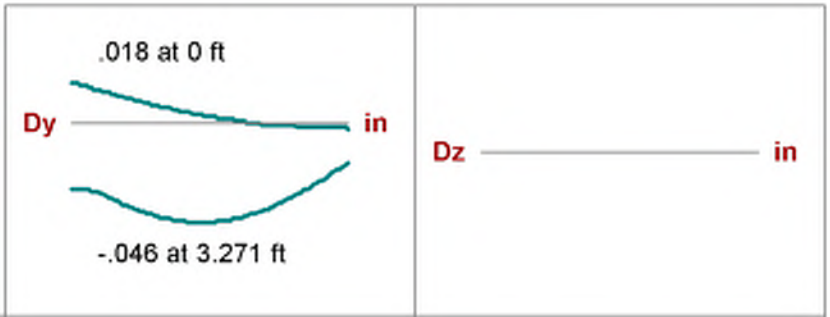
Beam: ***M44***

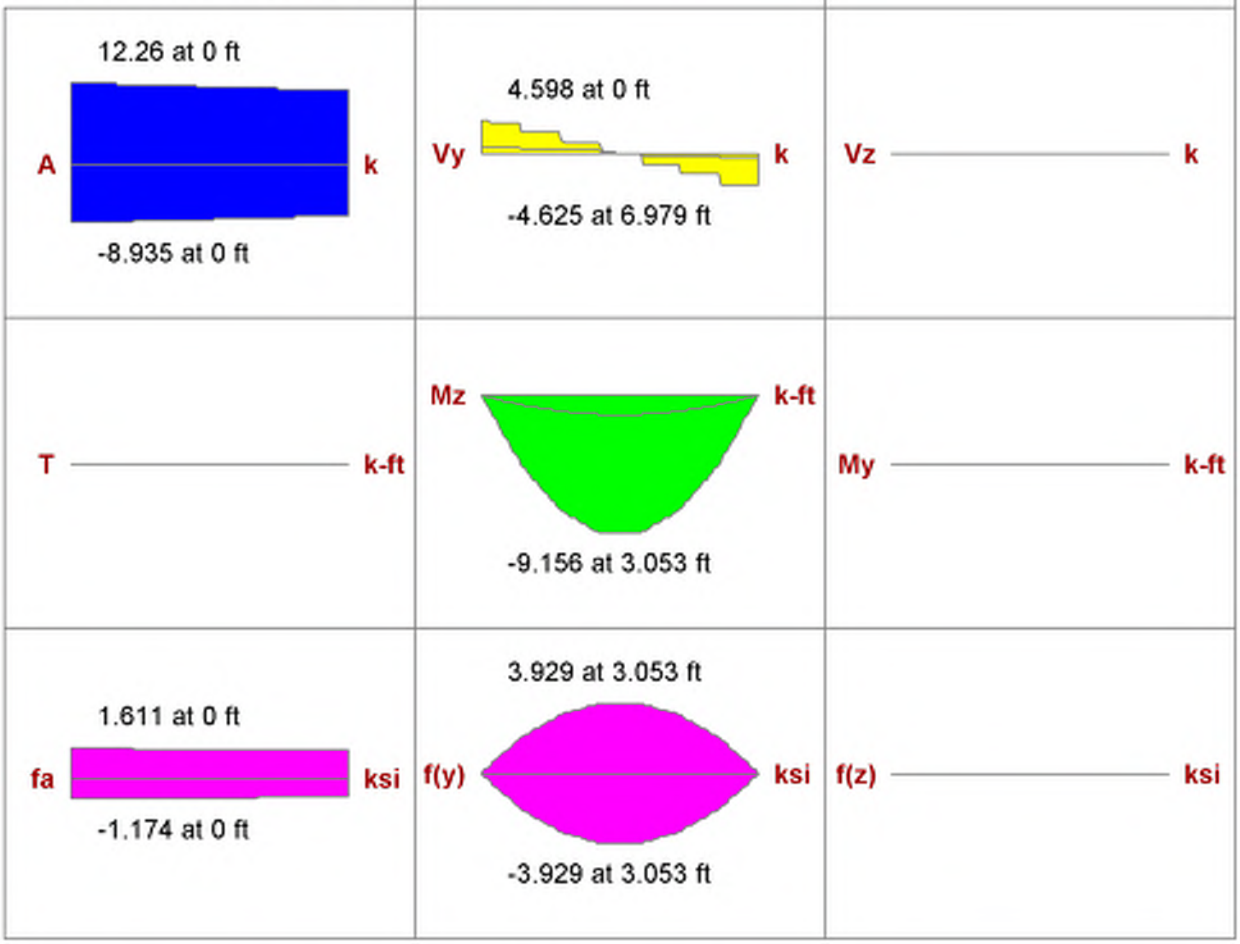
Shape:	**W10x26**
Material:	**A992**
Length:	**6.979 ft**
I Joint:	**N171**
J Joint:	**N176**

Envelope

Code Check: **0.094 (LC 25)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.094 (LC 25)**	Max Shear Check	**0.058 (y) (LC 23)**	
Location	**3.053 ft**	Location	**6.979 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/3472**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**6.979 ft**	**6.979 ft**
phi*Pnc	**259.653 k**	KL/r	**61.526**	**19.252**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**6.979 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**6.979 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.136**			

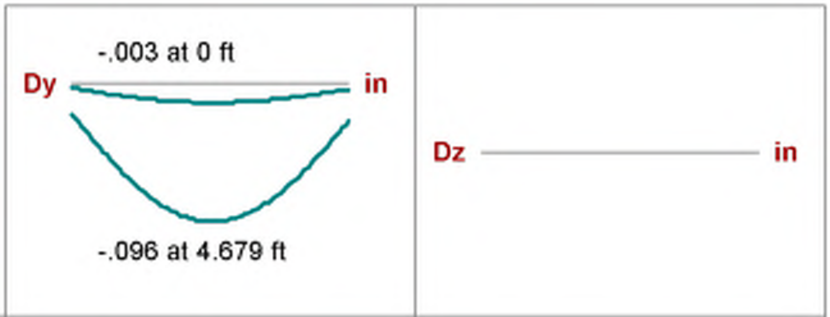
Beam: *M45*

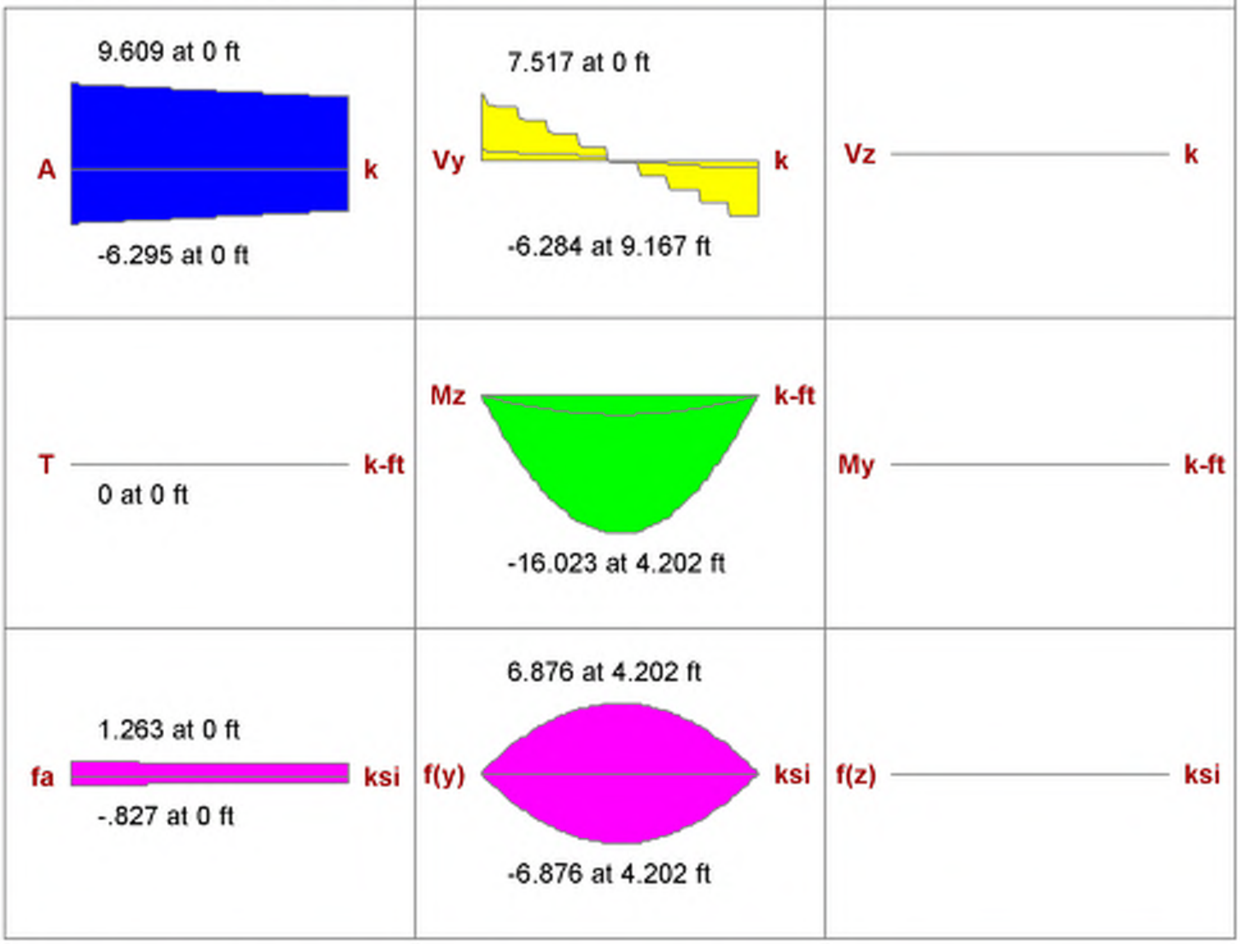
Shape:	**W10x26**
Material:	**A992**
Length:	**9.167 ft**
I Joint:	**N172**
J Joint:	**N173**

Envelope

Code Check: **0.159 (LC 25)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

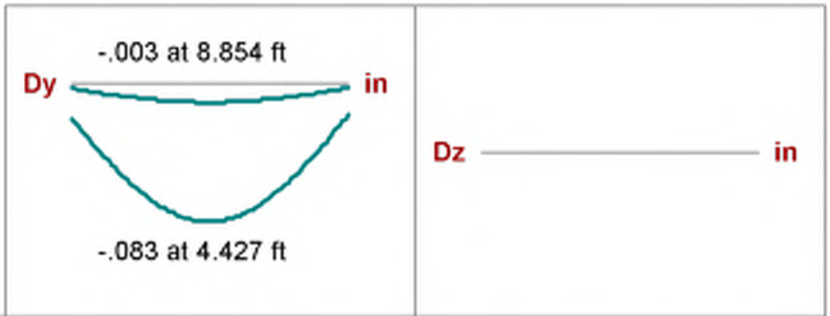
Direct Analysis Method

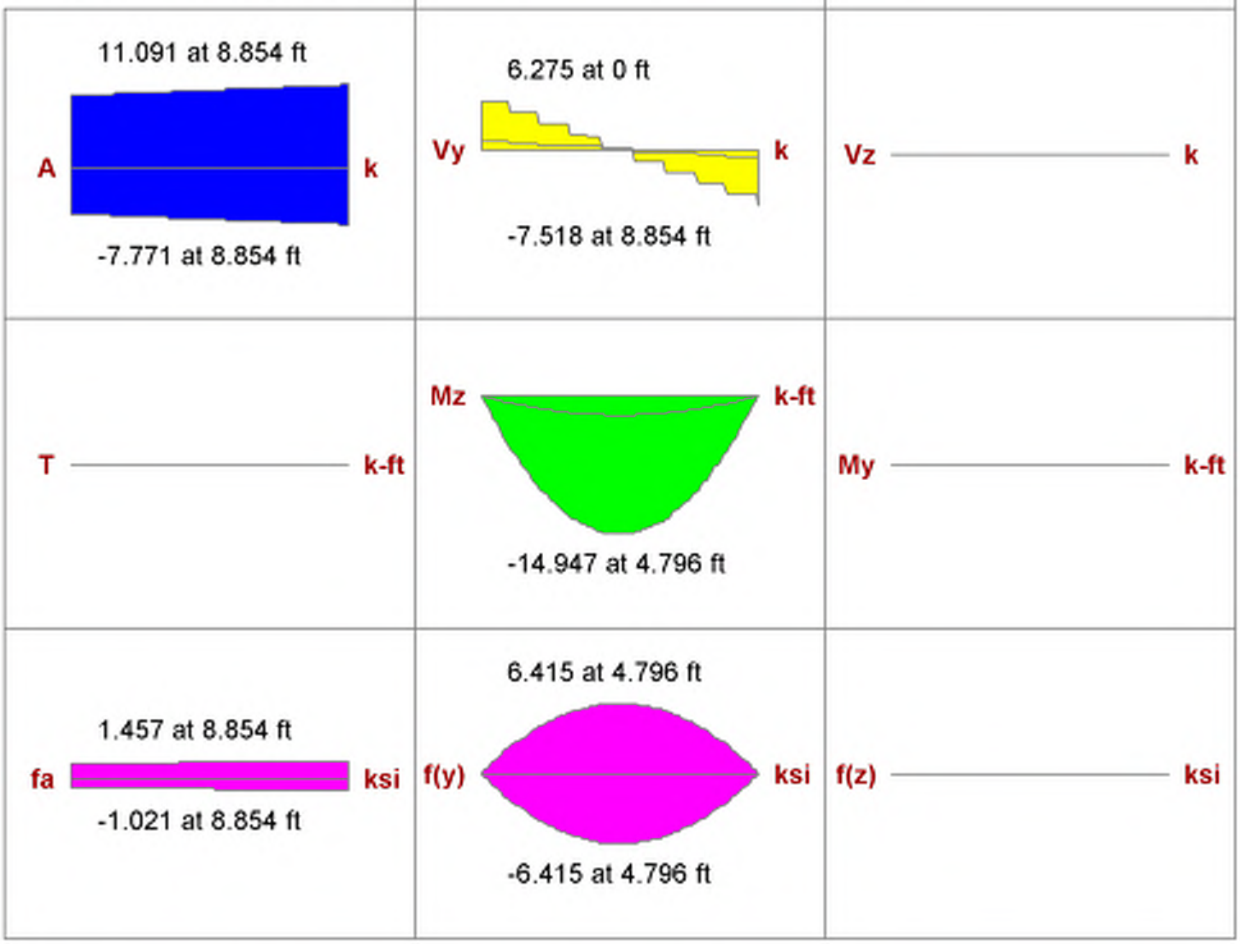
Max Bending Check	**0.159 (LC 25)**	Max Shear Check	**0.094 (y) (LC 25)**	
Location	**4.202 ft**	Location	**0 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/1517**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**9.167 ft**	**9.167 ft**
phi*Pnc	**212.426 k**	KL/r	**80.815**	**25.288**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**9.167 ft**	
phi*Mnz	**111.977 k-ft**	L-torque	**9.167 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.138**			

Beam: ***M46***

Shape: **W10x26**
Material: **A992**
Length: **8.854 ft**
I Joint: **N172**
J Joint: **N176**
Envelope
Code Check: **0.148 (LC 25)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.148 (LC 25)**	Max Shear Check	**0.094 (y) (LC 23)**
Location	**4.796 ft**	Location	**8.854 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/1683**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**8.854 ft**	**8.854 ft**
phi*Pnc	**219.345 k**	KL/r	**78.056**	**24.425**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**8.854 ft**	
phi*Mnz	**113.63 k-ft**	L-torque	**8.854 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.139**			

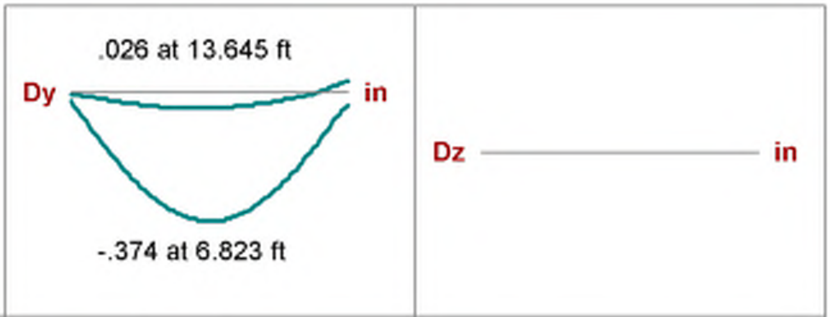
Beam: ***M47***

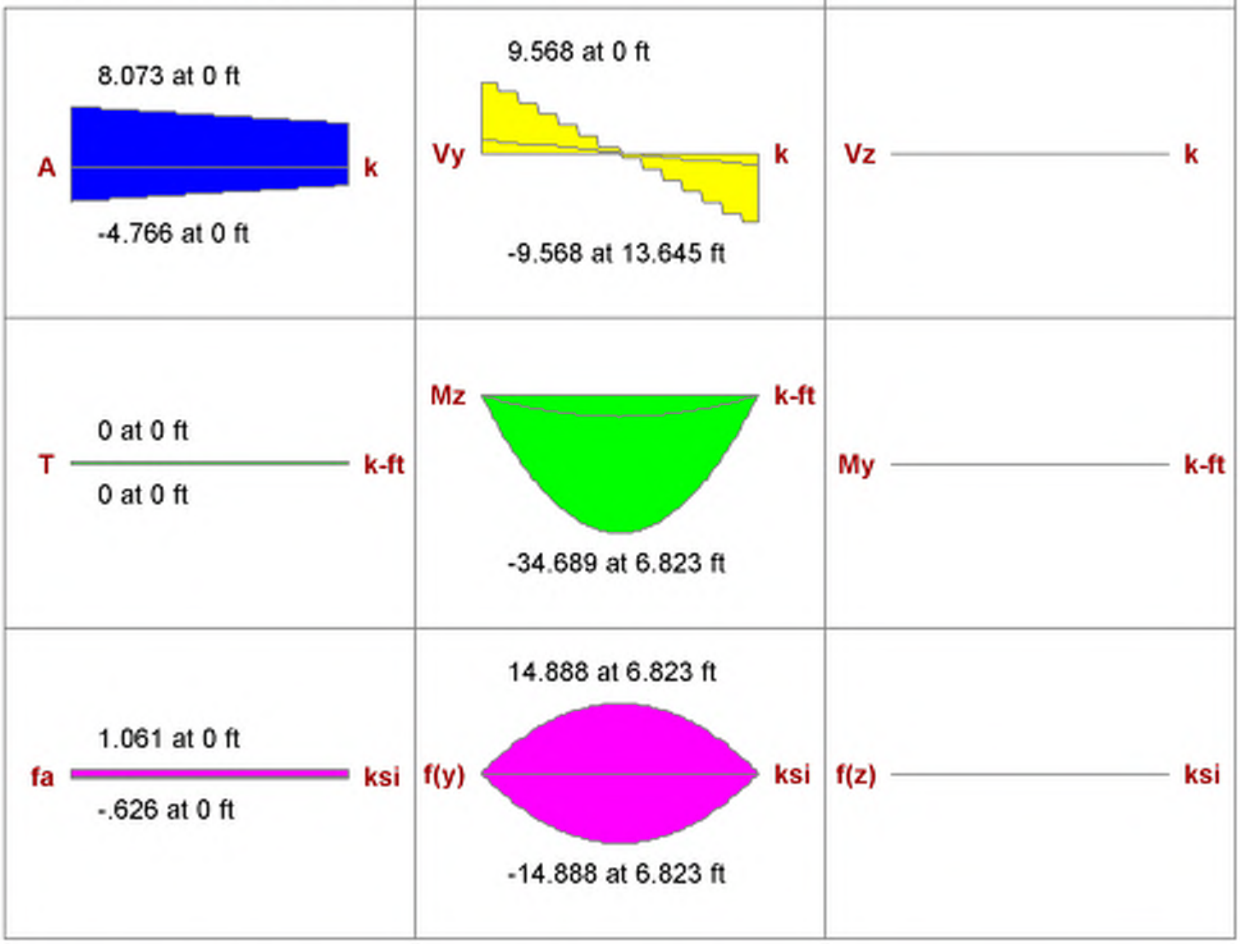
Shape:	**W10x26**
Material:	**A992**
Length:	**13.645 ft**
I Joint:	**N173**
J Joint:	**N117**

Envelope

Code Check: **0.409 (LC 25)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

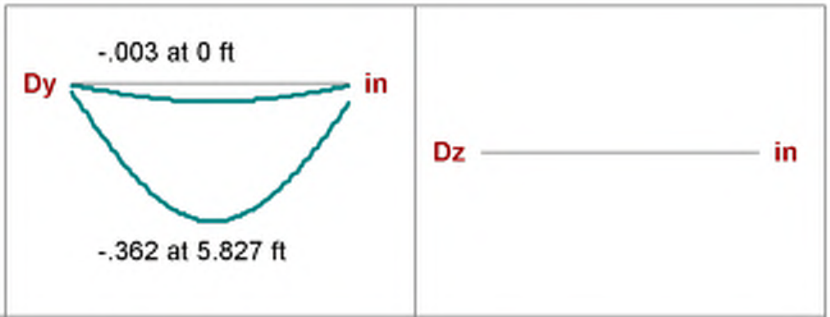
Direct Analysis Method

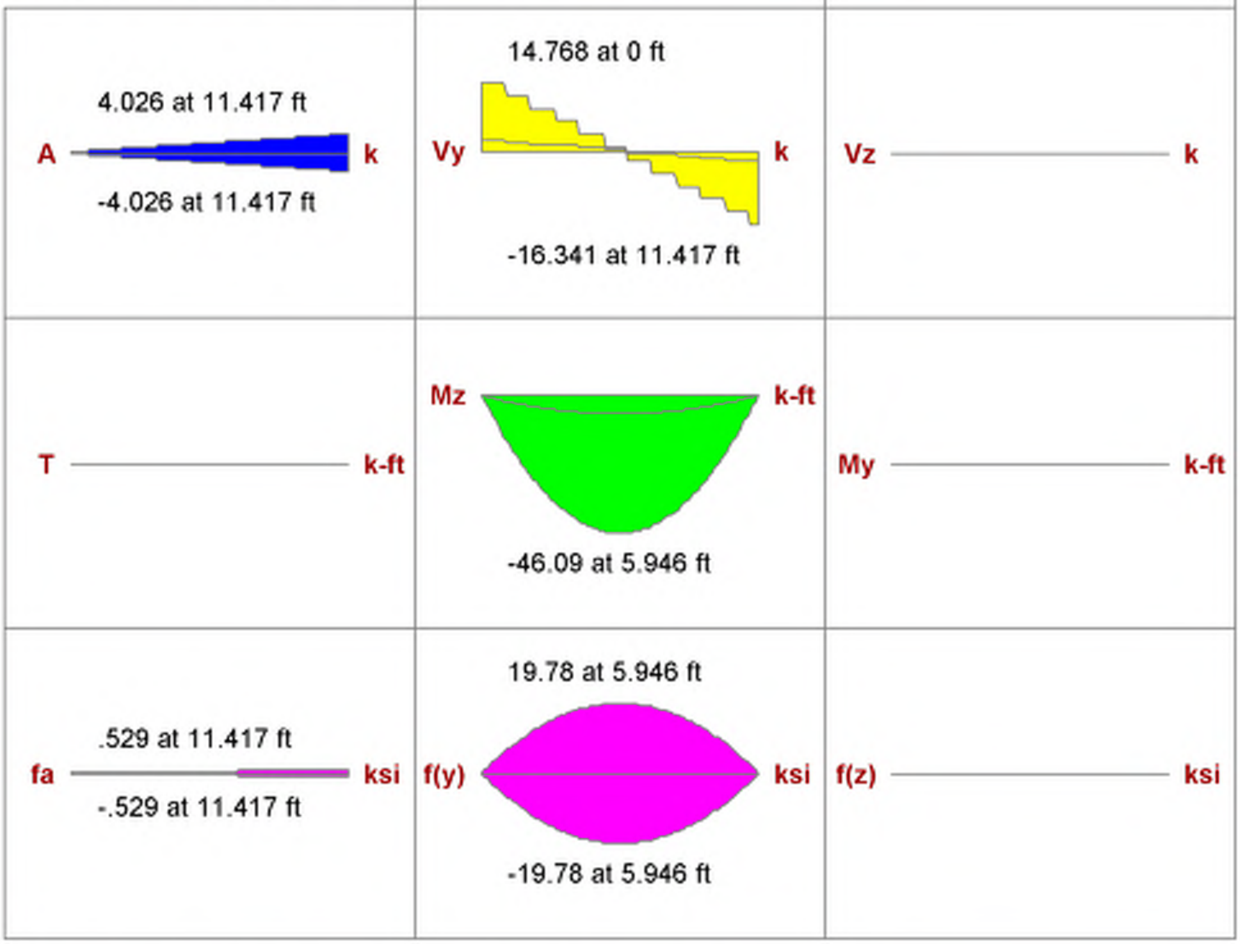
Max Bending Check	**0.409 (LC 25)**	Max Shear Check	**0.119 (y) (LC 25)**	
Location	**6.823 ft**	Location	**0 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/473**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**13.645 ft**	**13.645 ft**
phi*Pnc	**118.809 k**	KL/r	**120.292**	**37.641**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**13.645 ft**	
phi*Mnz	**89.929 k-ft**	L-torque	**13.645 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.14**			

Beam: ***M48***

Shape: **W10x26**
Material: **A992**
Length: **11.417 ft**
I Joint: **N170**
J Joint: **N175**
Envelope
Code Check: **0.460 (LC 23)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.460 (LC 23)**	Max Shear Check	**0.203 (y) (LC 23)**	
Location	**5.946 ft**	Location	**11.417 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/424**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**11.417 ft**	**11.417 ft**
phi*Pnc	**163.271 k**	KL/r	**100.651**	**31.495**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**11.417 ft**	
phi*Mnz	**100.943 k-ft**	L-torque	**11.417 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.139**			

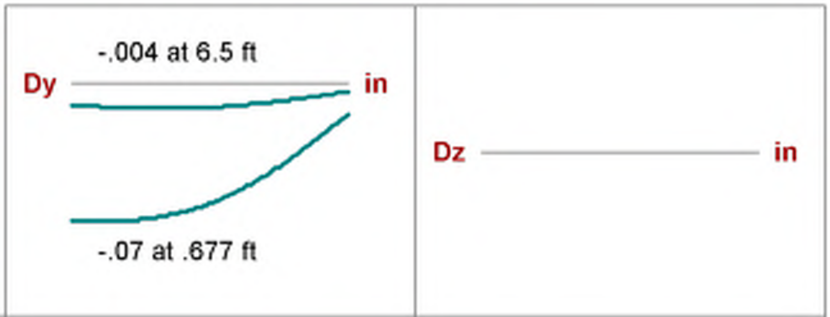
Beam: **M49**

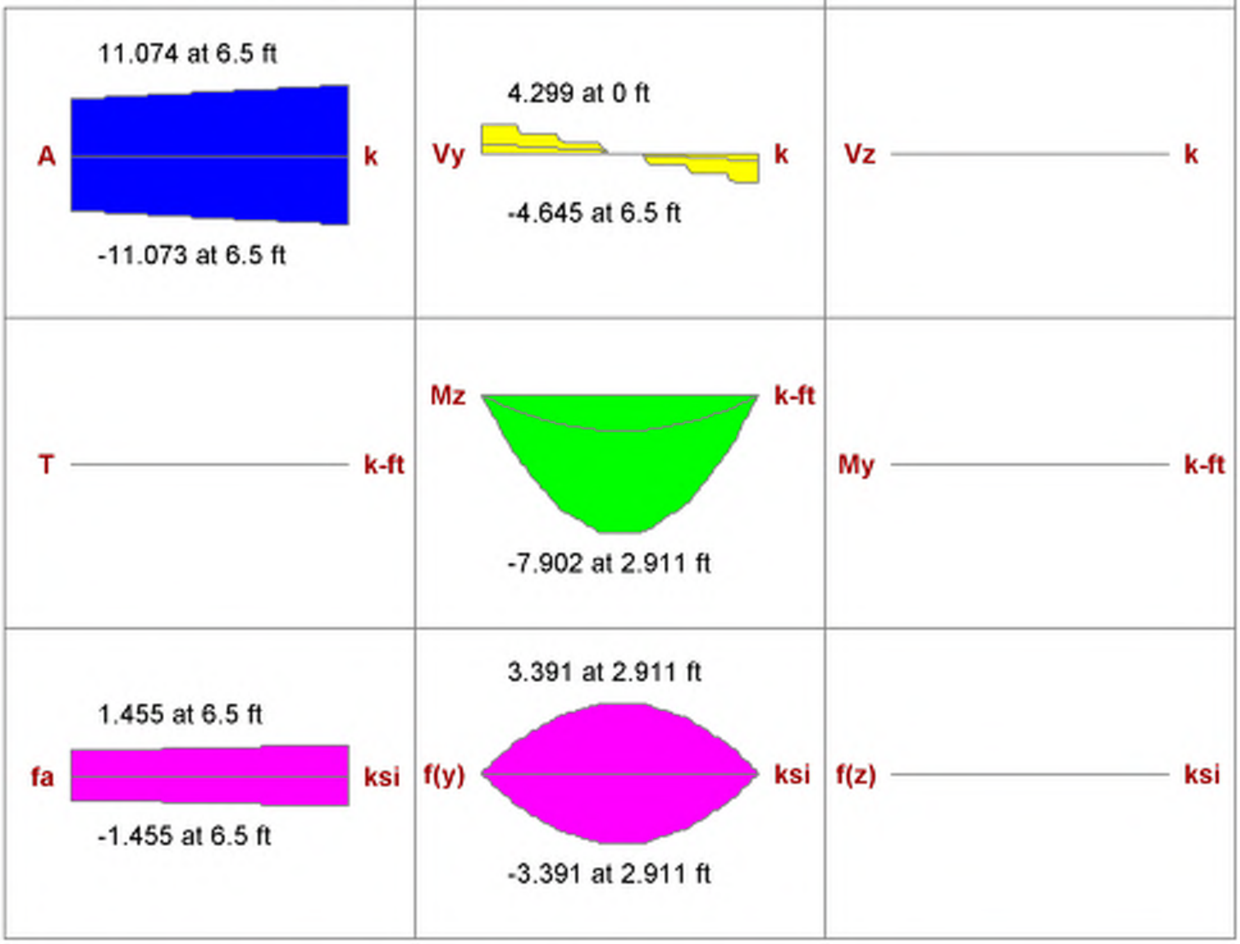
Shape:	**W10x26**
Material:	**A992**
Length:	**6.5 ft**
I Joint:	**N174**
J Joint:	**N115**

Envelope

Code Check: **0.077 (LC 23)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.077 (LC 23)**	Max Shear Check	**0.058 (y) (LC 23)**
Location	**2.911 ft**	Location	**6.5 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/4330**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**6.5 ft**	**6.5 ft**
phi*Pnc	**269.356 k**	KL/r	**57.303**	**17.931**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**6.5 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**6.5 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.135**			

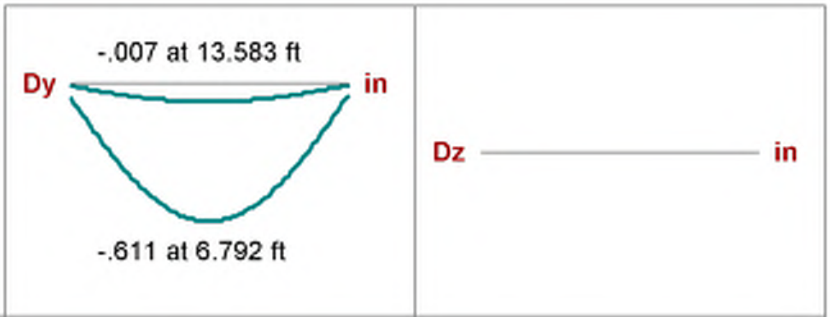
Beam: ***M50***

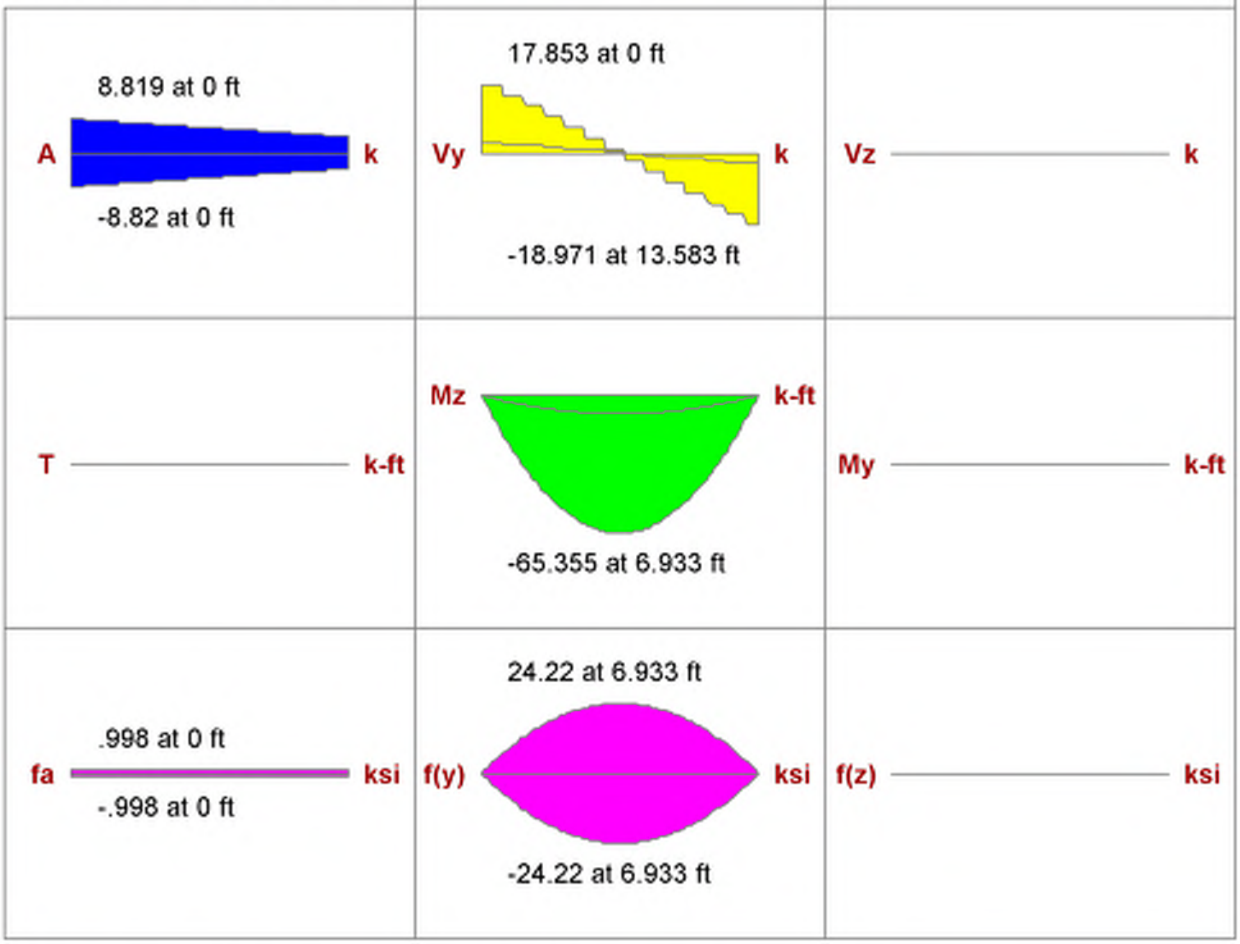
Shape:	**W10x30**
Material:	**A992**
Length:	**13.583 ft**
I Joint:	**N174**
J Joint:	**N175**

Envelope

Code Check: **0.604 (LC 23)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

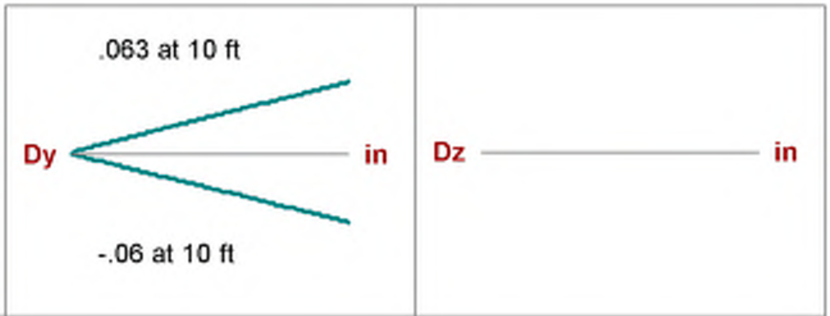
Direct Analysis Method

Max Bending Check	**0.604 (LC 23)**	Max Shear Check	**0.201 (y) (LC 23)**
Location	**6.933 ft**	Location	**13.583 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/297**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**13.583 ft**	**13.583 ft**
phi*Pnc	**142.005 k**	KL/r	**118.589**	**37.169**
phi*Pnt	**397.8 k**			
phi*Mny	**33.15 k-ft**	L Comp Flange	**13.583 ft**	
phi*Mnz	**110.294 k-ft**	L-torque	**13.583 ft**	
phi*Vny	**94.5 k**	Tau_b	**1**	
phi*Vnz	**160.007 k**			
Cb	**1.139**			

Column: ***M51***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N177**
J Joint: **N170**
Envelope
Code Check: **0.165 (LC 25)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

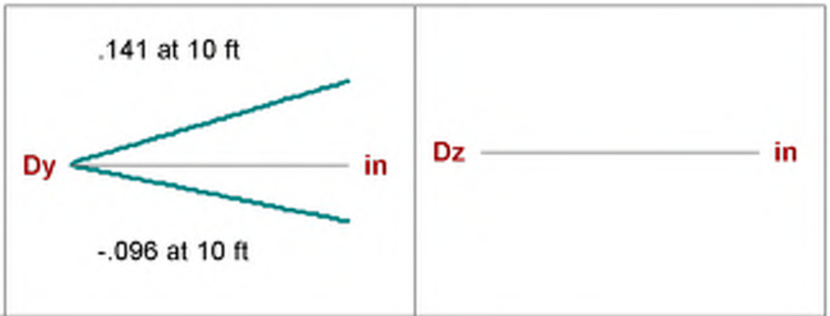
Direct Analysis Method

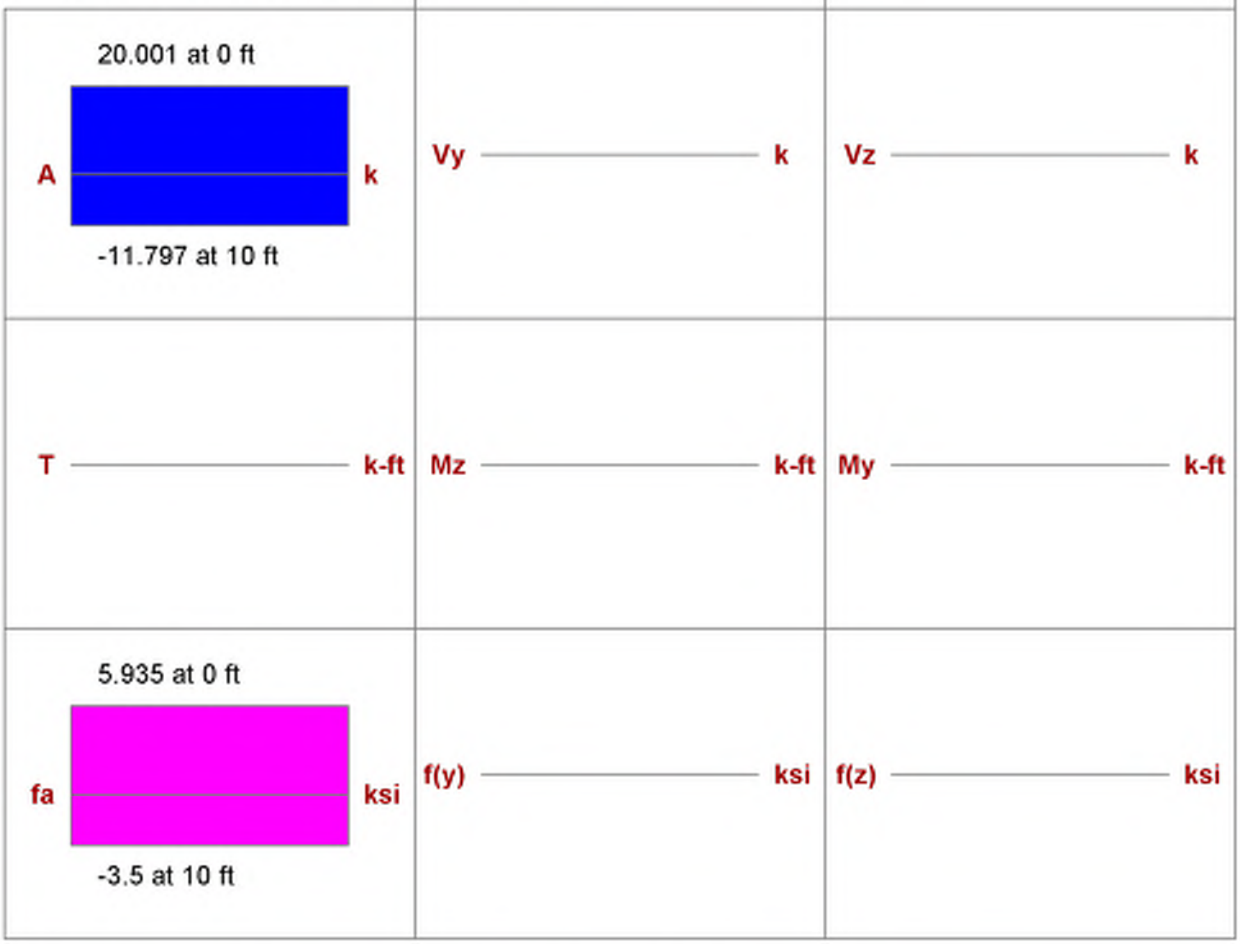
Max Bending Check	**0.165 (LC 25)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: ***M52***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N178**
J Joint: **N171**
Envelope
Code Check: **0.218 (LC 9)**
Report Based On 97 Sections





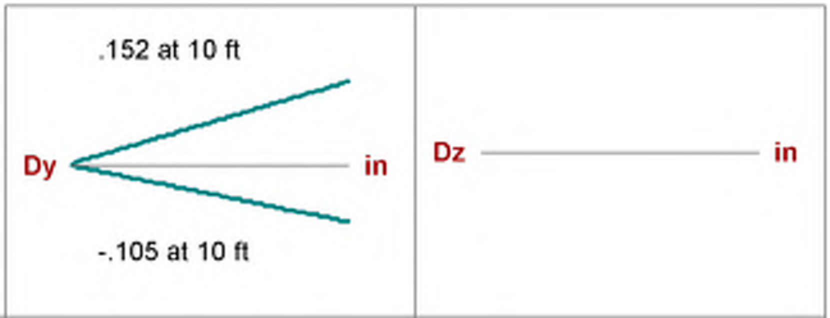
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

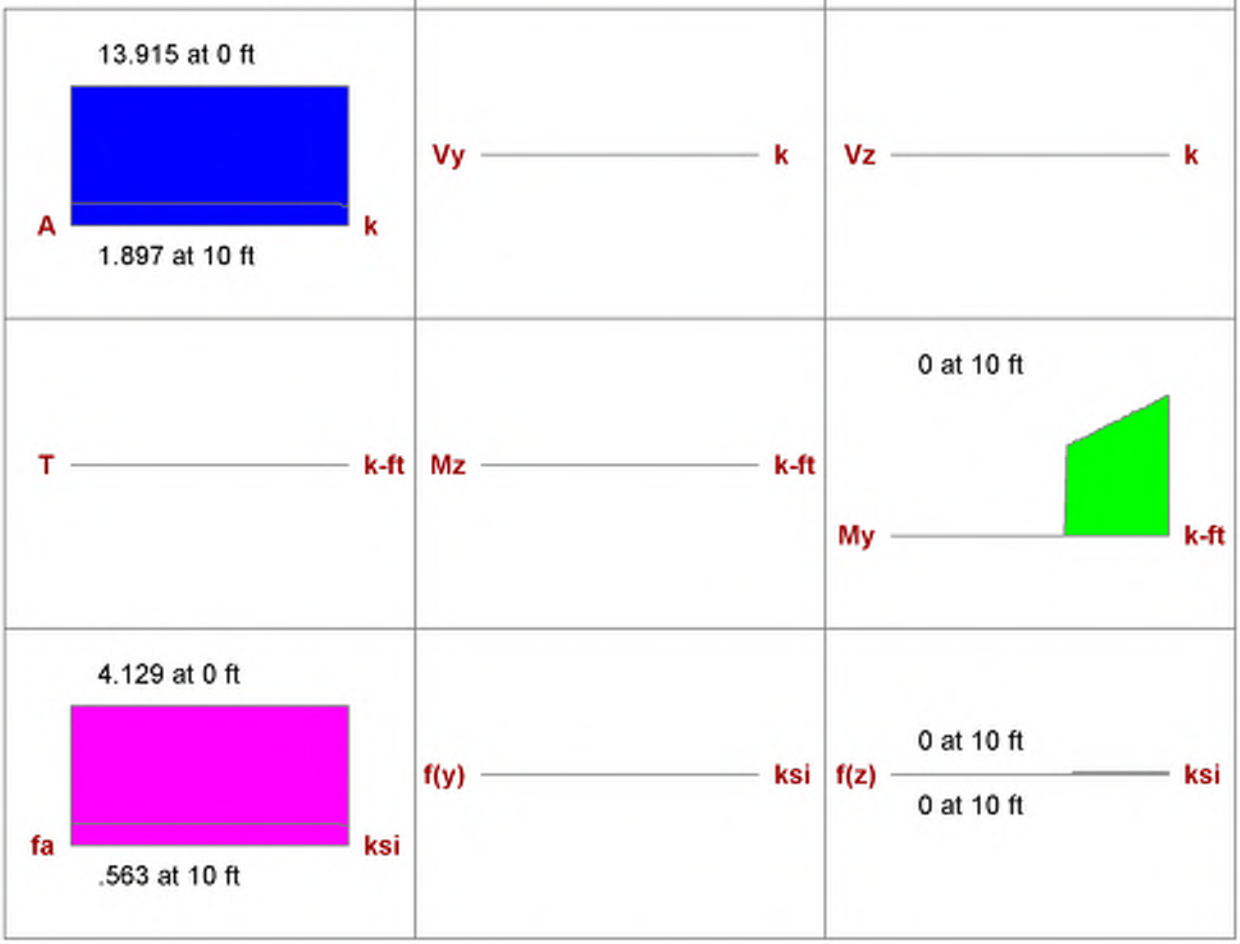
Max Bending Check	**0.218 (LC 9)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: *M53*

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N179**
J Joint: **N172**
Envelope
Code Check: **0.152 (LC 23)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.152 (LC 23)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

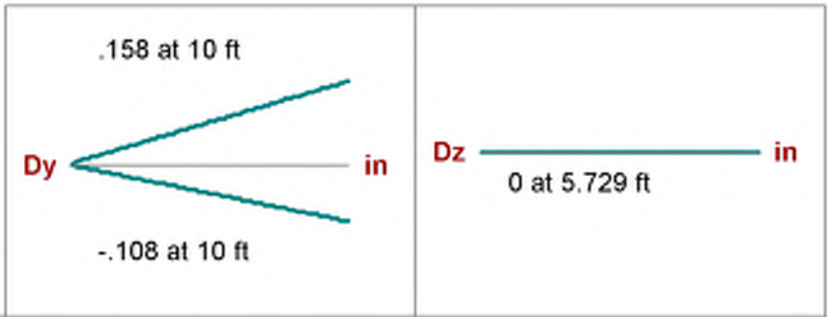
Column: ***M54***

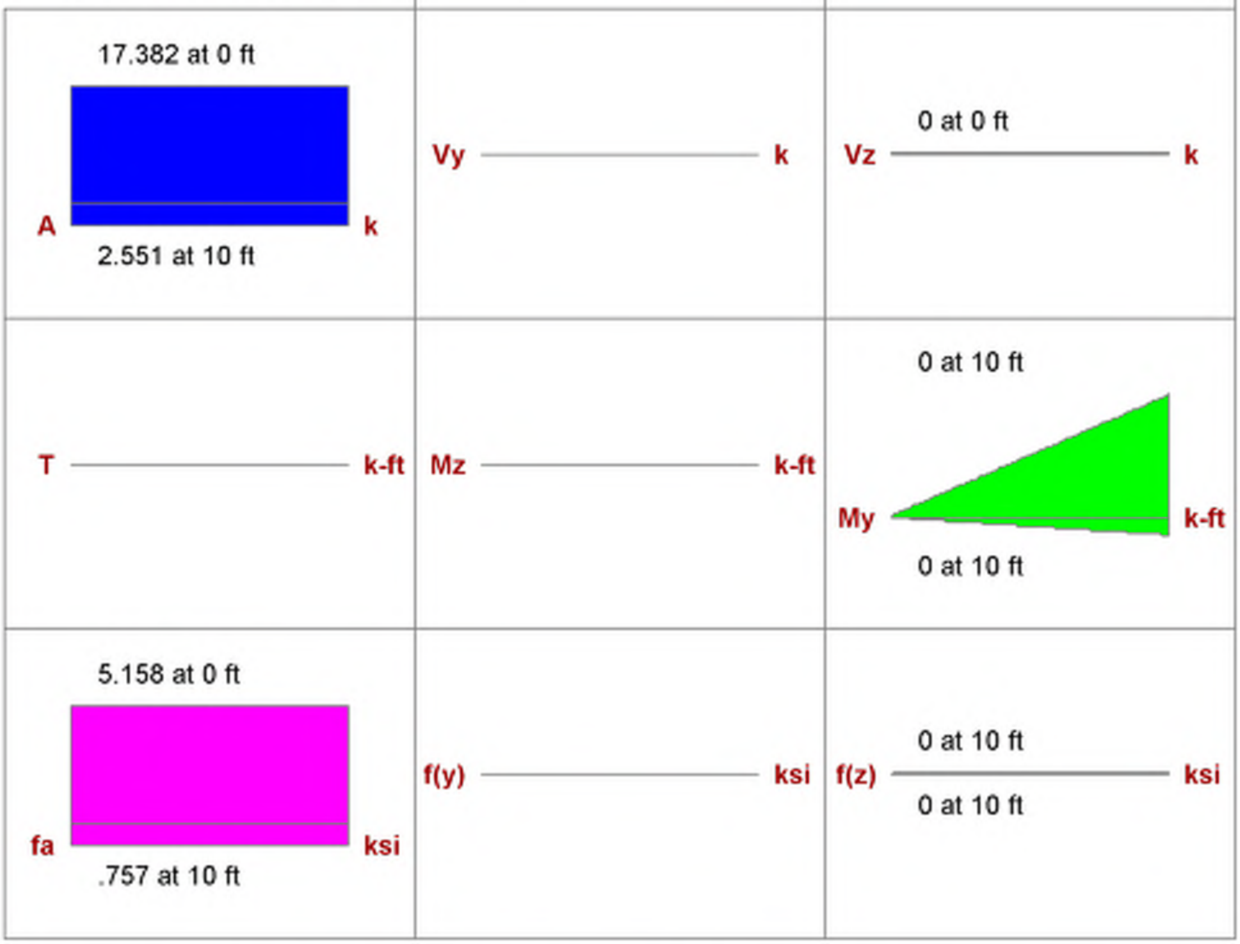
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**10 ft**
I Joint:	**N180**
J Joint:	**N173**

Envelope

Code Check: **0.189 (LC 24)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.189 (LC 24)**	Max Shear Check	**0.000 (z) (LC 9)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

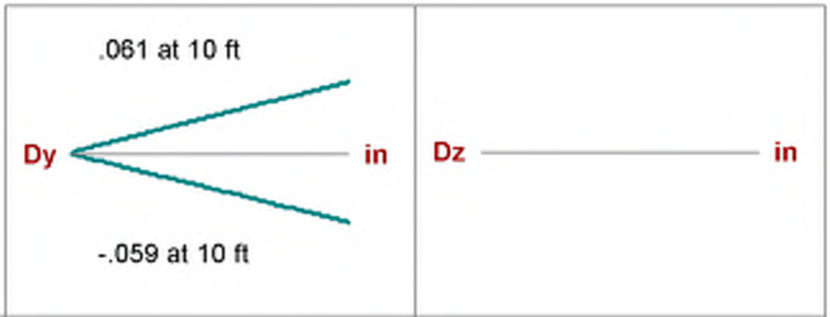
Column: ***M55***

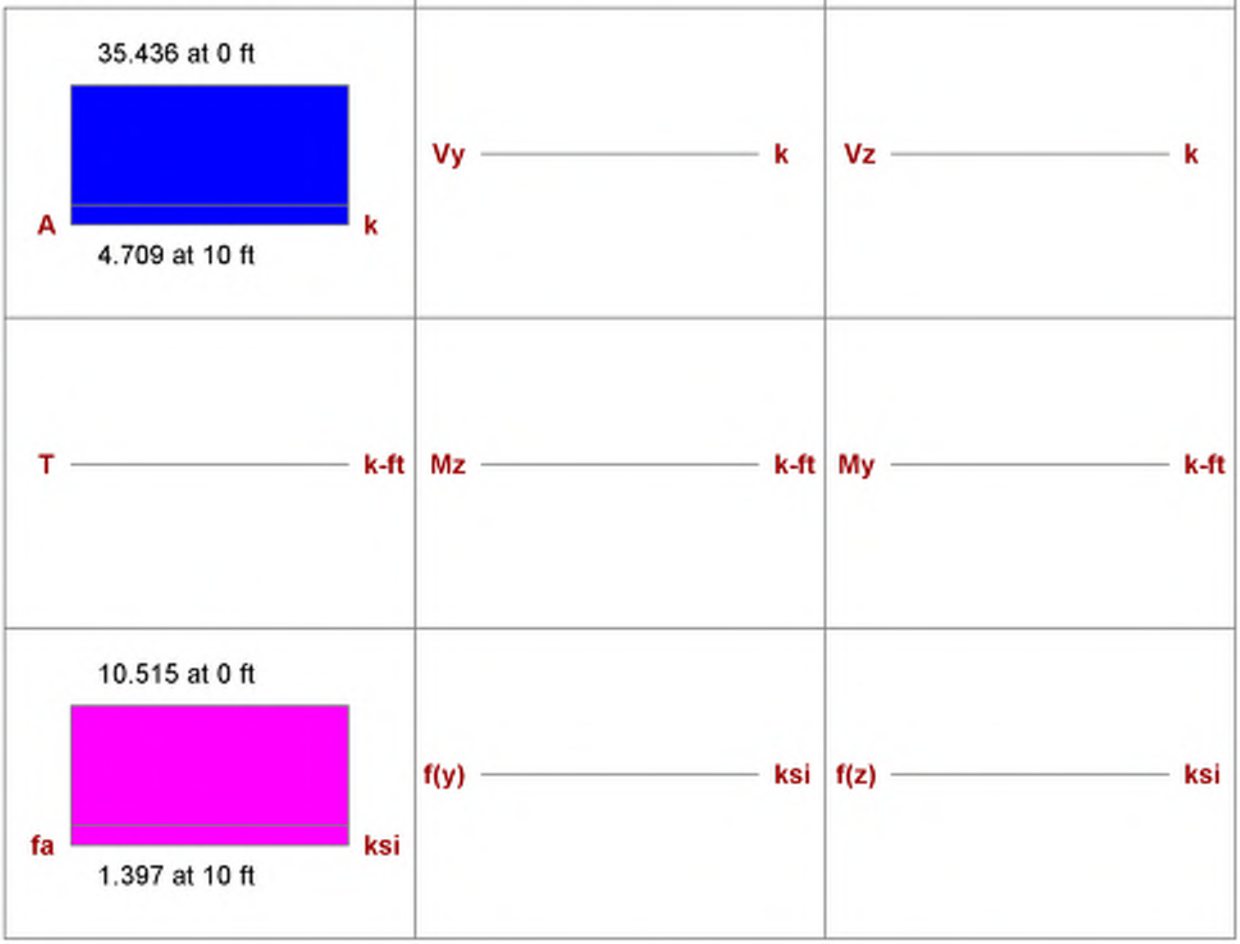
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**10 ft**
I Joint:	**N183**
J Joint:	**N175**

Envelope

Code Check: **0.386 (LC 25)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

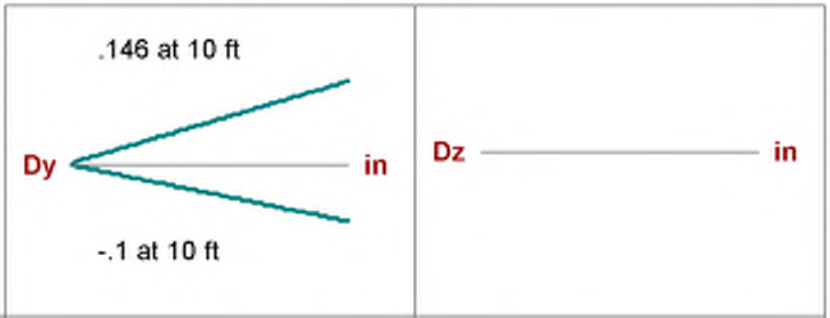
Direct Analysis Method

Max Bending Check	**0.386 (LC 25)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: ***M56***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N184**
J Joint: **N176**
Envelope
Code Check: **0.134 (LC 24)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

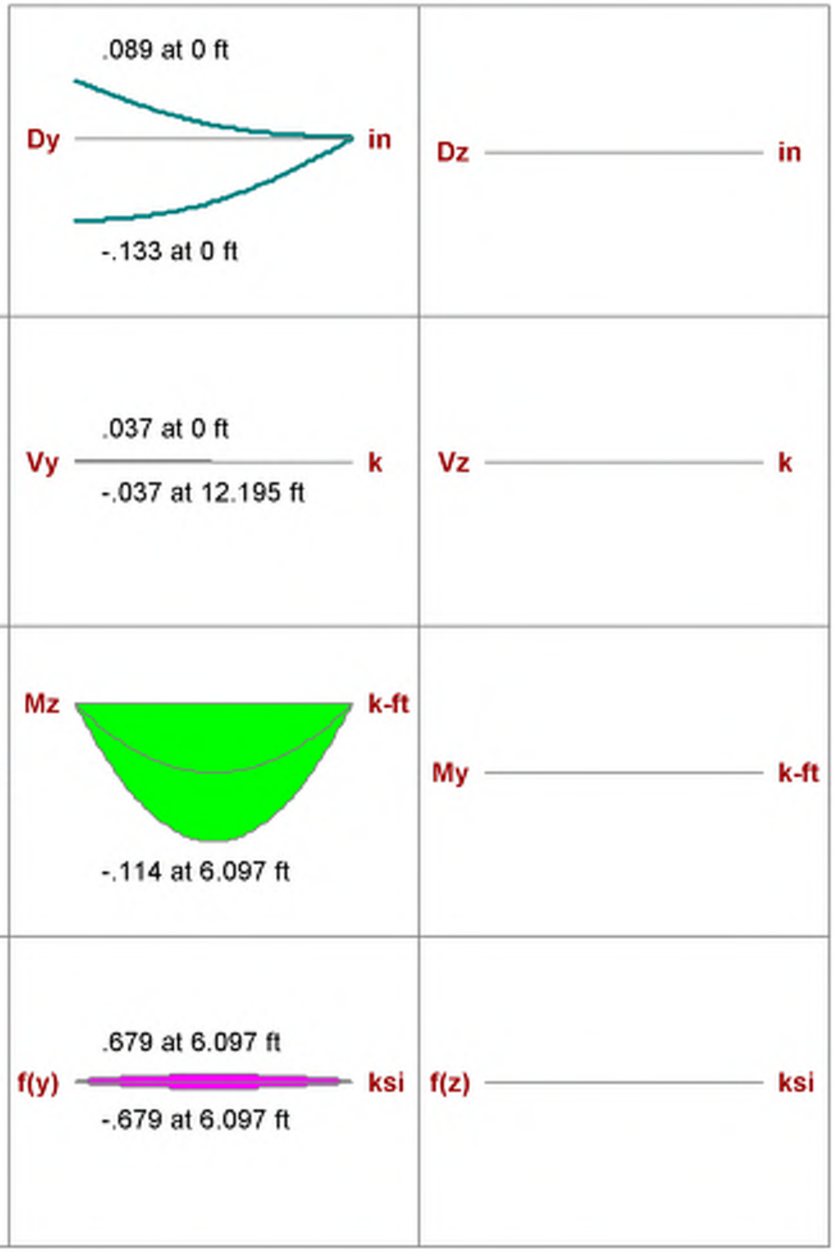
Direct Analysis Method

Max Bending Check	**0.134 (LC 24)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

VBrace: **M57**

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **12.195 ft**
I Joint: **N171**
J Joint: **N184**
Envelope
Code Check: **0.213 (LC 9)**
Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.213 (LC 9)**	Max Shear Check	**0.001 (y) (LC 8)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a***	Max Defl Ratio	**L/1639**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

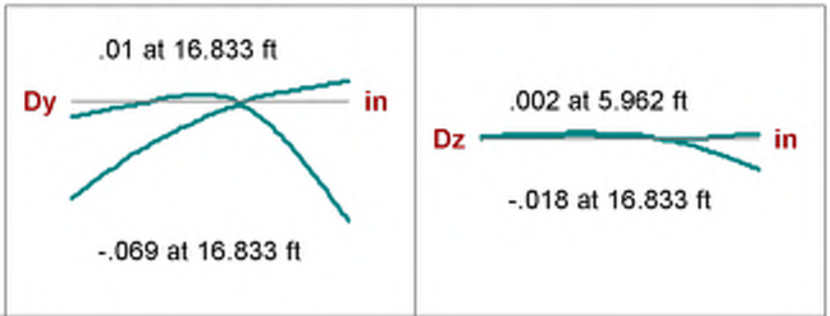
Fy	**46 ksi**
phi*Pnc	**31.861 k**
phi*Pnt	**101.016 k**
phi*Mny	**8.556 k-ft**
phi*Mnz	**8.556 k-ft**
phi*Vny	**26.635 k**
phi*Vnz	**26.635 k**
phi*Tn	**7.284 k-ft**
Cb	**1.136**

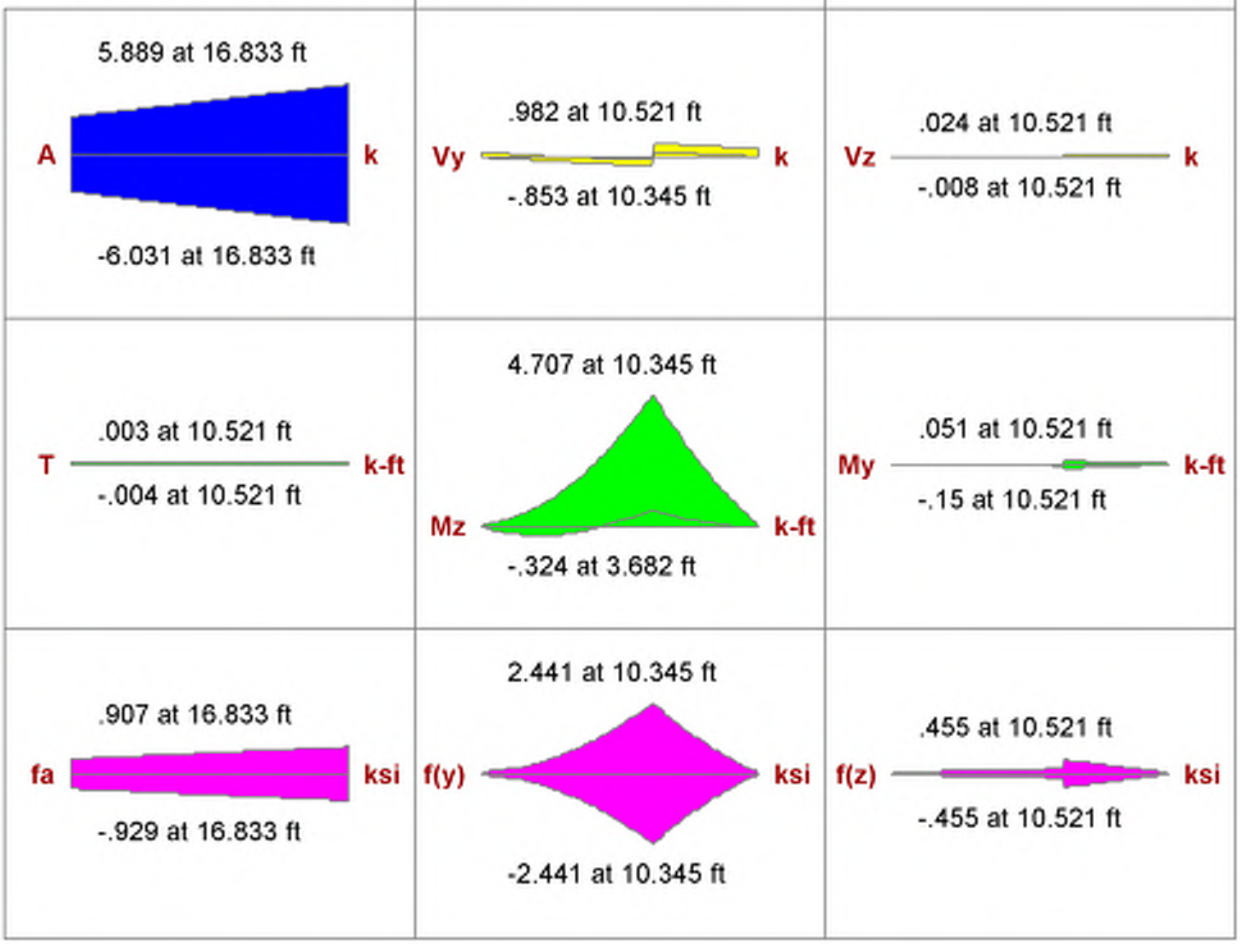
	y-y	z-z
Lb	**12.195 ft**	**12.195 ft**
KL/r	**131.534**	**131.534**

L Comp Flange	**12.195 ft**
L-torque	**12.195 ft**
Tau_b	**1**

Beam: ***M58***

Shape: **W10x22**
Material: **A992**
Length: **16.833 ft**
I Joint: **N108**
J Joint: **N112**
Envelope
Code Check: **0.098 (LC 9)**
Report Based On 97 Sections





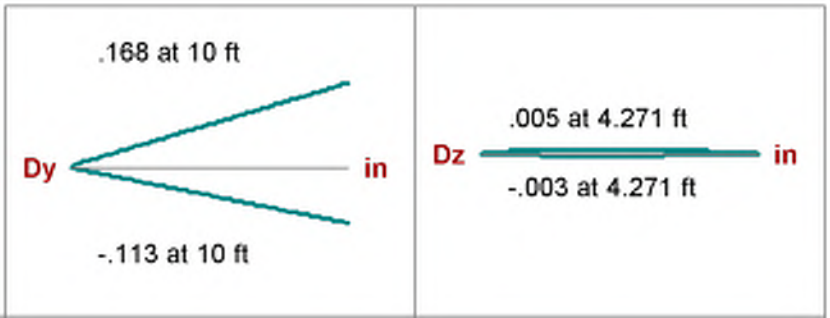
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

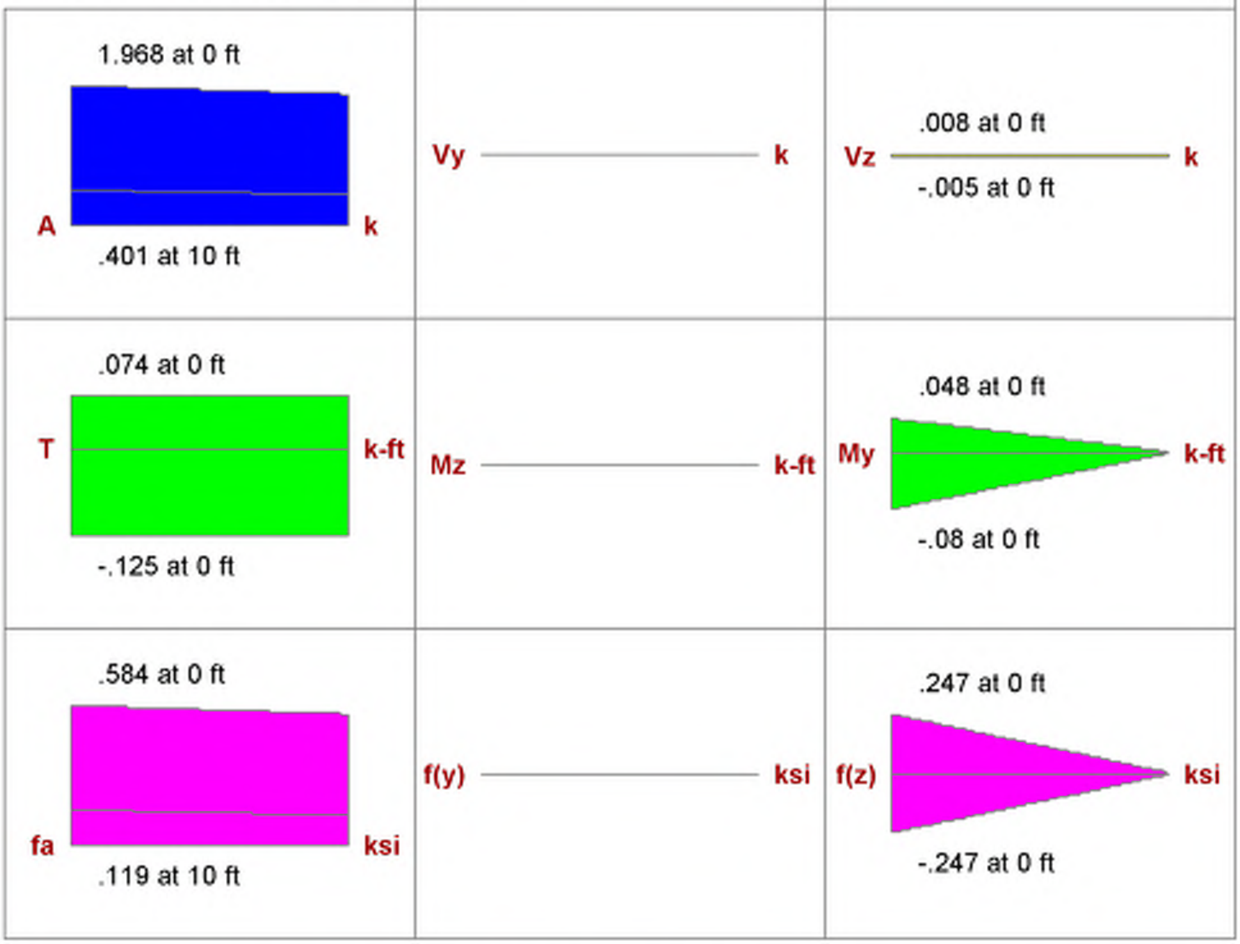
Max Bending Check	**0.098 (LC 9)**	Max Shear Check	**0.014 (y) (LC 9)**
Location	**10.521 ft**	Location	**10.521 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/4064**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**16.833 ft**	**16.833 ft**
phi*Pnc	**63.119 k**	KL/r	**152.41**	**47.372**
phi*Pnt	**292.05 k**			
phi*Mny	**22.875 k-ft**	L Comp Flange	**16.833 ft**	
phi*Mnz	**77.435 k-ft**	L-torque	**16.833 ft**	
phi*Vny	**73.44 k**	Tau_b	**1**	
phi*Vnz	**111.78 k**			
Cb	**1.704**			

Column: **M59**

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N186**
J Joint: **N185**
Envelope
Code Check: **0.021 (LC 25)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

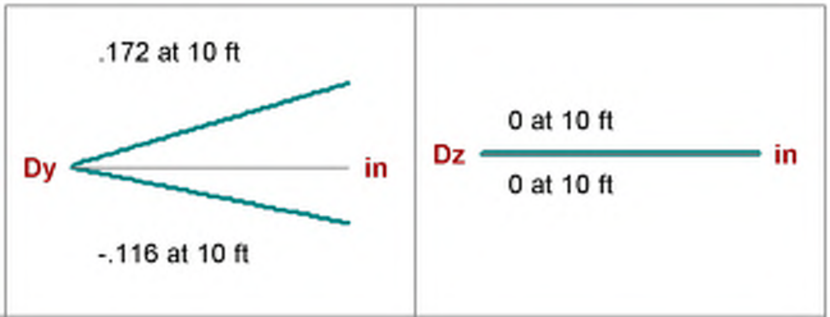
Direct Analysis Method

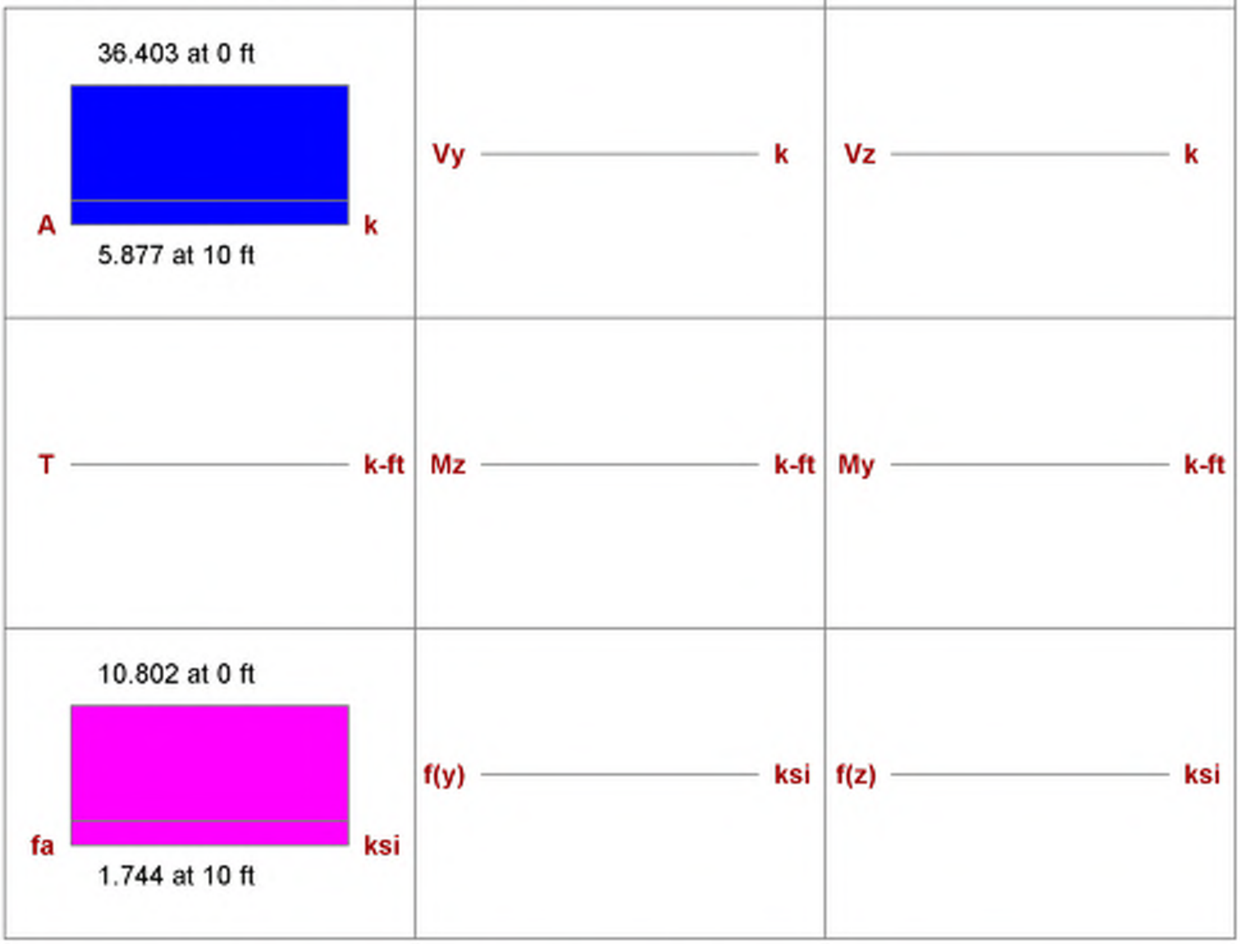
Max Bending Check	**0.021 (LC 25)**	Max Shear Check	**0.009 (z) (LC 9)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Column: ***M60***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N187**
J Joint: **N108**
Envelope
Code Check: **0.397 (LC 23)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

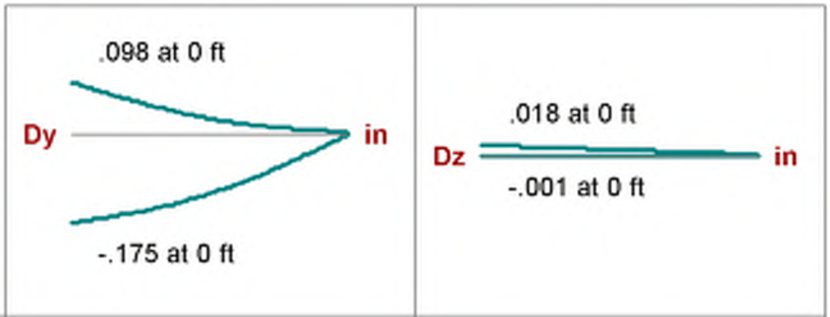
Direct Analysis Method

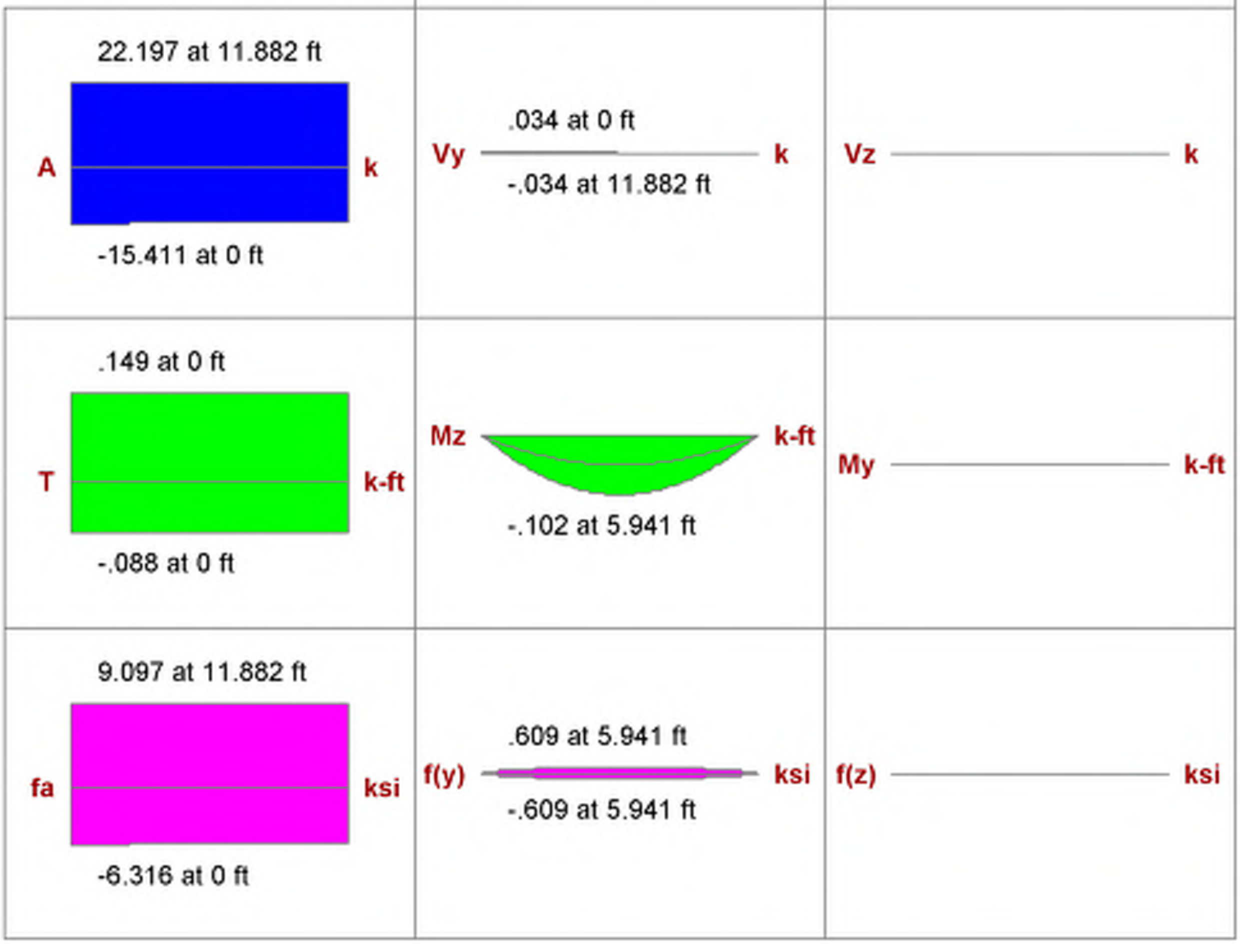
Max Bending Check	**0.397 (LC 23)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**1 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**7.888**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

VBrace: ***M61***

Shape: **HSS3x3x4**
Material: **A500 Gr.B Rect**
Length: **11.882 ft**
I Joint: **N112**
J Joint: **N186**
Envelope
Code Check: **0.670 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

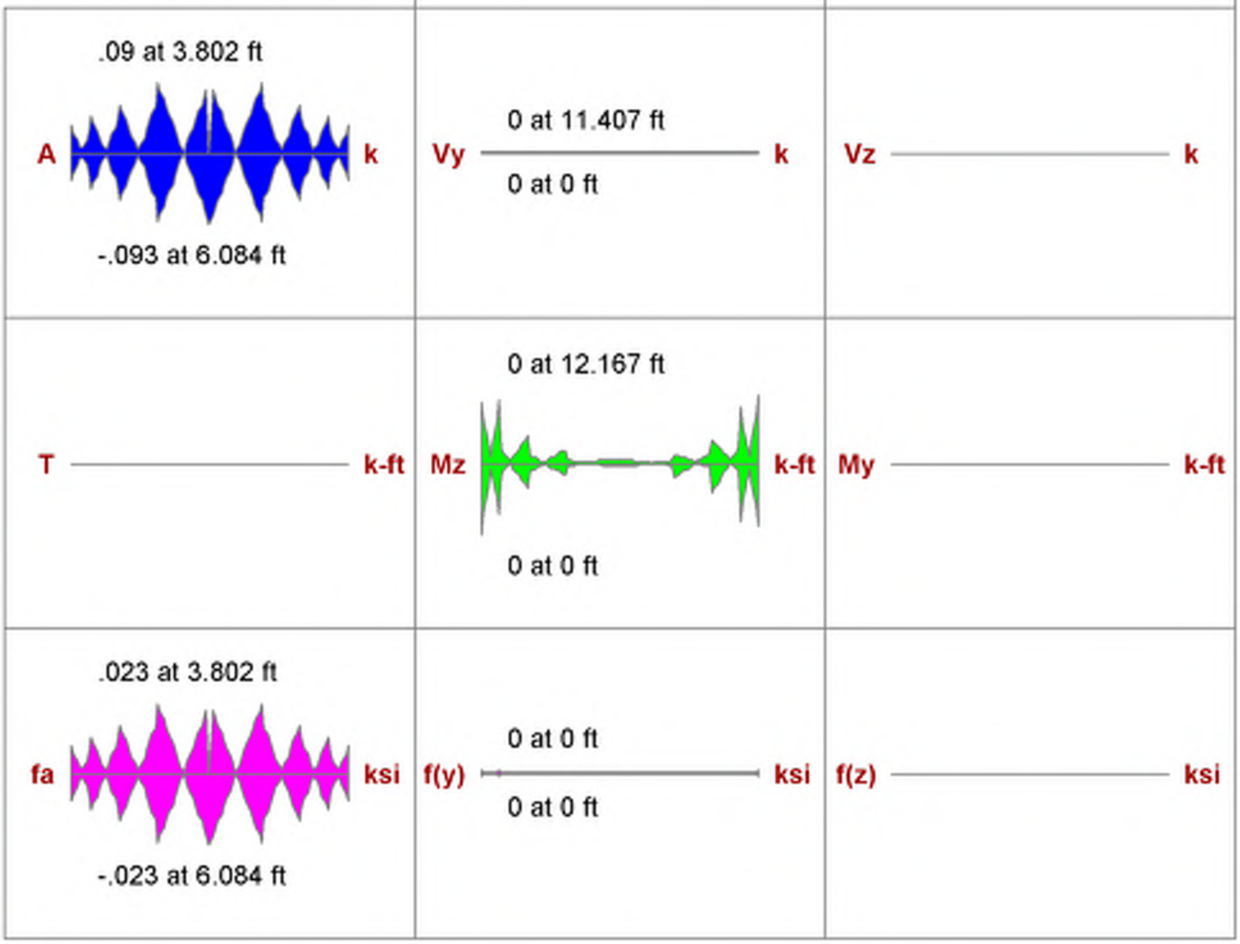
Max Bending Check	**0.670 (LC 7)**	Max Shear Check	**0.021 (y) (LC 9)**
Location	**6.436 ft**	Location	**11.882 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/1454**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**11.882 ft**	**11.882 ft**
phi*Pnc	**33.56 k**	KL/r	**128.161**	**128.161**
phi*Pnt	**101.016 k**			
phi*Mny	**8.556 k-ft**	L Comp Flange	**11.882 ft**	
phi*Mnz	**8.556 k-ft**	L-torque	**11.882 ft**	
phi*Vny	**26.635 k**	Tau_b	**1**	
phi*Vnz	**26.635 k**			
phi*Tn	**7.284 k-ft**			
Cb	**1.136**			

Beam: ***M62***

Shape: **RE2X2**
Material: **Null**
Length: **12.167 ft**
I Joint: **N28**
J Joint: **N29**

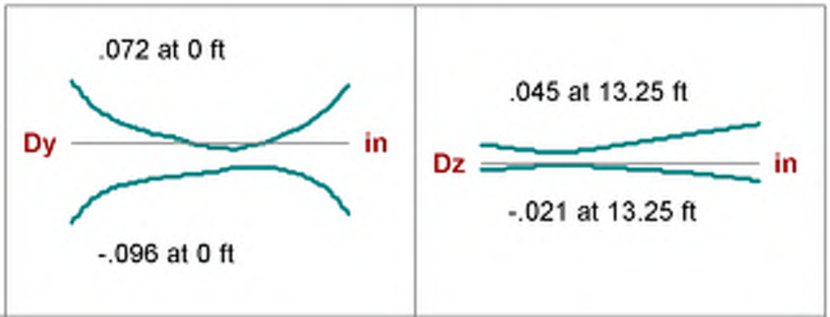
Code Check: **No Calc**
Report Based On 97 Sections

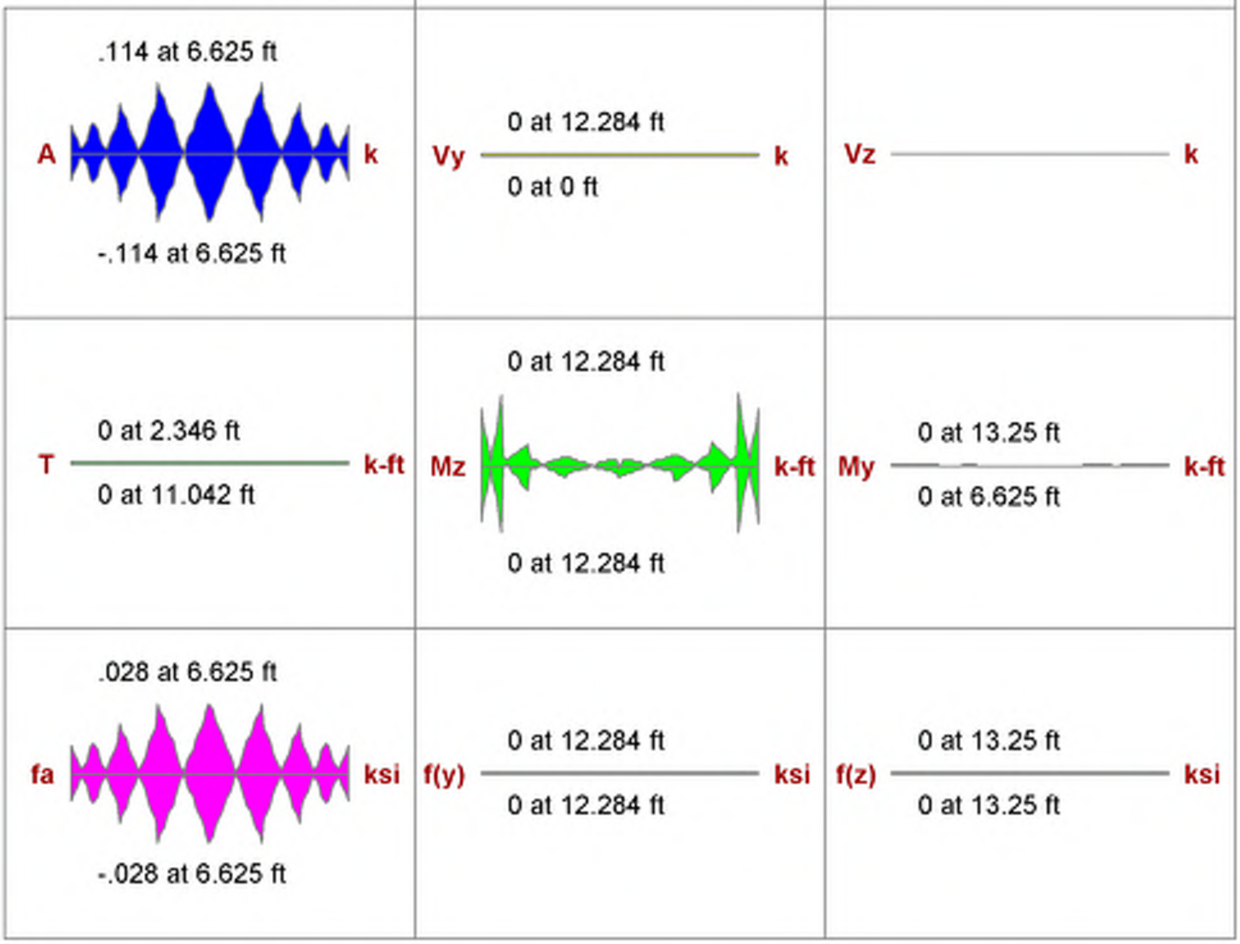


Beam: *M63*

Shape: **RE2X2**
Material: **Null**
Length: **13.25 ft**
I Joint: **N84**
J Joint: **N85**

Code Check: **No Calc**
Report Based On 97 Sections





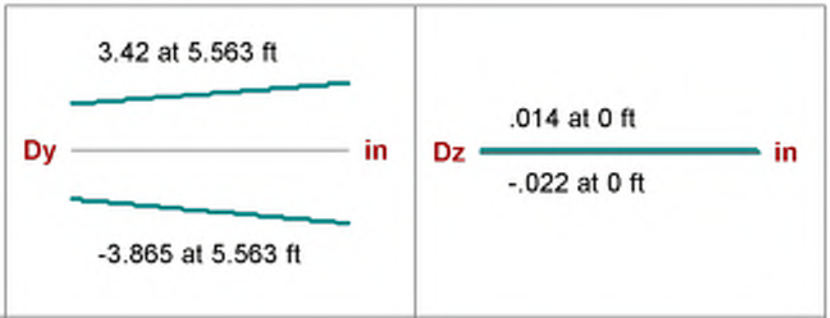
Column: ***M64***

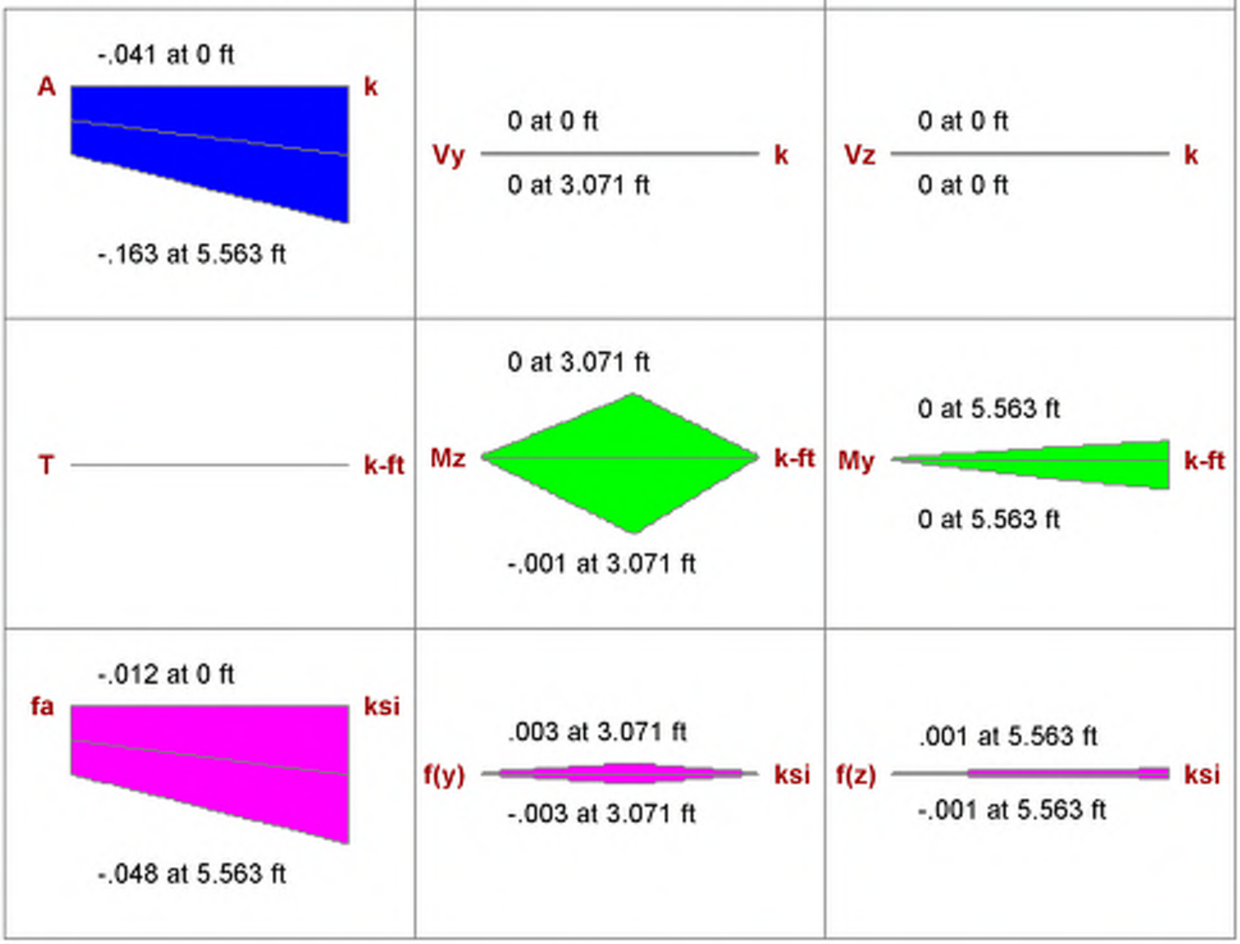
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**5.563 ft**
I Joint:	**N151**
J Joint:	**N15**

Envelope

Code Check: **0.001 (LC 9)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.001 (LC 9)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**5.563 ft**	Location	**3.071 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/3061**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**5.563 ft**	**5.563 ft**
phi*Pnc	**122.569 k**	KL/r	**43.879**	**43.879**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**5.563 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**5.563 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.361**			

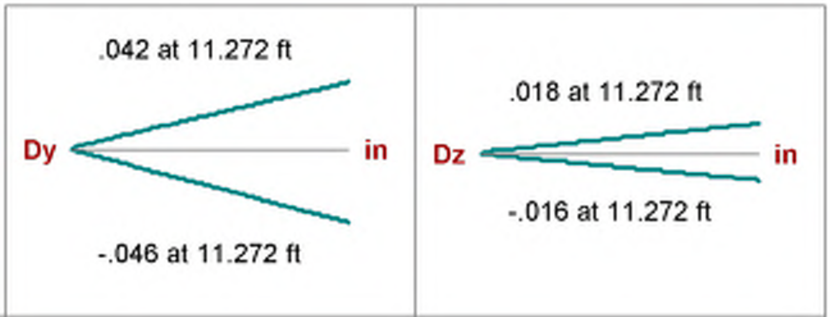
Beam: ***M65***

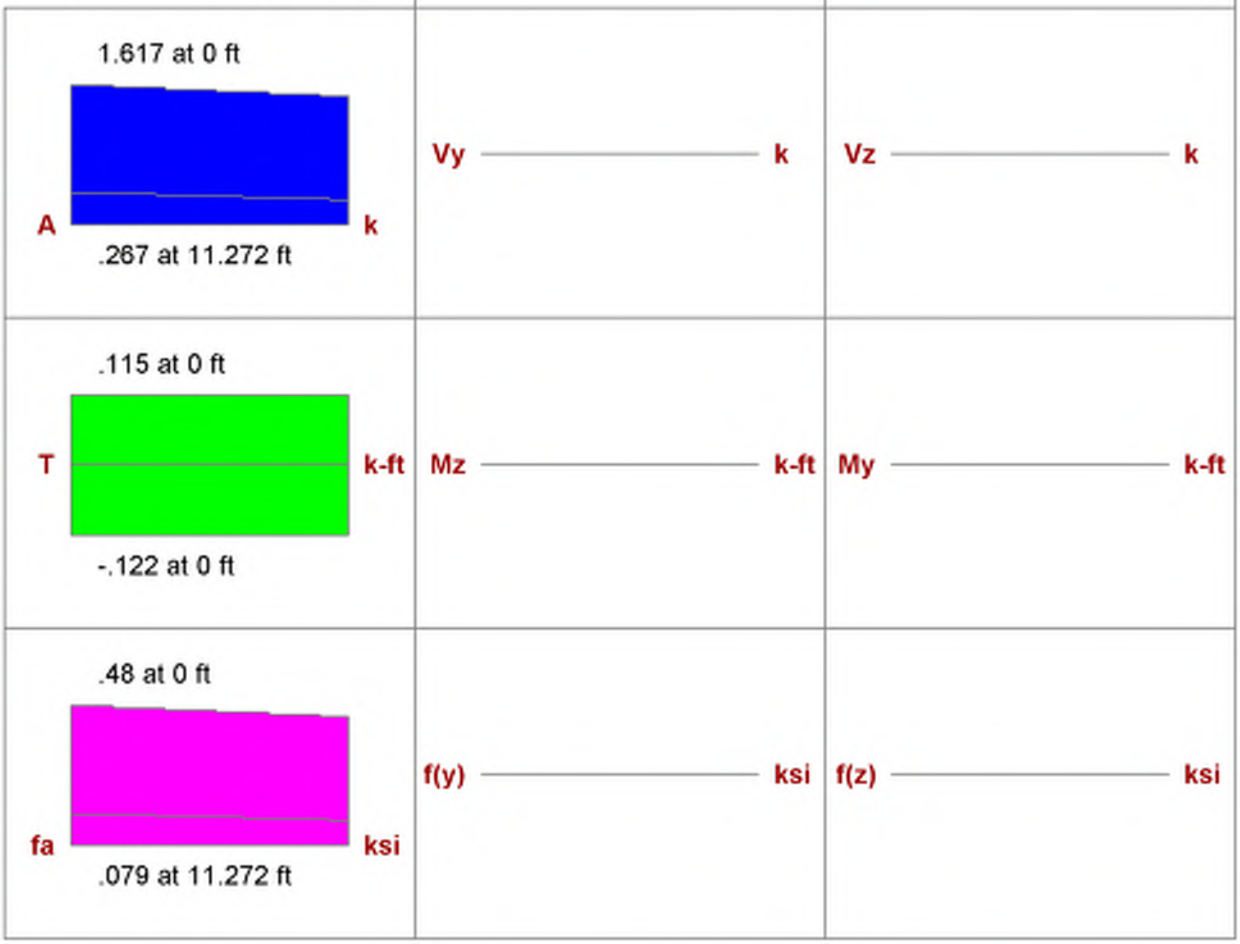
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**11.272 ft**
I Joint:	**N45**
J Joint:	**N27**

Envelope

Code Check: **0.020 (LC 24)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.020 (LC 24)**	Max Shear Check	**0.009 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**1 ft**	**11.272 ft**
phi*Pnc	**81.98 k**	KL/r	**7.888**	**88.907**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**1 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**11.272 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

Beam: ***M66***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **4.333 ft**
I Joint: **N45**
J Joint: **N207**
Envelope
Code Check: **0.040 (LC 23)**
Report Based On 97 Sections

AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.040 (LC 23)**	Max Shear Check	**0.000 (y) (LC 7)**
Location	**4.333 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**1 ft**	**4.333 ft**
phi*Pnc	**128.975 k**	KL/r	**7.888**	**34.177**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**1 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**4.333 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1**			

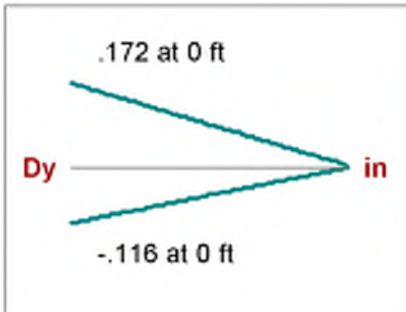
Column: ***M67***

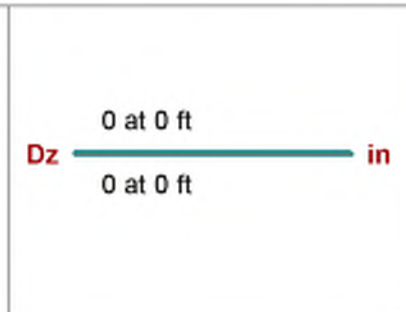
Shape:	**HSS4x4x4**
Material:	**A500 Gr.B Rect**
Length:	**16.008 ft**
I Joint:	**N108**
J Joint:	**N208**

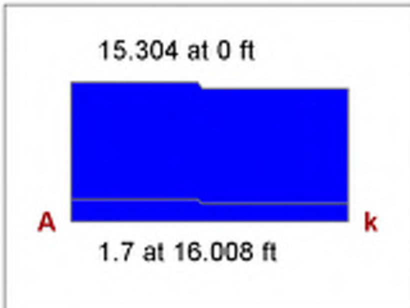
Envelope

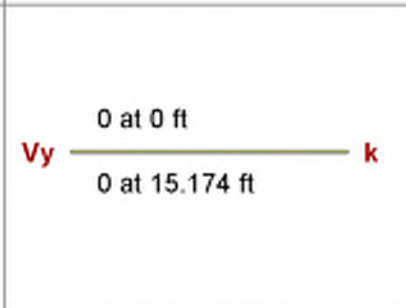
Code Check: **0.320 (LC 25)**

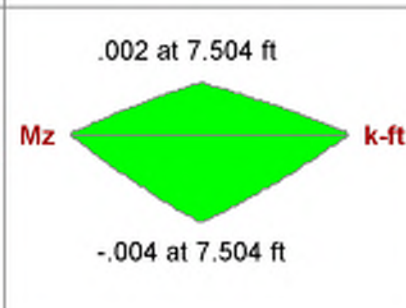
Report Based On 97 Sections

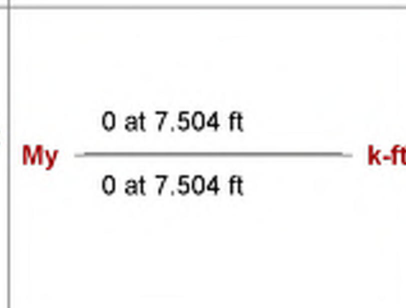


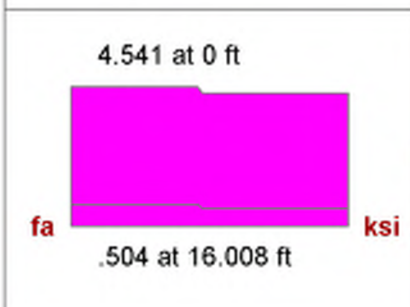


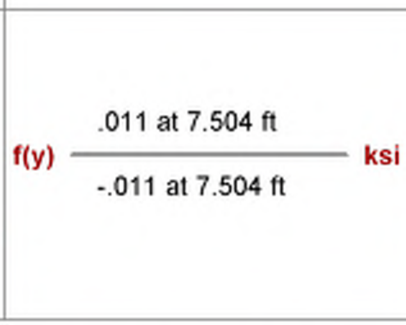


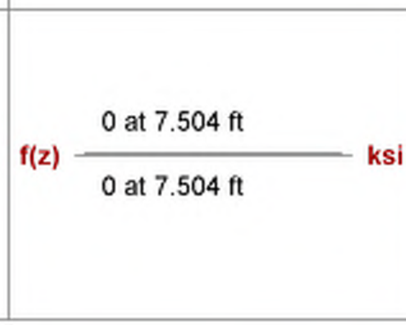












AISC 14th(360-10): LRFD Code Check

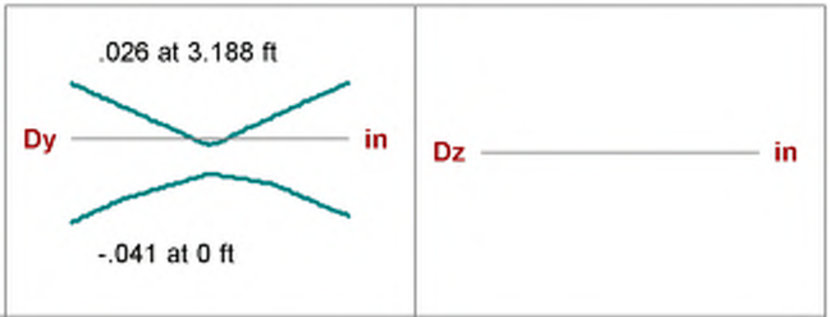
Direct Analysis Method

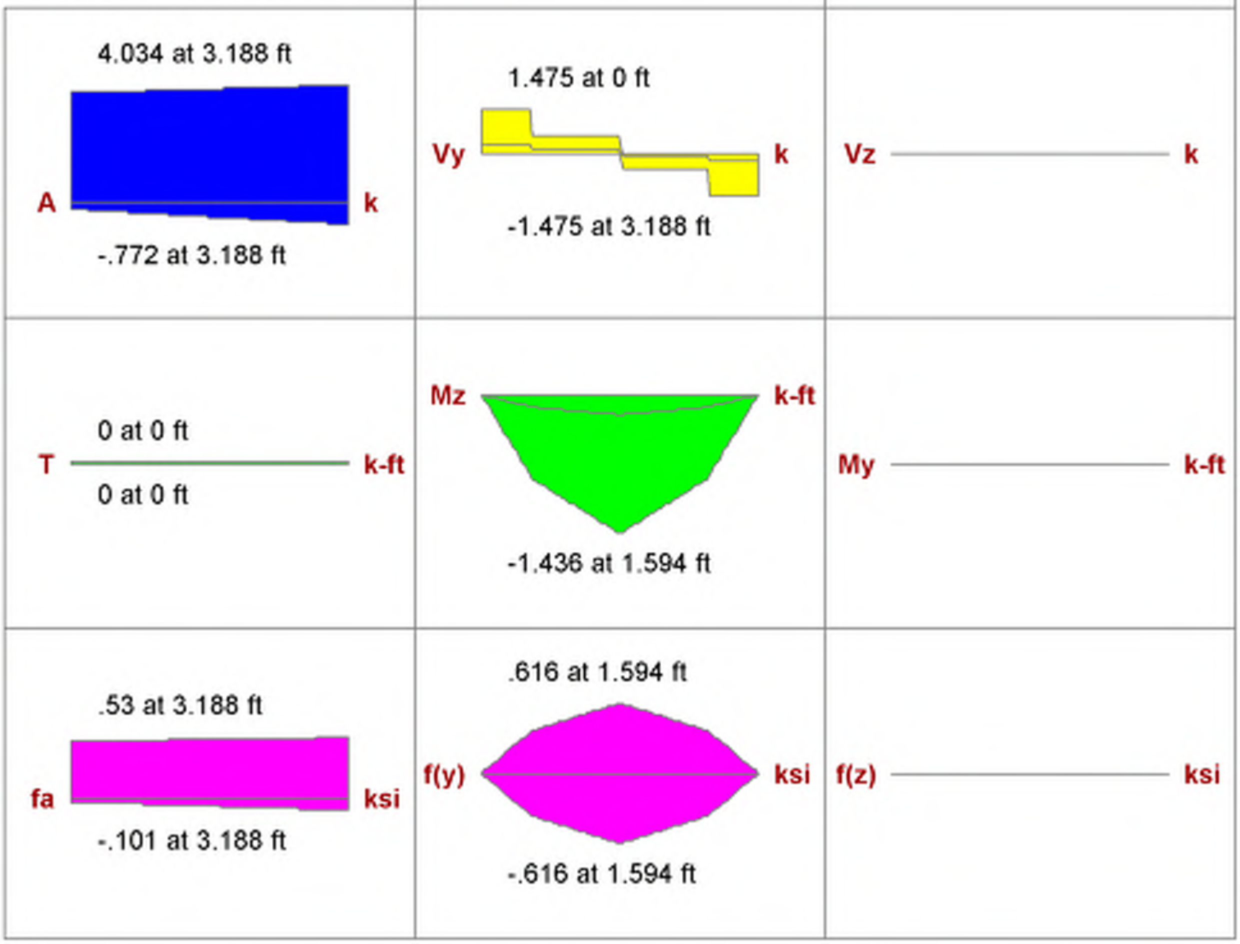
Max Bending Check	**0.320 (LC 25)**	Max Shear Check	**0.000 (y) (LC 9)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/1118**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**16.008 ft**	**16.008 ft**
phi*Pnc	**47.756 k**	KL/r	**126.262**	**126.262**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**16.008 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**16.008 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.278**			

Beam: ***M68***

Shape: **W10x26**
Material: **A992**
Length: **3.188 ft**
I Joint: **N118**
J Joint: **N117**
Envelope
Code Check: **0.018 (LC 25)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

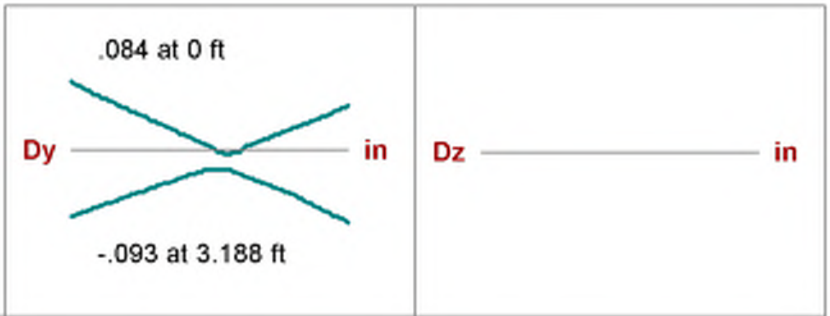
Direct Analysis Method

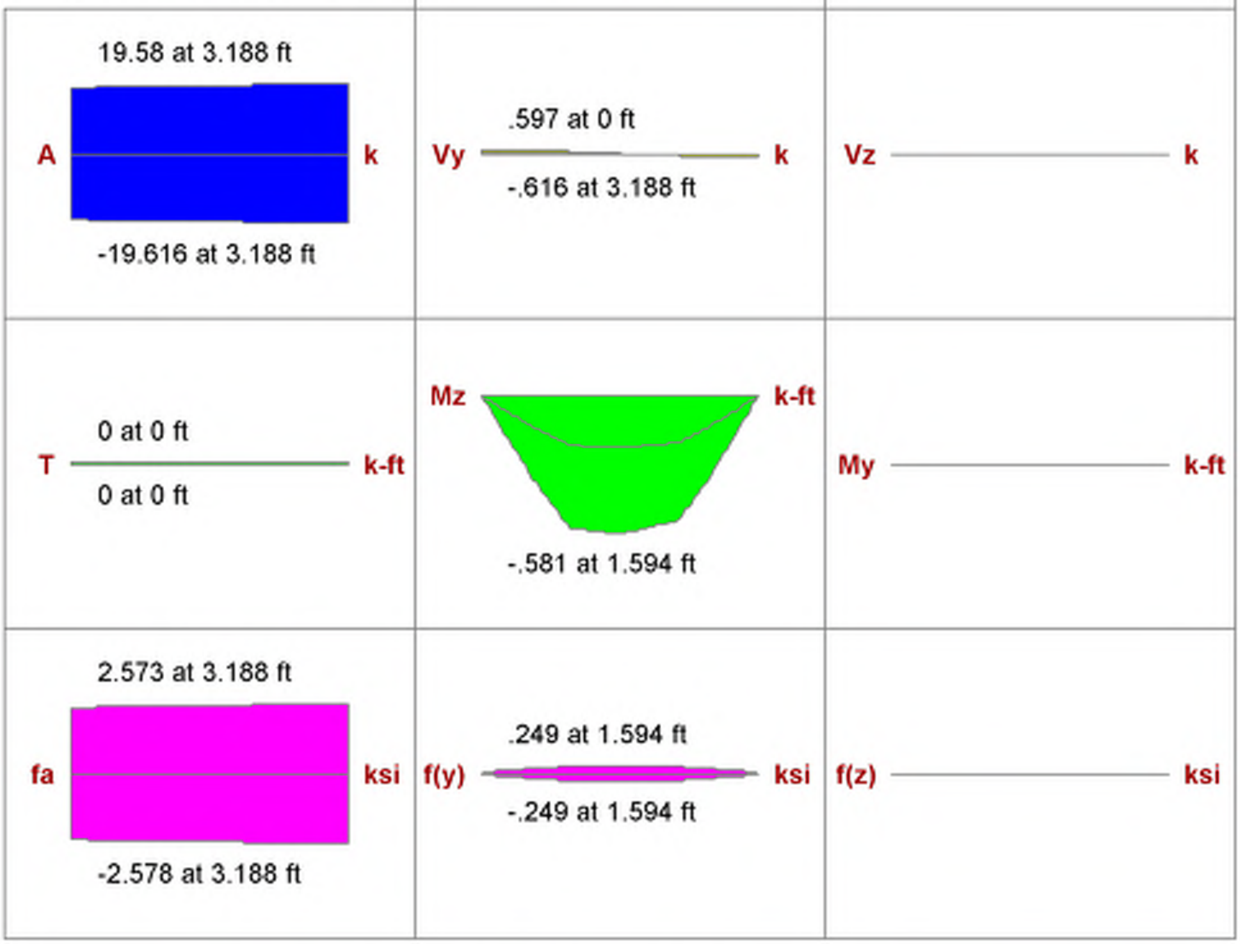
Max Bending Check	**0.018 (LC 25)**	Max Shear Check	**0.018 (y) (LC 25)**
Location	**1.594 ft**	Location	**3.188 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**3.188 ft**	**3.188 ft**
phi*Pnc	**323.232 k**	KL/r	**28.105**	**8.794**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**3.188 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**3.188 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.176**			

Beam: ***M69***

Shape: **W10x26**
Material: **A992**
Length: **3.188 ft**
I Joint: **N119**
J Joint: **N114**
Envelope
Code Check: **0.061 (LC 7)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.061 (LC 7)**	Max Shear Check	**0.008 (y) (LC 9)**
Location	**3.188 ft**	Location	**3.188 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/238**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**3.188 ft**	**3.188 ft**
phi*Pnc	**323.232 k**	KL/r	**28.105**	**8.794**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**3.188 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**3.188 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.116**			

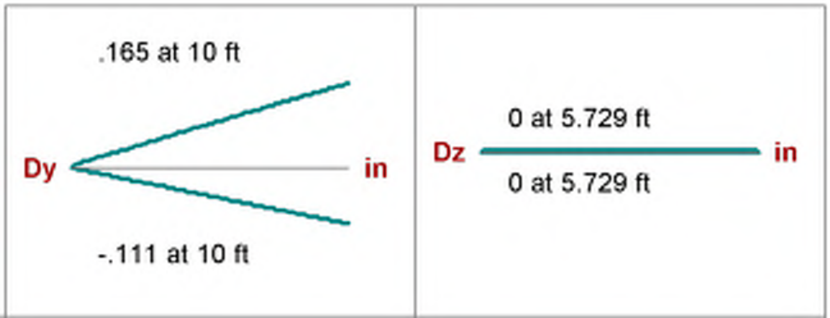
Column: *M70*

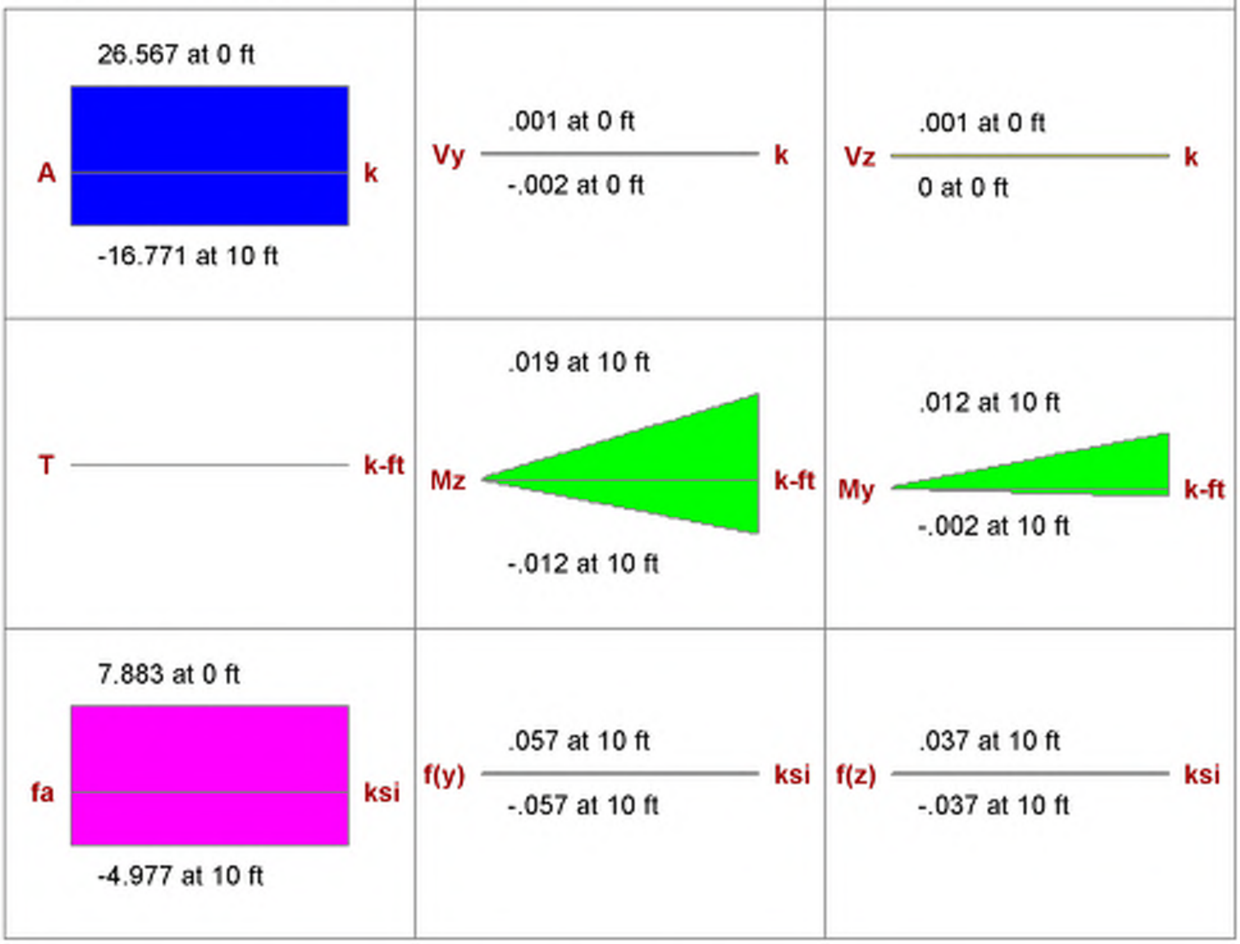
Shape:	**HSS4x4x4**
Material:	**A992**
Length:	**10 ft**
I Joint:	**N275**
J Joint:	**N118**

Envelope

Code Check: **0.276 (LC 7)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.276 (LC 7)**	Max Shear Check	**0.000 (y) (LC 9)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**96.223 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**151.65 k**			
phi*Mny	**17.588 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**17.588 k-ft**	L-torque	**10 ft**	
phi*Vny	**41.533 k**	Tau_b	**1**	
phi*Vnz	**41.533 k**			
phi*Tn	**14.769 k-ft**			
Cb	**1.667**			

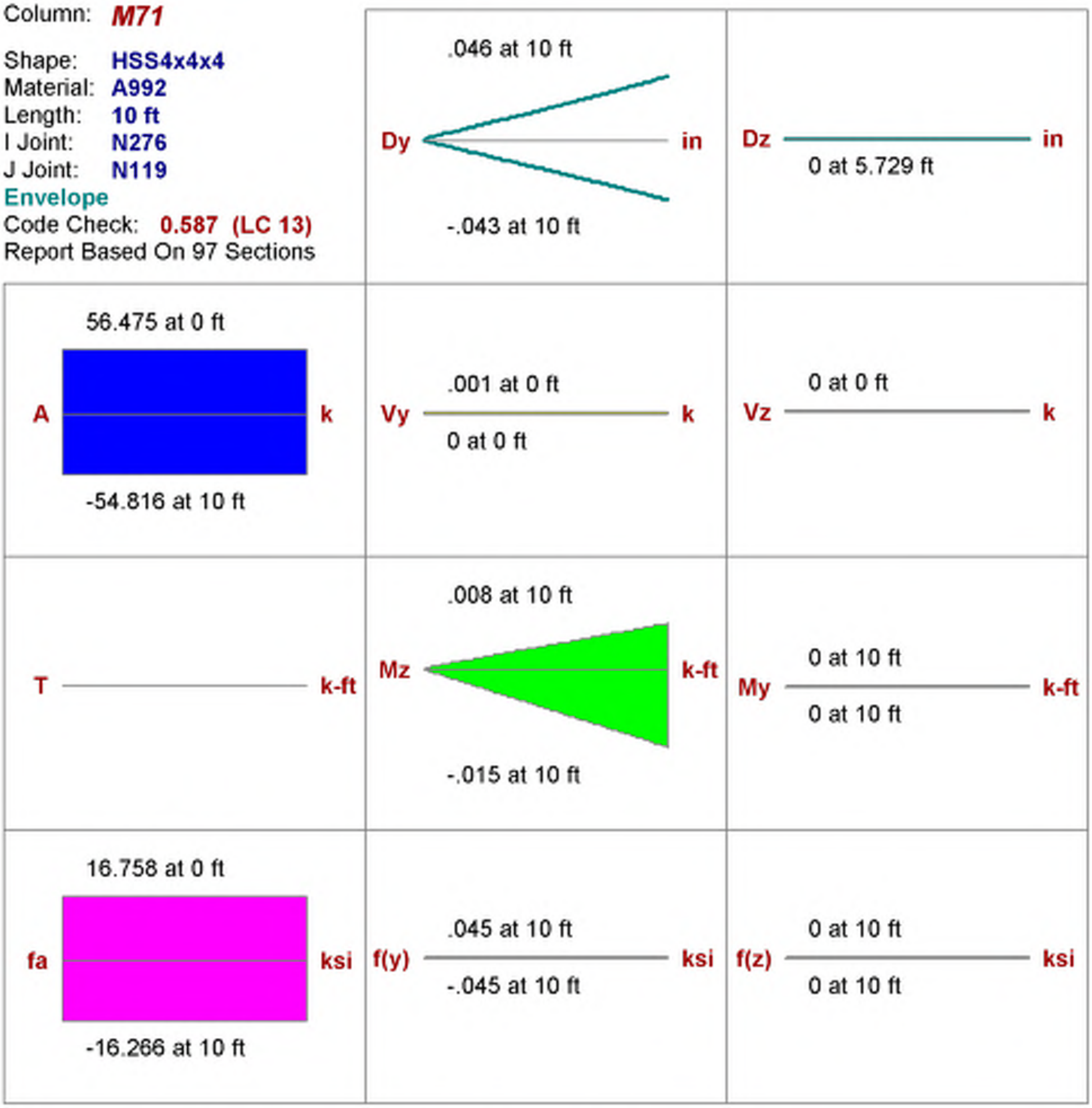
Column: ***M71***

Shape:	**HSS4x4x4**
Material:	**A992**
Length:	**10 ft**
I Joint:	**N276**
J Joint:	**N119**

Envelope

Code Check: **0.587 (LC 13)**

Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.587 (LC 13)**	Max Shear Check	**0.000 (y) (LC 9)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/2635**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**50 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**96.223 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**151.65 k**			
phi*Mny	**17.588 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**17.588 k-ft**	L-torque	**10 ft**	
phi*Vny	**41.533 k**	Tau_b	**1**	
phi*Vnz	**41.533 k**			
phi*Tn	**14.769 k-ft**			
Cb	**1.667**			

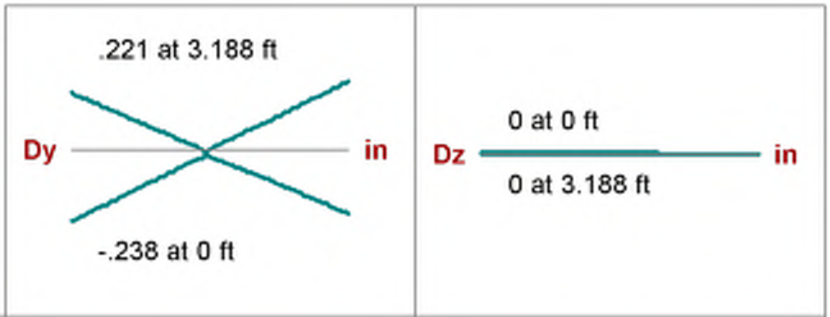
Beam: ***M72***

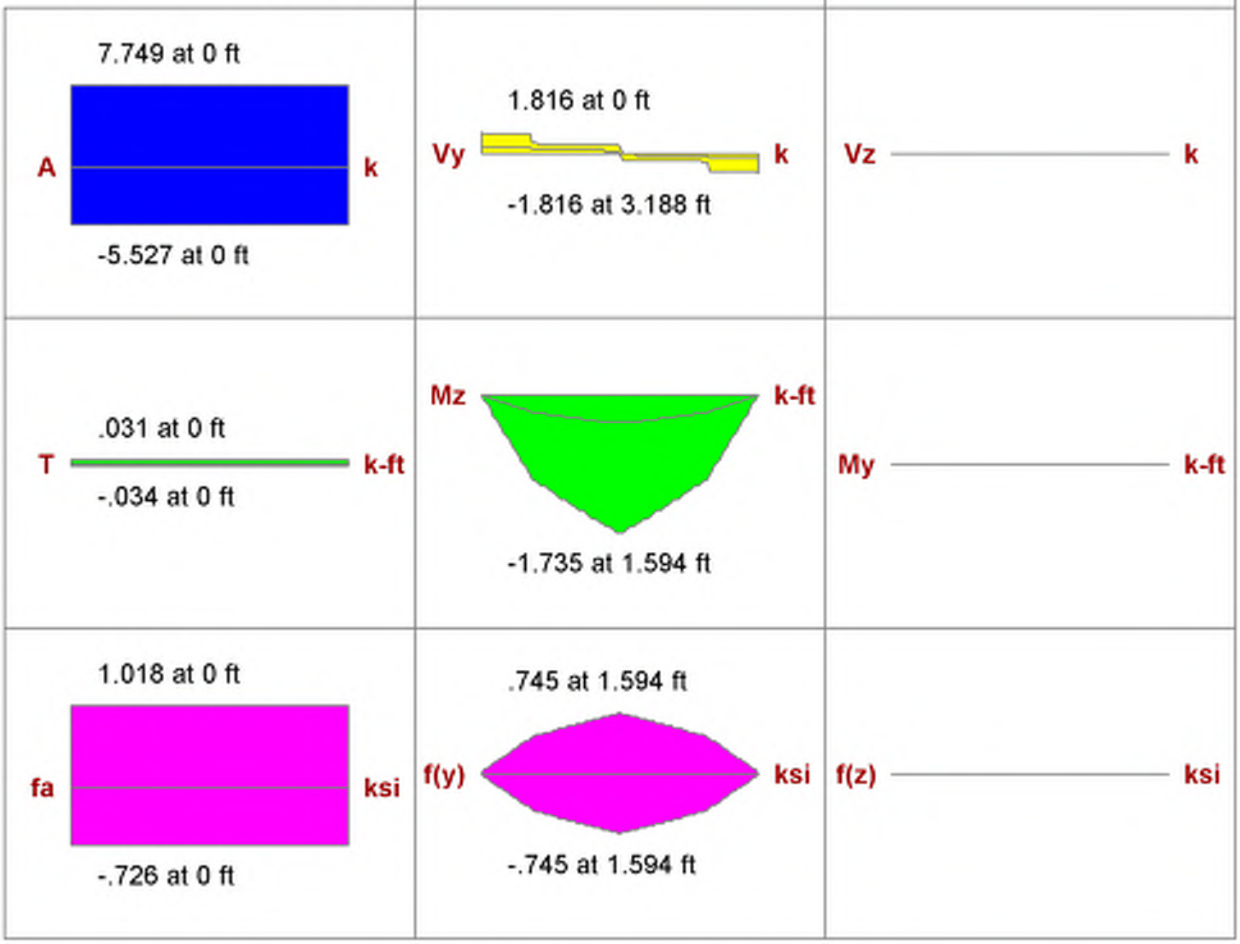
Shape:	**W10x26**
Material:	**A992**
Length:	**3.188 ft**
I Joint:	**N134**
J Joint:	**N137**

Envelope

Code Check: **0.032 (LC 23)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

Max Bending Check	**0.024 (LC 13)**	Max Shear Check	**0.032 (y) (LC 23)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/10000**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**3.188 ft**	**3.188 ft**
phi*Pnc	**323.232 k**	KL/r	**28.105**	**8.794**
phi*Pnt	**342.45 k**			
phi*Mny	**28.125 k-ft**	L Comp Flange	**3.188 ft**	
phi*Mnz	**117.375 k-ft**	L-torque	**3.188 ft**	
phi*Vny	**80.34 k**	Tau_b	**1**	
phi*Vnz	**137.095 k**			
Cb	**1.163**			

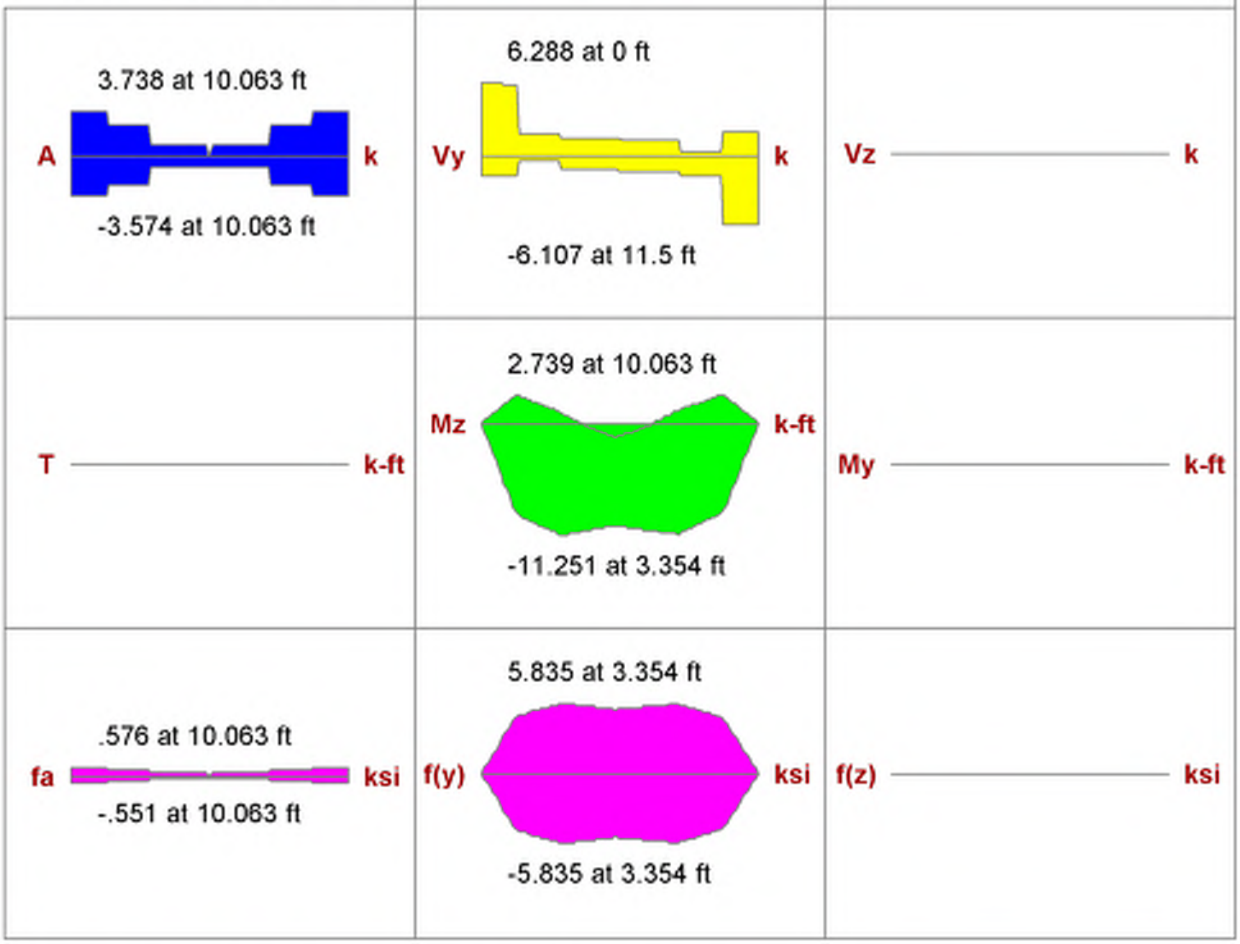
Beam: *M73*

Shape:	**W10x22**
Material:	**A992**
Length:	**11.5 ft**
I Joint:	**N75**
J Joint:	**N76**

Envelope

Code Check: **0.145 (LC 24)**

Report Based On 97 Sections



AISC 14th(360-10): LRFD Code Check

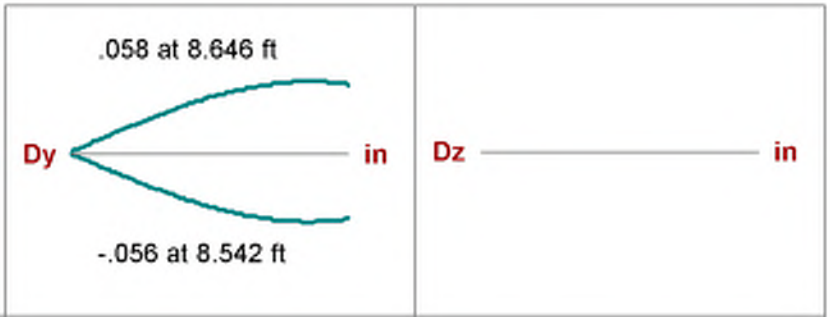
Direct Analysis Method

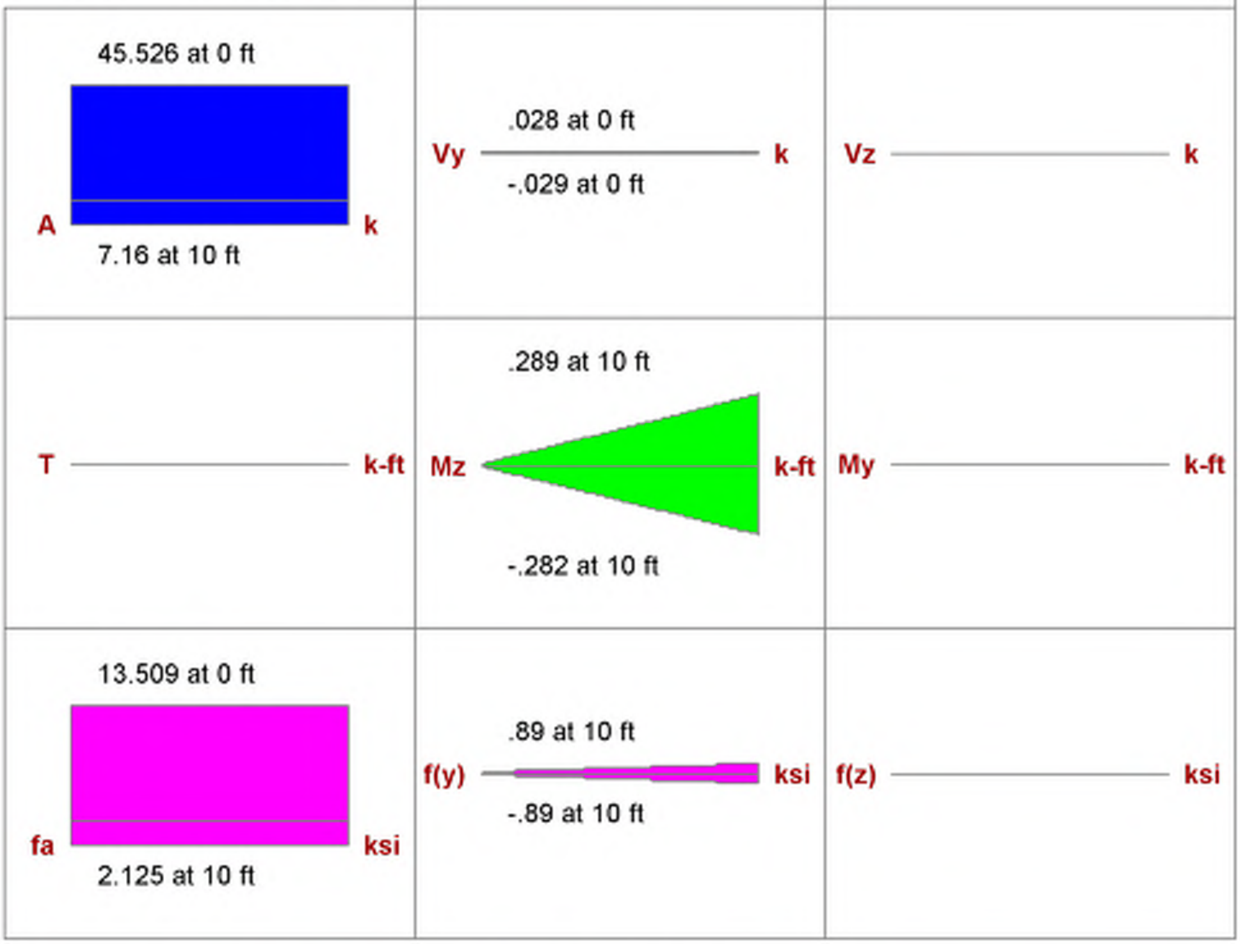
Max Bending Check	**0.145 (LC 24)**	Max Shear Check	**0.086 (y) (LC 26)**
Location	**8.266 ft**	Location	**0 ft**
Equation	**H1-1b**	Max Defl Ratio	**L/1353**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**11.5 ft**	**11.5 ft**
phi*Pnc	**132.186 k**	KL/r	**104.124**	**32.364**
phi*Pnt	**292.05 k**			
phi*Mny	**22.875 k-ft**	L Comp Flange	**11.5 ft**	
phi*Mnz	**79.153 k-ft**	L-torque	**11.5 ft**	
phi*Vny	**73.44 k**	Tau_b	**1**	
phi*Vnz	**111.78 k**			
Cb	**1.129**			

Column: ***M74***

Shape: **HSS4x4x4**
Material: **A500 Gr.B Rect**
Length: **10 ft**
I Joint: **N181**
J Joint: **N174**
Envelope
Code Check: **0.502 (LC 25)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

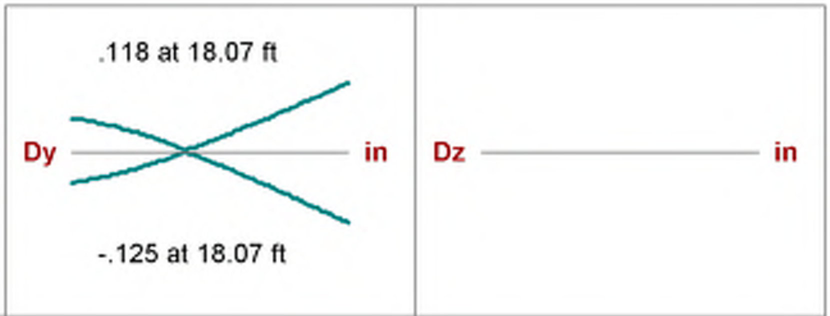
Direct Analysis Method

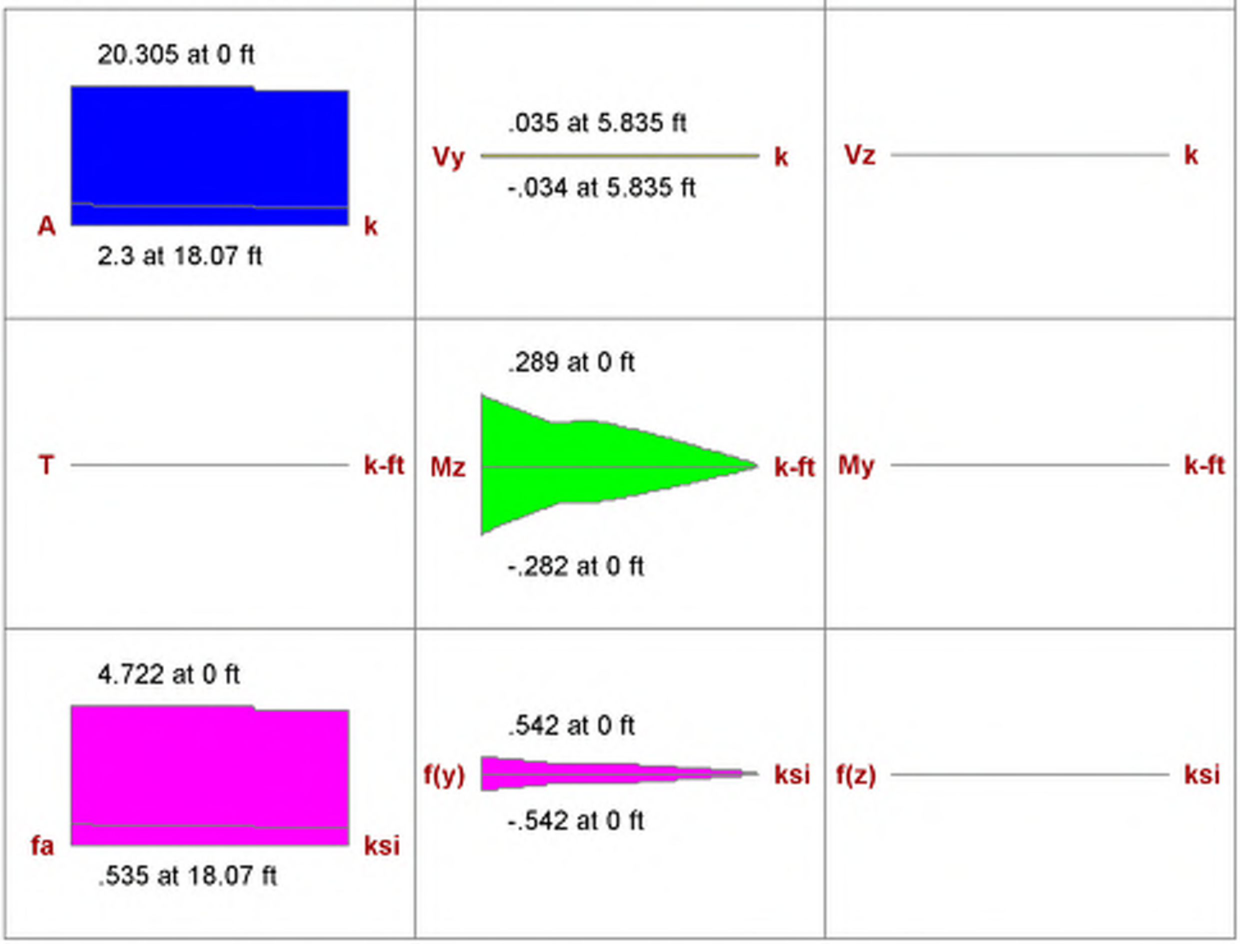
Max Bending Check	**0.502 (LC 25)**	Max Shear Check	**0.001 (y) (LC 13)**
Location	**10 ft**	Location	**0 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/6773**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**10 ft**	**10 ft**
phi*Pnc	**91.807 k**	KL/r	**78.877**	**78.877**
phi*Pnt	**139.518 k**			
phi*Mny	**16.181 k-ft**	L Comp Flange	**10 ft**	
phi*Mnz	**16.181 k-ft**	L-torque	**10 ft**	
phi*Vny	**38.211 k**	Tau_b	**1**	
phi*Vnz	**38.211 k**			
phi*Tn	**13.587 k-ft**			
Cb	**1.667**			

Column: **M75**

Shape: **HSS5x5x4**
Material: **A500 Gr.B Rect**
Length: **18.07 ft**
I Joint: **N174**
J Joint: **N192**
Envelope
Code Check: **0.270 (LC 25)**
Report Based On 97 Sections





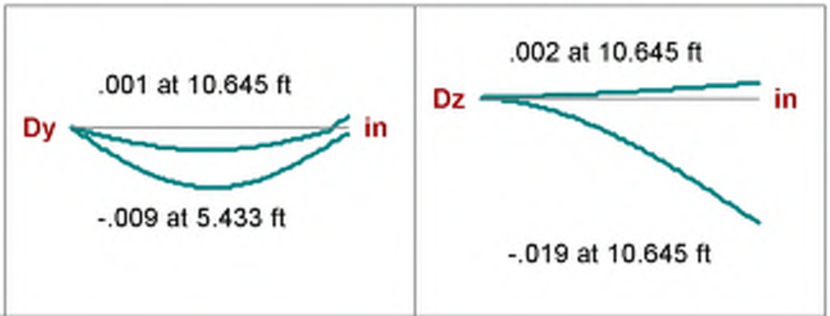
AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

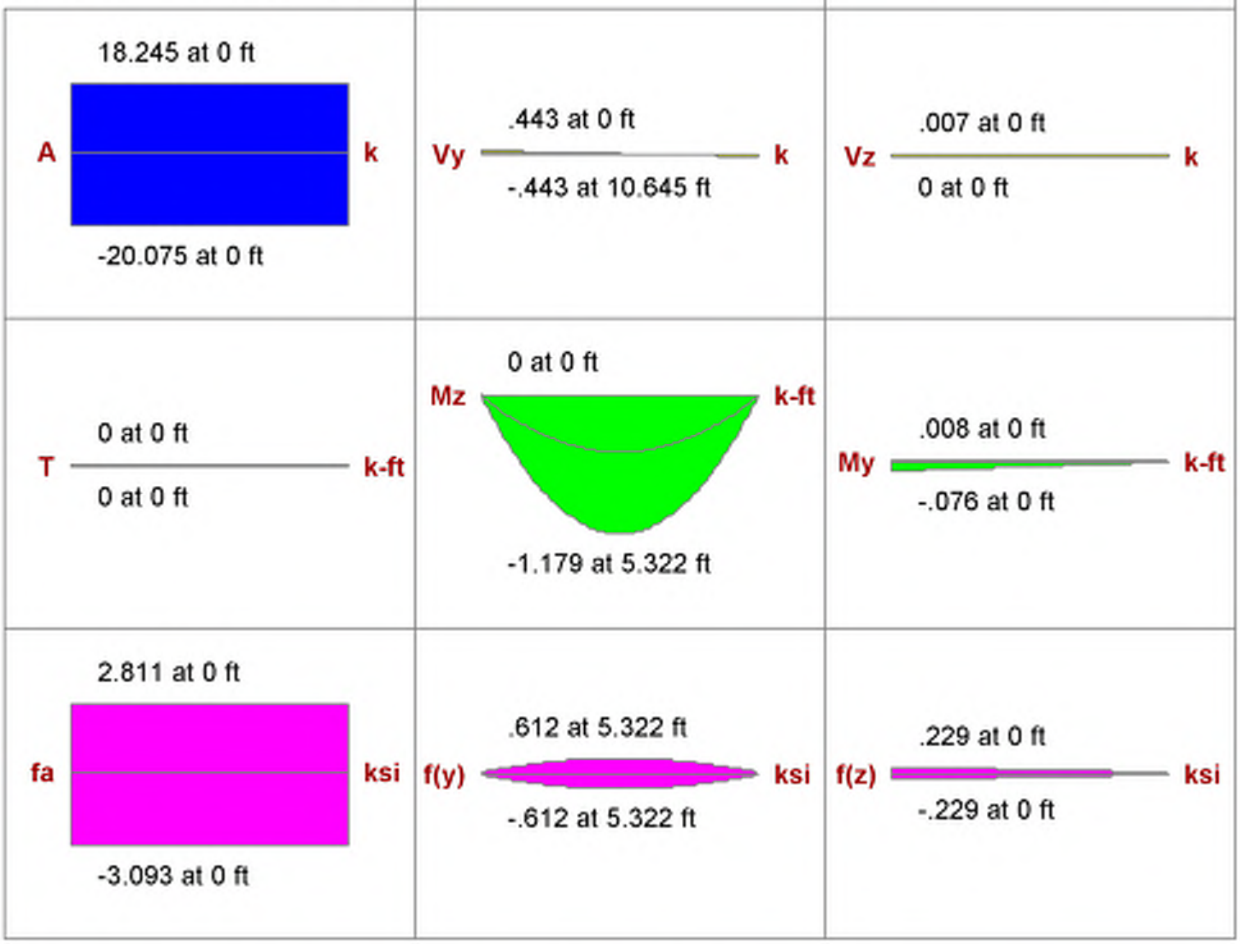
Max Bending Check	**0.270 (LC 25)**	Max Shear Check	**0.001 (y) (LC 13)**
Location	**2.635 ft**	Location	**5.835 ft**
Equation	**H1-1a**	Max Defl Ratio	**L/1197**
Bending Flange	**Compact**	Compression Flange	**Non-Slender**
Bending Web	**Compact**	Compression Web	**Non-Slender**

			y-y	z-z
Fy	**46 ksi**	Lb	**12 ft**	**18 ft**
phi*Pnc	**76.588 k**	KL/r	**74.651**	**111.977**
phi*Pnt	**178.02 k**			
phi*Mny	**26.255 k-ft**	L Comp Flange	**18.07 ft**	
phi*Mnz	**26.255 k-ft**	L-torque	**18.07 ft**	
phi*Vny	**49.786 k**	Tau_b	**1**	
phi*Vnz	**49.786 k**			
phi*Tn	**21.819 k-ft**			
Cb	**1.207**			

Beam: ***M76***

Shape: **W10x22**
Material: **A992**
Length: **10.645 ft**
I Joint: **N107**
J Joint: **N116**
Envelope
Code Check: **0.123 (LC 11)**
Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check
Direct Analysis Method

Max Bending Check	**0.123 (LC 11)**	Max Shear Check	**0.006 (y) (LC 7)**
Location	**0 ft**	Location	**0 ft**
Equation	**H1-1b***	Max Defl Ratio	**L/6738**
Bending Flange	**Compact**	Compression Flange	**Non-Slender Qs=1**
Bending Web	**Compact**	Compression Web	**Slender Qa=1**

			y-y	z-z
Fy	**50 ksi**	Lb	**10.645 ft**	**10.645 ft**
phi*Pnc	**148.072 k**	KL/r	**96.382**	**29.958**
phi*Pnt	**292.05 k**			
phi*Mny	**22.875 k-ft**	L Comp Flange	**10.645 ft**	
phi*Mnz	**83.556 k-ft**	L-torque	**10.645 ft**	
phi*Vny	**73.44 k**	Tau_b	**1**	
phi*Vnz	**111.78 k**			
Cb	**1.136**			

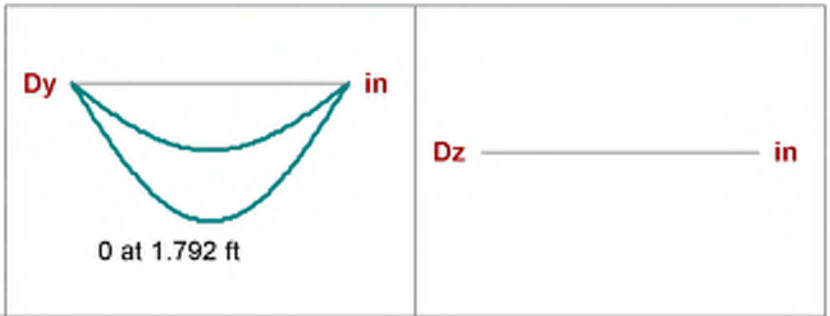
Beam: ***M77***

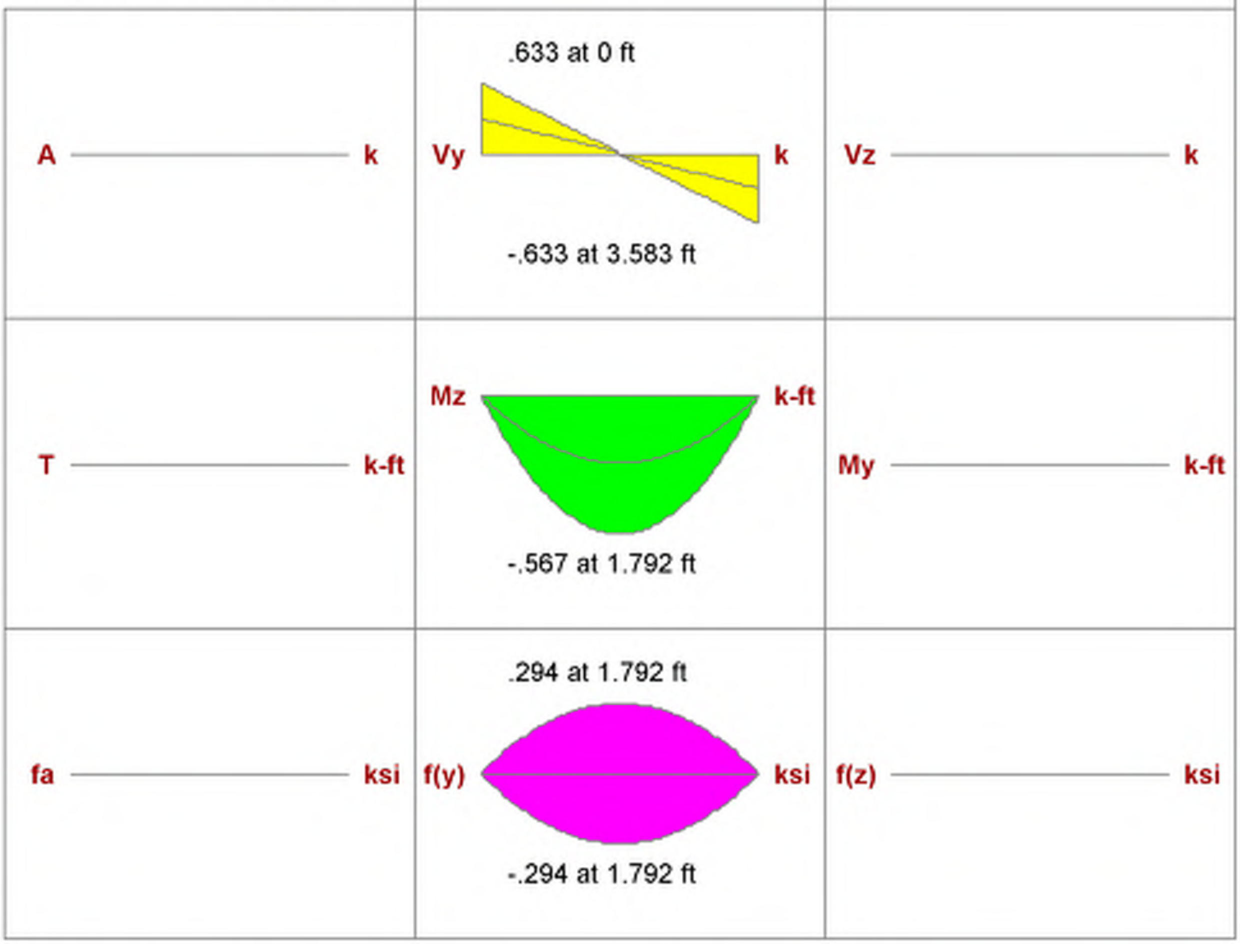
Shape:	**W10x22**
Material:	**A992**
Length:	**3.583 ft**
I Joint:	**F4_N59**
J Joint:	**N75**

Envelope

Code Check: **0.009 (LC 7)**

Report Based On 97 Sections





AISC 14th(360-10): LRFD Code Check

Direct Analysis Method

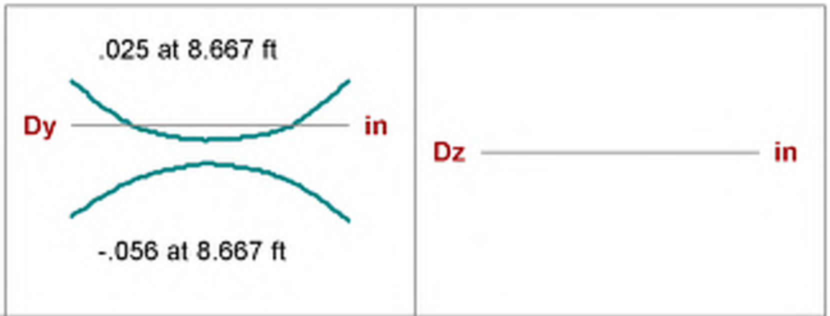
Max Bending Check	**0.006 (LC 7)**	Max Shear Check	**0.009 (y) (LC 7)**	
Location	**1.792 ft**	Location	**3.583 ft**	
Equation	**H1-1b**	Max Defl Ratio	**L/10000**	
Bending Flange	**Compact**	Compression Flange	**Non-Slender**	**Qs=1**
Bending Web	**Compact**	Compression Web	**Slender**	**Qa=.984**

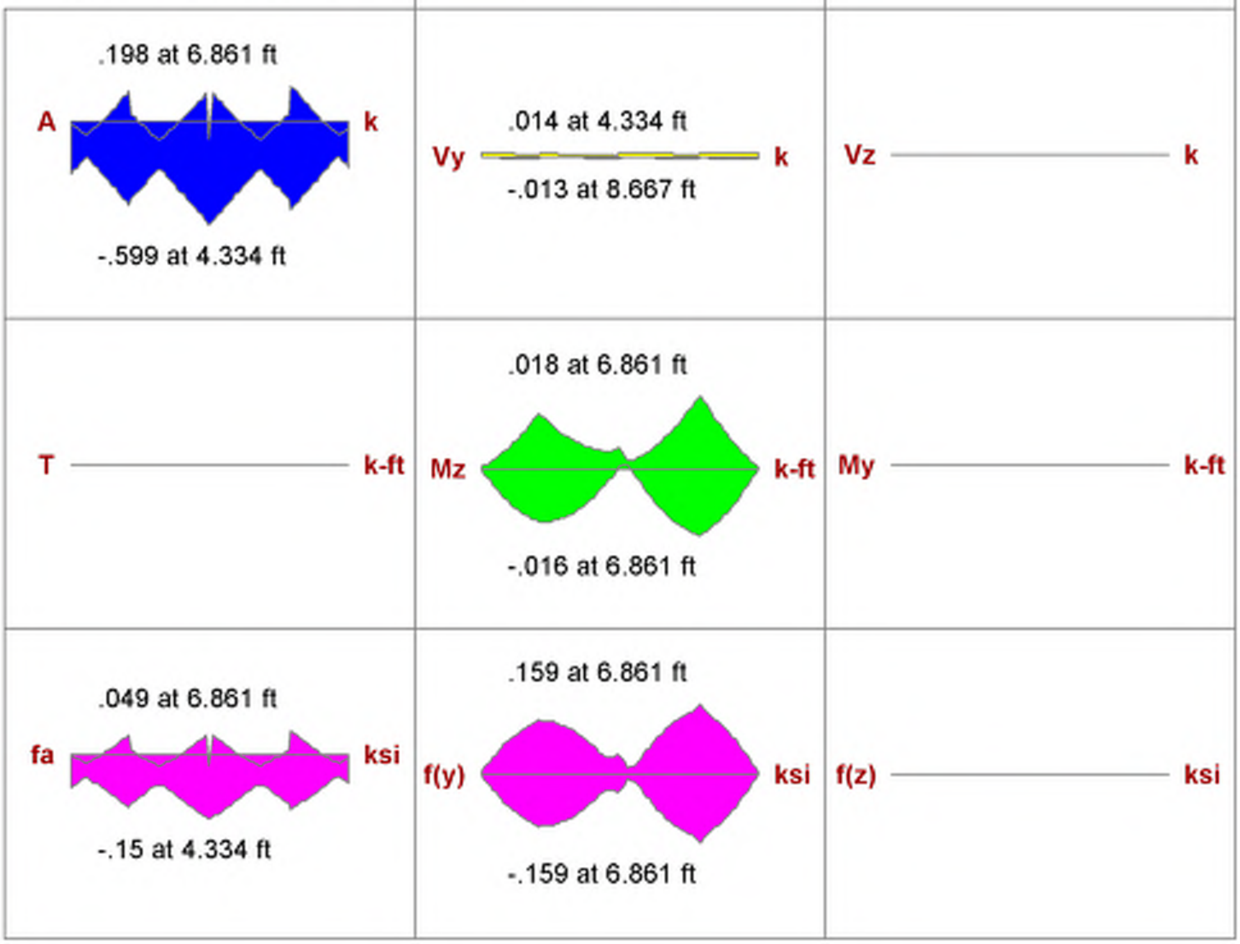
			y-y	z-z
Fy	**50 ksi**	Lb	**3.583 ft**	**3.583 ft**
phi*Pnc	**266.43 k**	KL/r	**32.441**	**10.083**
phi*Pnt	**292.05 k**			
phi*Mny	**22.875 k-ft**	L Comp Flange	**3.583 ft**	
phi*Mnz	**97.5 k-ft**	L-torque	**3.583 ft**	
phi*Vny	**73.44 k**	Tau_b	**1**	
phi*Vnz	**111.78 k**			
Cb	**1.136**			

Beam: ***M78***

Shape: **RE2X2**
Material: **gen_Conc3NW**
Length: **8.667 ft**
I Joint: **N121**
J Joint: **N110**

Code Check: **No Calc**
Report Based On 97 Sections

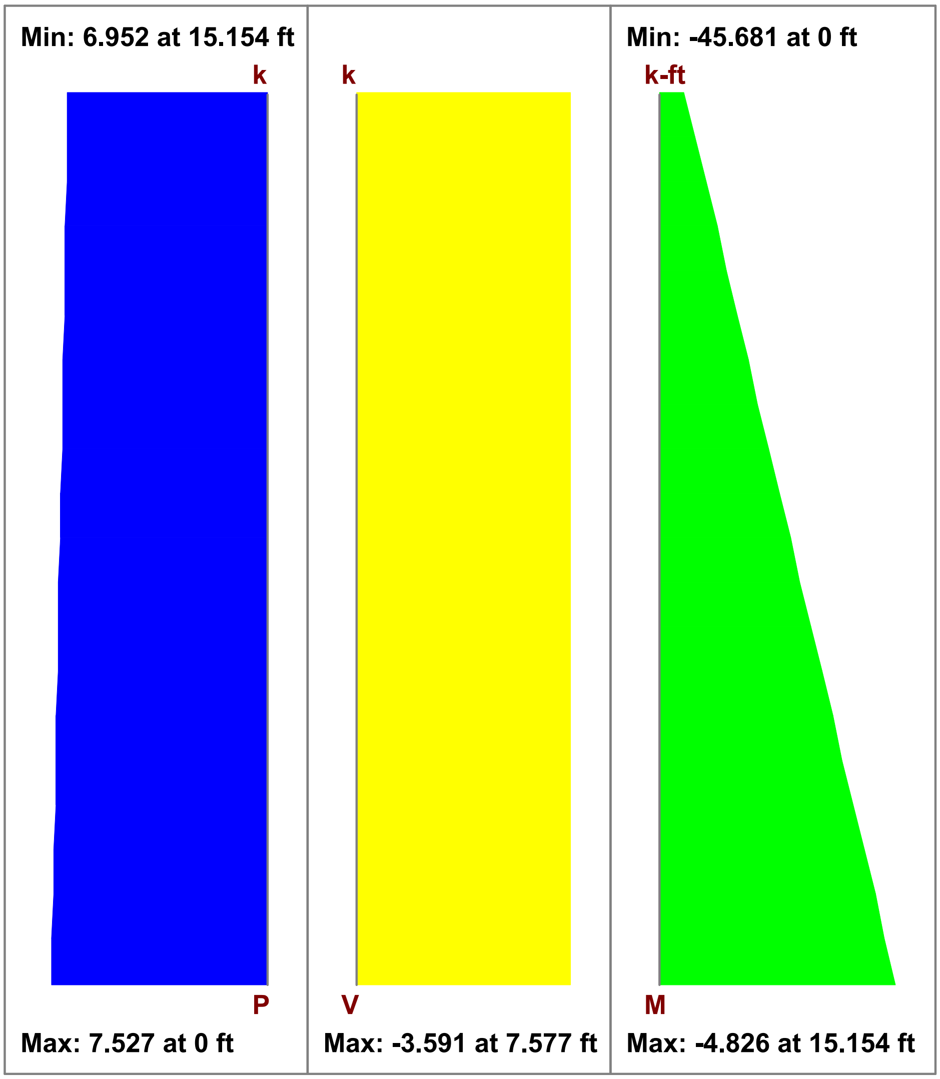




Lateral Shear Wall Detailed Reports

CRITERIA		MATERIALS		GEOMETRY	
Code	: AWC NDS-15:ASD	Wall Studs	: Spruce-Pine-Fir	Total Height	: 15.154 ft
		Stud Size	: 2X6	Total Length	: 11.5 ft
Wall Material	: Spruce-Pine-Fir	Chord Material	: Spruce-Pine-Fir	Region H/W	: 1.32
Panel Schedule	: AWC 2015 PLY 0.469 ...	Chord Size	: 2-2X6	Cap. Adj. (2w/h)	: 1.00
Optimize HD	: Yes	Top Pl & Sill	: Spruce-Pine-Fir	Stud Spacing	: 16 in
HD Manufacturer	: SIMPSON	Top Pl Size	: 2-2X6	K	: 1.00
		Sill Pl Size	: 2X6	HD Eccentricity	: 4.313 in

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL

Required Cap	: .312	k/ft
Provided Cap	: .43	k/ft
Ratio	: .726	
Governing LC	: 16 (Seismic)	

CHORDS

Max Comp Force	: 5.693 k
Comp Capacity	: 6.371 k
Comp Ratio	: .894
Gov Comp LC	: 26
Max Tens Force	: 4.147 k
Tens Capacity	: 15.444 k
Tens Ratio	: .269
Gov Tens LC	: 30

STUDS

No gravity-only LC solved.

HOLD-DOWNS

Required Cap	: 4.235	k
Provided Cap	: 4.565	k
Ratio	: .928	
Governing LC	: 30	

DEFLECTIONS

Flexure Comp	: .033	in
Shear Comp	: .338	in
HD Elong	: .109	in
Tot Deflection	: .48	in
Governing LC	: 16	

DESIGN DETAILS

SELECTED SHEAR PANEL : **S1_15/32_8d@4**

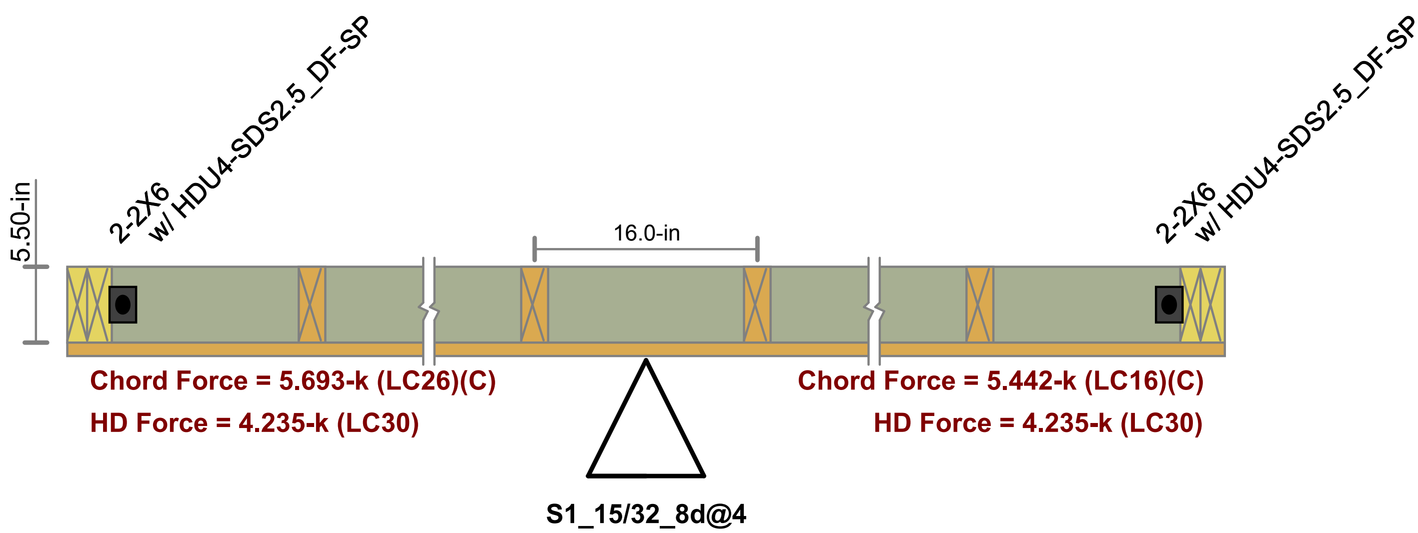
Panel Grade	: **St-I**		Nail Size	: **8d**		Num Sides	: **One**	
Panel Thick	: **0.469**	**in**	Reqd Pen	: **1.375**	**in**	Over Gyp Brd.	: **No**	
			Reqd. Spacing	: **4**	**in**	Shear Capacity	: **0.430**	**k/ft**
						Adjusted Cap	: **0.430**	**k/ft**

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

SELECTED HOLD-DOWN : **HDU4-SDS2.5_DF-SP**

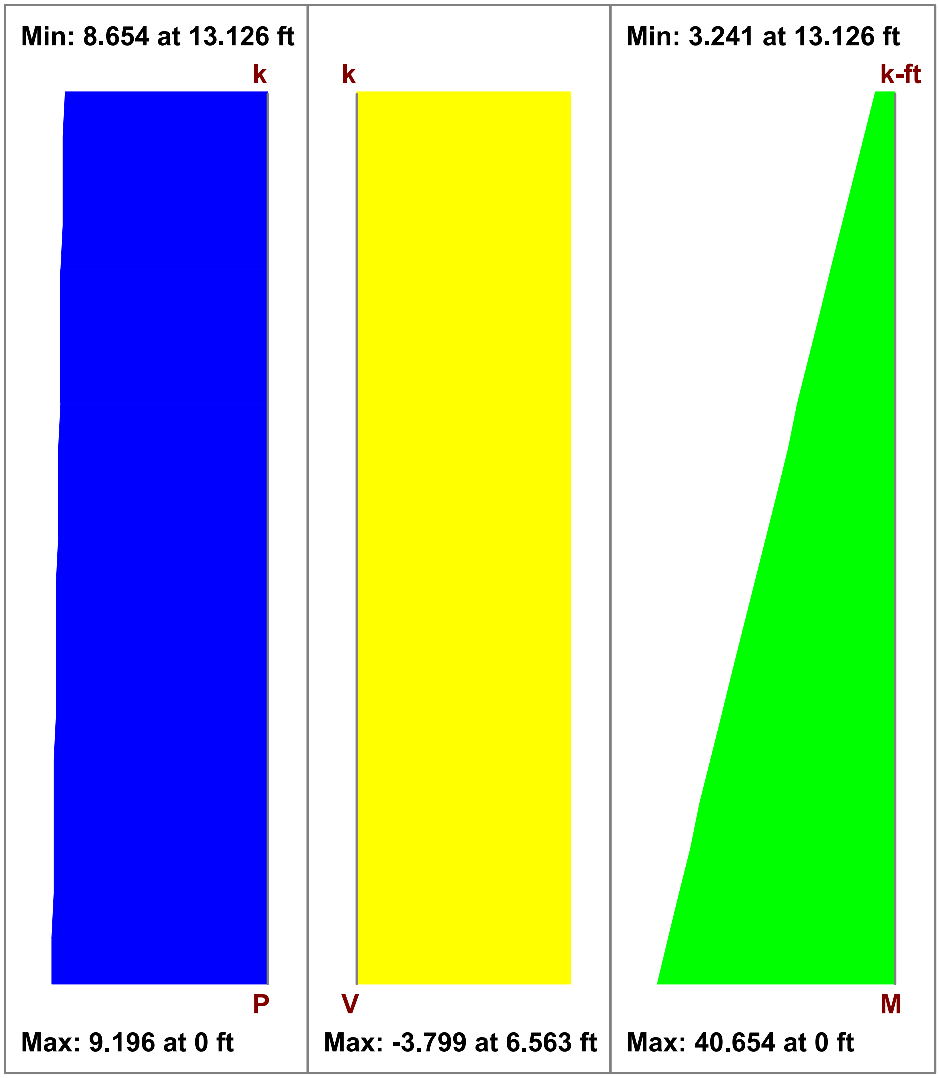
Min Chord Thk	: **3.00**	**in**	Bolt Size:	: **n/a**	Base Cap(CD=1):	**2.853**	**k**
Reqd Chord Mat	: **Douglas Fir**				CD factor	: **1.6**	
					Adjusted Cap	: **4.565**	**k**

CROSS SECTION DETAILING



CRITERIA		MATERIALS		GEOMETRY	
Code	: AWC NDS-15:ASD	Wall Studs	: Spruce-Pine-Fir	Total Height	: 13.126 ft
		Stud Size	: 2X6	Total Length	: 12.167 ft
Wall Material	: Spruce-Pine-Fir	Chord Material	: Spruce-Pine-Fir	Region H/W	: 1.08
Panel Schedule	: AWC 2015 PLY 0.469 ...	Chord Size	: 2-2X6	Cap. Adj. (2w/h)	: 1.00
Optimize HD	: Yes	Top Pl & Sill	: Spruce-Pine-Fir	Stud Spacing	: 16 in
HD Manufacturer:	SIMPSON	Top Pl Size	: 2-2X6	K	: 1.00
		Sill Pl Size	: 2X6	HD Eccentricity	: 4.313 in

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL

Required Cap	: .312	k/ft
Provided Cap	: .43	k/ft
Ratio	: .726	
Governing LC	: 16 (Seismic)	

CHORDS

Max Comp Force:	5.434 k
Comp Capacity	: 8.398 k
Comp Ratio	: .647
Gov Comp LC	: 24
Max Tens Force	: 3.286 k
Tens Capacity	: 15.444 k
Tens Ratio	: .213
Gov Tens LC	: 28

STUDS

No gravity-only LC solved.

HOLD-DOWNS

Required Cap	: 3.352	k
Provided Cap	: 4.565	k
Ratio	: .734	
Governing LC	: 28	

DEFLECTIONS

Flexure Comp	: .02	in
Shear Comp	: .293	in
HD Elong	: .065	in
Tot Deflection	: .378	in
Governing LC	: 16	

DESIGN DETAILS

SELECTED SHEAR PANEL : S1_15/32_8d@4

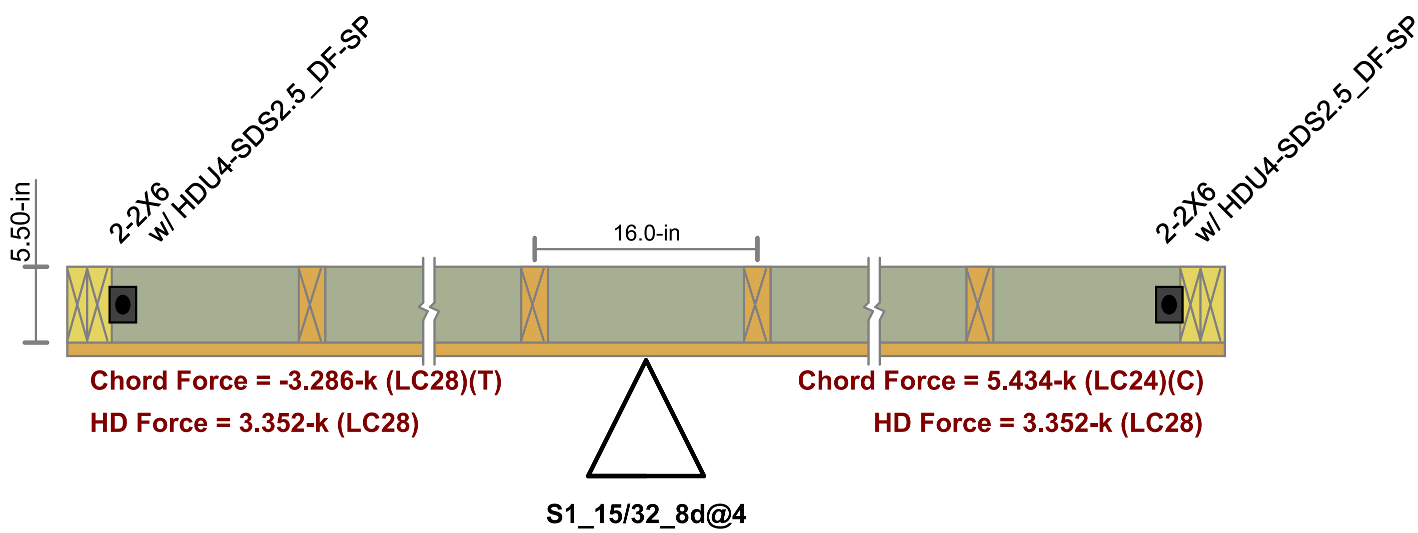
Panel Grade	: **St-I**		Nail Size	: **8d**		Num Sides	: **One**	
Panel Thick	: **0.469**	**in**	Reqd Pen	: **1.375**	**in**	Over Gyp Brd.	: **No**	
			Reqd. Spacing	: **4**	**in**	Shear Capacity	: **0.430**	**k/ft**
						Adjusted Cap	: **0.430**	**k/ft**

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

SELECTED HOLD-DOWN : HDU4-SDS2.5_DF-SP

Min Chord Thk	: **3.00**	**in**	Bolt Size:	: **n/a**	Base Cap(CD=1):	**2.853**	**k**
Reqd Chord Mat	: **Douglas Fir**				CD factor	: **1.6**	
					Adjusted Cap	: **4.565**	**k**

CROSS SECTION DETAILING



CRITERIA

Code	: AWC NDS-15:ASD
Wall Material	: Spruce-Pine-Fir
Panel Schedule	: AWC 2015 PLY 0.469 ...
Optimize HD	: Yes
HD Manufacturer	: SIMPSON

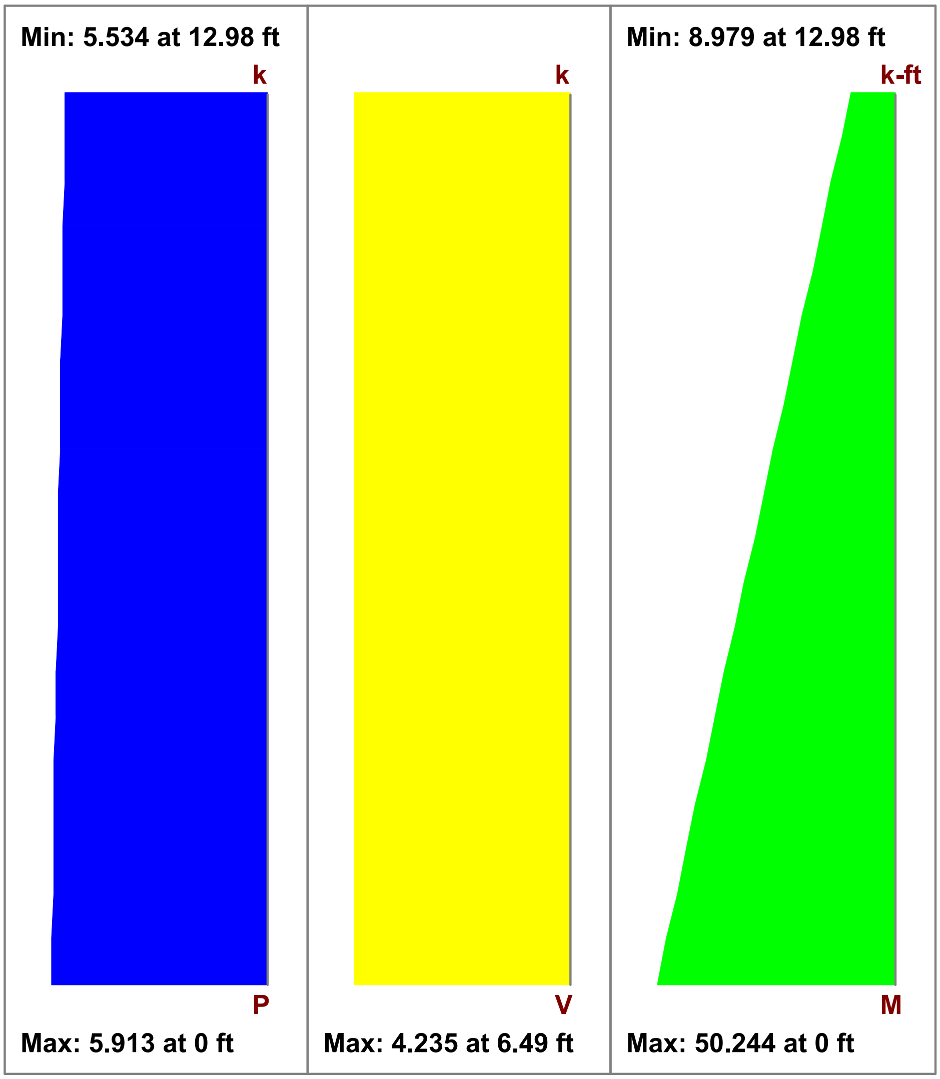
MATERIALS

Wall Studs	: Spruce-Pine-Fir
Stud Size	: 2X6
Chord Material	: Spruce-Pine-Fir
Chord Size	: 2-2X6
Top Pl & Sill	: Spruce-Pine-Fir
Top Pl Size	: 2-2X6
Sill Pl Size	: 2X6

GEOMETRY

Total Height	: 12.98 ft
Total Length	: 7.957 ft
Region H/W	: 1.63
Cap. Adj. (2w/h)	: 1.00
Stud Spacing	: 16 in
K	: 1.00
HD Eccentricity	: 4.375 in

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL

Required Cap	: .532 k/ft
Provided Cap	: .55 k/ft
Ratio	: .968
Governing LC	: 16 (Seismic)

CHORDS

Max Comp Force	: 8.298 k
Comp Capacity	: 8.579 k
Comp Ratio	: .967
Gov Comp LC	: 26
Max Tens Force	: 6.837 k
Tens Capacity	: 15.444 k
Tens Ratio	: .443
Gov Tens LC	: 30

STUDS

No gravity-only LC solved.

HOLD-DOWNS

Required Cap	: 7.056 k
Provided Cap	: 7.87 k
Ratio	: .897
Governing LC	: 30

DEFLECTIONS

Flexure Comp	: .051 in
Shear Comp	: .406 in
HD Elong	: .132 in
Tot Deflection	: .589 in
Governing LC	: 16

DESIGN DETAILS

SELECTED SHEAR PANEL : S1_15/32_8d@3

Panel Grade	: **St-I**		Nail Size	: **8d**		Num Sides	: **One**	
Panel Thick	: **0.469**	**in**	Reqd Pen	: **1.375**	**in**	Over Gyp Brd.	: **No**	
			Reqd. Spacing	: **3**	**in**	Shear Capacity	: **0.550**	**k/ft**
						Adjusted Cap	: **0.550**	**k/ft**

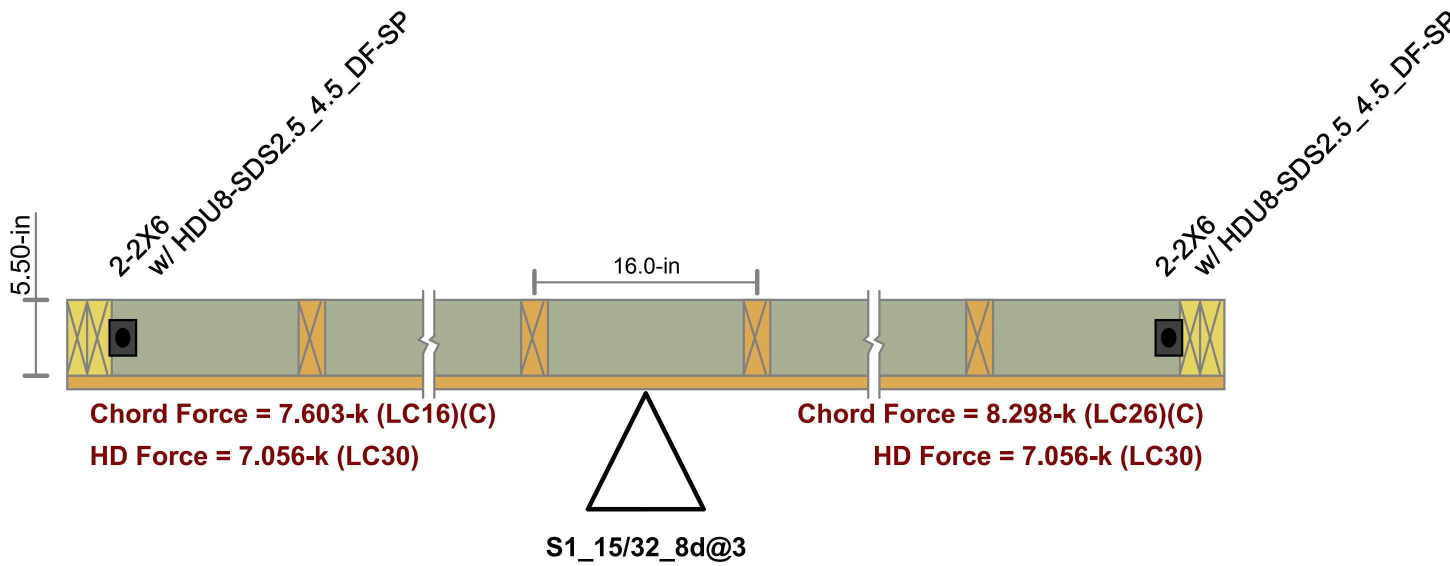
NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

Note: The selected Hold-Down does not meet the Required Chord thickness, see Design Rules-Hold Down Schedule.

SELECTED HOLD-DOWN : HDU8-SDS2.5_4.5_DF-SP

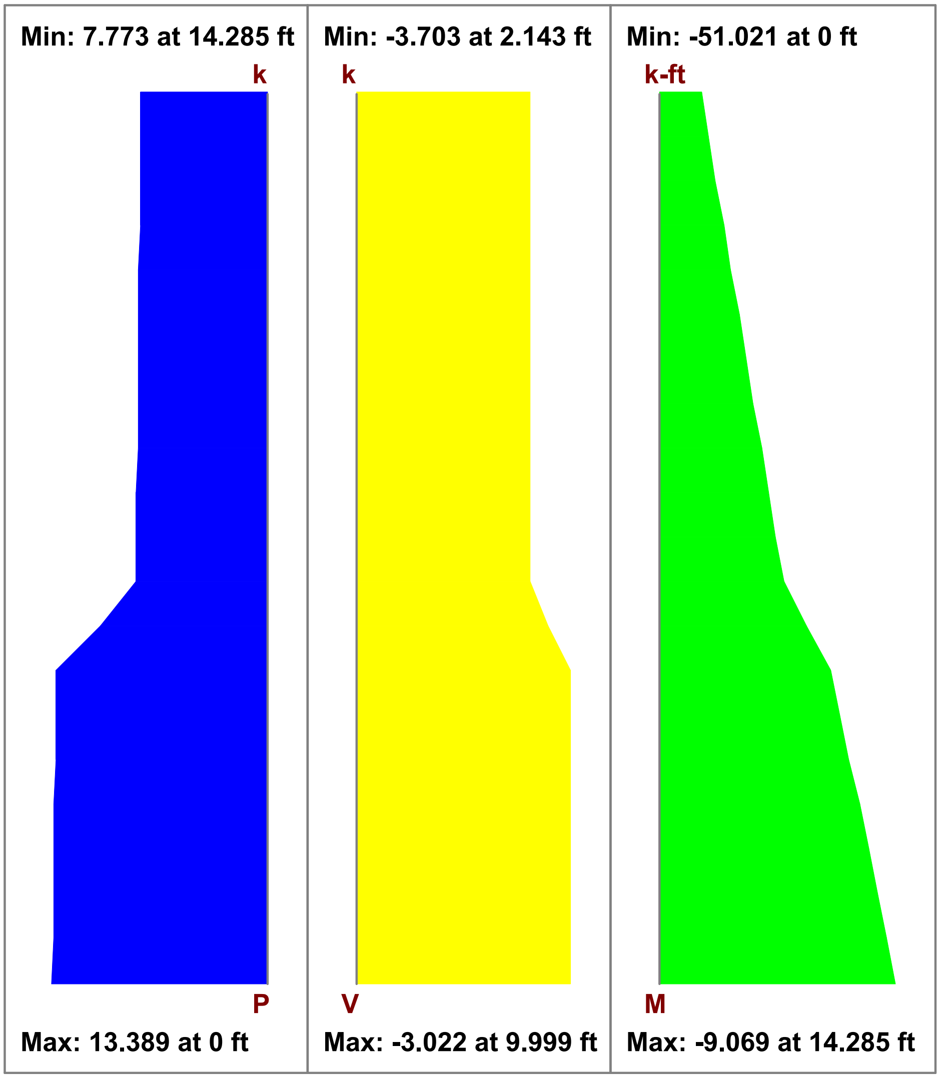
Min Chord Thk	: **4.50**	**in**	Bolt Size:	: **n/a**		Base Cap(CD=1):	**4.919**	**k**
Reqd Chord Mat	: **Douglas Fir**					CD factor	: **1.6**	
						Adjusted Cap	: **7.870**	**k**

CROSS SECTION DETAILING



CRITERIA		MATERIALS		GEOMETRY	
Code	: **AWC NDS-15:ASD**	Wall Studs	: **Spruce-Pine-Fir**	Total Height	: **14.285 ft**
		Stud Size	: **2X6**	Total Length	: **12.167 ft**
Wall Material	: **Spruce-Pine-Fir**	Chord Material	: **Spruce-Pine-Fir**	Region H/W	: **1.17**
Panel Schedule	: **AWC 2015 PLY 0.469 ...**	Chord Size	: **2-2X6**	Cap. Adj. (2w/h)	: **1.00**
Optimize HD	: **Yes**	Top Pl & Sill	: **Spruce-Pine-Fir**	Stud Spacing	: **16 in**
HD Manufacturer:	**SIMPSON**	Top Pl Size	: **2-2X6**	K	: **1.00**
		Sill Pl Size	: **2X6**	HD Eccentricity	: **4.313 in**

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL

Required Cap	: **.304 k/ft**
Provided Cap	: **.43 k/ft**
Ratio	: **.708**
Governing LC	: **16 (Seismic)**

CHORDS

Max Comp Force:	**6.615 k**
Comp Capacity	: **7.143 k**
Comp Ratio	: **.926**
Gov Comp LC	: **26**
Max Tens Force	: **2.426 k**
Tens Capacity	: **15.444 k**
Tens Ratio	: **.157**
Gov Tens LC	: **30**

STUDS

No gravity-only LC solved.

HOLD-DOWNS

Required Cap	: **2.474 k**
Provided Cap	: **3.075 k**
Ratio	: **.805**
Governing LC	: **30**

DEFLECTIONS

Flexure Comp	: **.025 in**
Shear Comp	: **.311 in**
HD Elong	: **.012 in**
Tot Deflection	: **.347 in**
Governing LC	: **16**

DESIGN DETAILS

SELECTED SHEAR PANEL : S1_15/32_8d@4

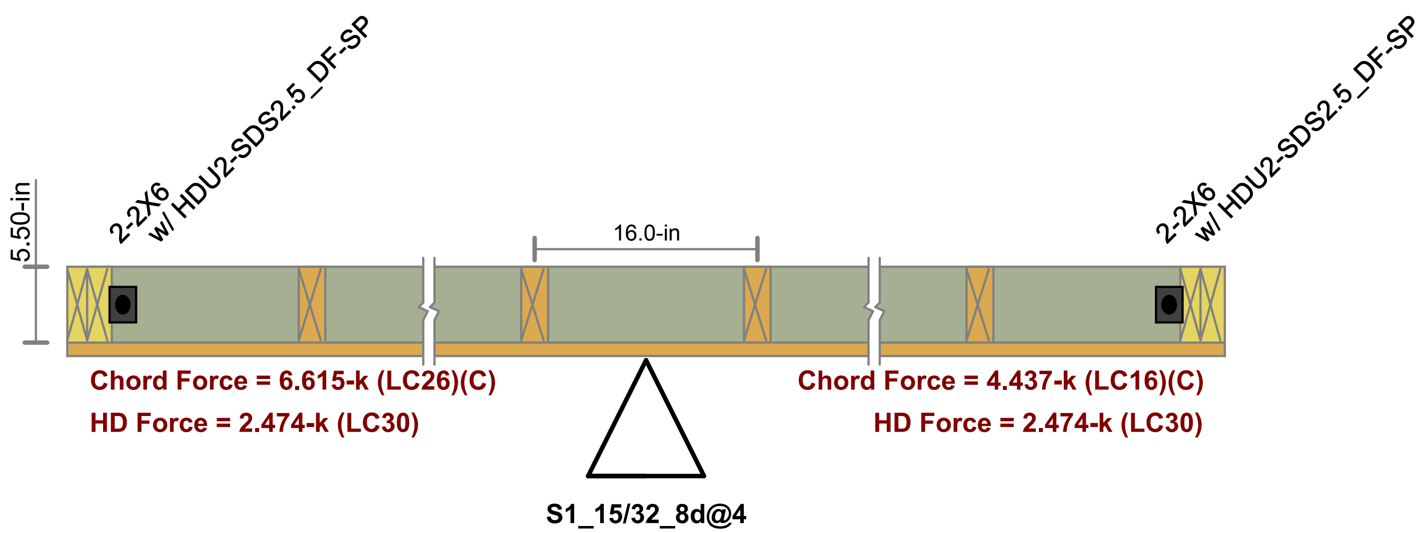
Panel Grade	: **St-I**		Nail Size	: **8d**		Num Sides	: **One**	
Panel Thick	: **0.469**	**in**	Reqd Pen	: **1.375**	**in**	Over Gyp Brd.	: **No**	
			Reqd. Spacing	: **4**	**in**	Shear Capacity	: **0.430**	**k/ft**
						Adjusted Cap	: **0.430**	**k/ft**

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

SELECTED HOLD-DOWN : HDU2-SDS2.5_DF-SP

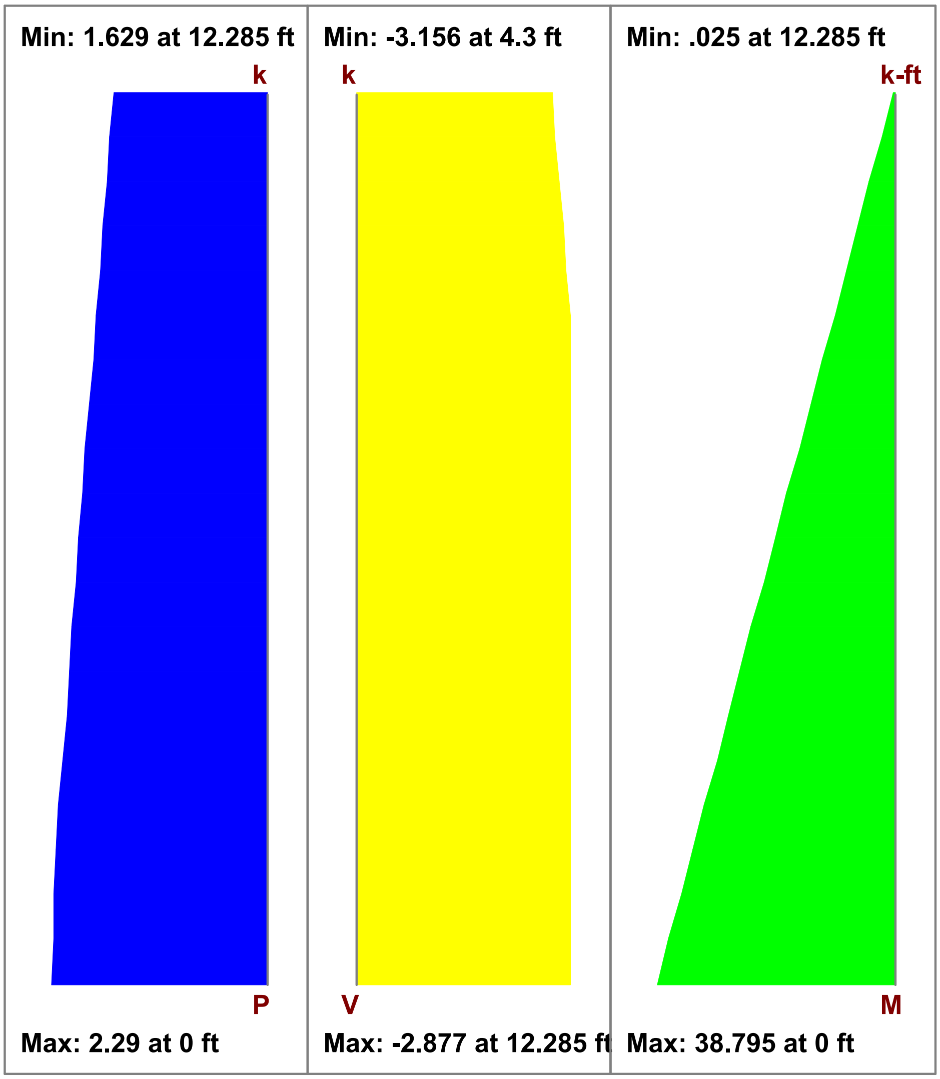
Min Chord Thk	: **3.00**	**in**	Bolt Size:	: **n/a**	Base Cap(CD=1):	**1.922**	**k**
Reqd Chord Mat	: **Douglas Fir**				CD factor	: **1.6**	
					Adjusted Cap	: **3.075**	**k**

CROSS SECTION DETAILING



CRITERIA		MATERIALS		GEOMETRY	
Code	: **AWC NDS-15:ASD**	Wall Studs	: **Spruce-Pine-Fir**	Total Height	: **12.285 ft**
		Stud Size	: **2X6**	Total Length	: **16.833 ft**
Wall Material	: **Spruce-Pine-Fir**	Chord Material	: **Spruce-Pine-Fir**	Region H/W	: **0.73**
Panel Schedule	: **AWC 2015 PLY 0.469 ...**	Chord Size	: **2-2X6**	Cap. Adj. (2w/h)	: **1.00**
Optimize HD	: **Yes**	Top Pl & Sill	: **Spruce-Pine-Fir**	Stud Spacing	: **16 in**
HD Manufacturer:	**SIMPSON**	Top Pl Size	: **2-2X6**	K	: **1.00**
		Sill Pl Size	: **2X6**	HD Eccentricity	: **4.313 in**

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL

Required Cap	: **.187**	**k/ft**
Provided Cap	: **.28**	**k/ft**
Ratio	: **.67**	
Governing LC	: **15 (Seismic)**	

CHORDS

Max Comp Force:	**2.424 k**
Comp Capacity	: **9.514 k**
Comp Ratio	: **.255**
Gov Comp LC	: **15**
Max Tens Force	: **1.985 k**
Tens Capacity	: **15.444 k**
Tens Ratio	: **.129**
Gov Tens LC	: **27**

STUDS

No gravity-only LC solved.

HOLD-DOWNS

Required Cap	: **2.014**	**k**
Provided Cap	: **3.075**	**k**
Ratio	: **.655**	
Governing LC	: **27**	

DEFLECTIONS

Flexure Comp	: **.007**	**in**
Shear Comp	: **.209**	**in**
HD Elong	: **.036**	**in**
Tot Deflection	: **.253**	**in**
Governing LC	: **15**	

DESIGN DETAILS

SELECTED SHEAR PANEL : S1_15/32_8d@6

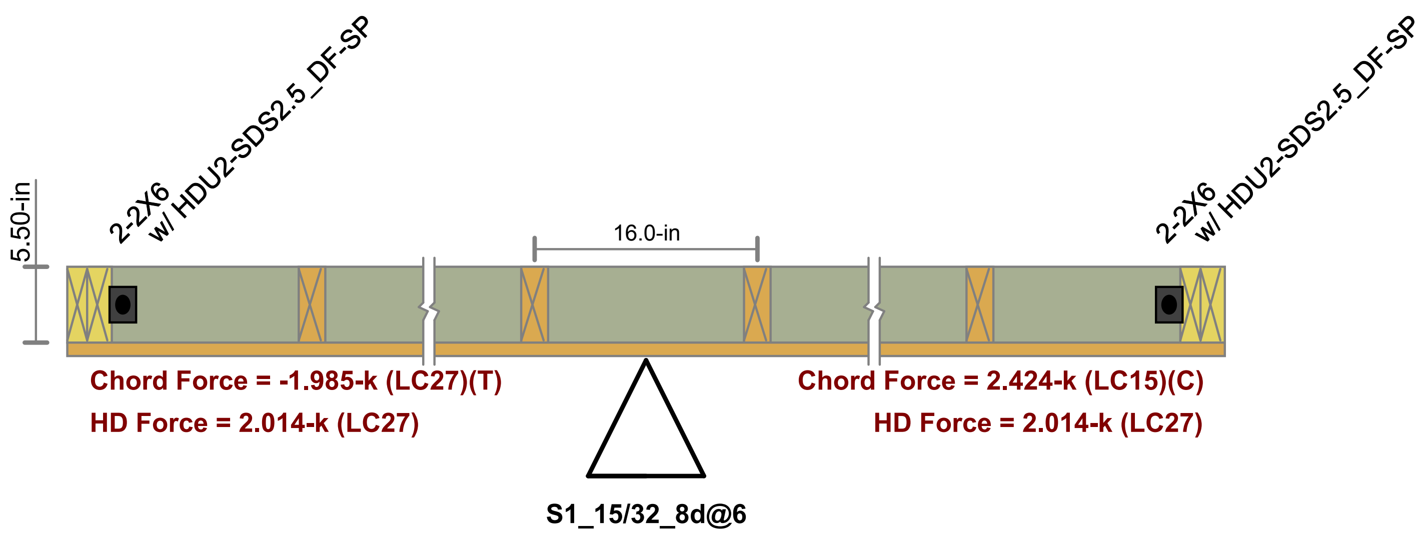
Panel Grade	: **St-I**		Nail Size	: **8d**		Num Sides	: **One**	
Panel Thick	: **0.469**	**in**	Reqd Pen	: **1.375**	**in**	Over Gyp Brd.	: **No**	
			Reqd. Spacing	: **6**	**in**	Shear Capacity	: **0.280**	**k/ft**
						Adjusted Cap	: **0.280**	**k/ft**

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

SELECTED HOLD-DOWN : HDU2-SDS2.5_DF-SP

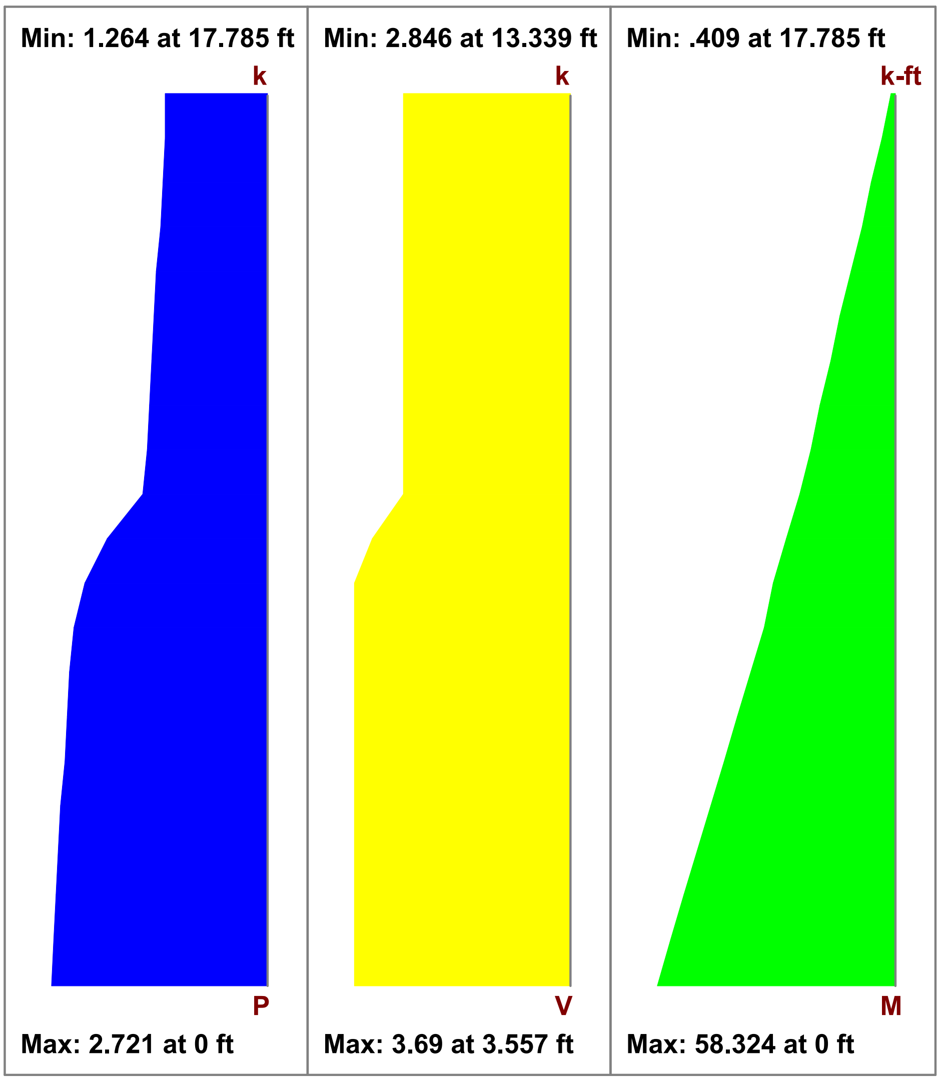
Min Chord Thk	: **3.00**	**in**	Bolt Size:	: **n/a**	Base Cap(CD=1):	**1.922**	**k**
Reqd Chord Mat	: **Douglas Fir**				CD factor	: **1.6**	
					Adjusted Cap	: **3.075**	**k**

CROSS SECTION DETAILING



CRITERIA		**MATERIALS**		**GEOMETRY**	
Code	: **AWC NDS-15:ASD**	Wall Studs	: **Spruce-Pine-Fir**	Total Height	: **17.785 ft**
		Stud Size	: **2X6**	Total Length	: **13.25 ft**
Wall Material	: **Spruce-Pine-Fir**	Chord Material	: **Spruce-Pine-Fir**	Region H/W	: **1.34**
Panel Schedule	: **AWC 2015 PLY 0.469 ...**	Chord Size	: **2-2X6**	Cap. Adj. (2w/h)	: **1.00**
Optimize HD	: **Yes**	Top Pl & Sill	: **Spruce-Pine-Fir**	Stud Spacing	: **16 in**
HD Manufacturer	: **SIMPSON**	Top Pl Size	: **2-2X6**	K	: **1.00**
		Sill Pl Size	: **2X6**	HD Eccentricity	: **4.313 in**

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL

Required Cap	: .278	k/ft
Provided Cap	: .28	k/ft
Ratio	: .995	
Governing LC	: 15 (Seismic)	

CHORDS

Max Comp Force	: 4.629 k
Comp Capacity	: 4.656 k
Comp Ratio	: .994
Gov Comp LC	: 17
Max Tens Force	: 4.011 k
Tens Capacity	: 15.444 k
Tens Ratio	: .26
Gov Tens LC	: 29

STUDS

No gravity-only LC solved.

HOLD-DOWNS

Required Cap	: 4.085	k
Provided Cap	: 4.565	k
Ratio	: .895	
Governing LC	: 29	

DEFLECTIONS

Flexure Comp	: .041	in
Shear Comp	: .45	in
HD Elong	: .121	in
Tot Deflection	: .612	in
Governing LC	: 15	

DESIGN DETAILS

SELECTED SHEAR PANEL : S1_15/32_8d@6

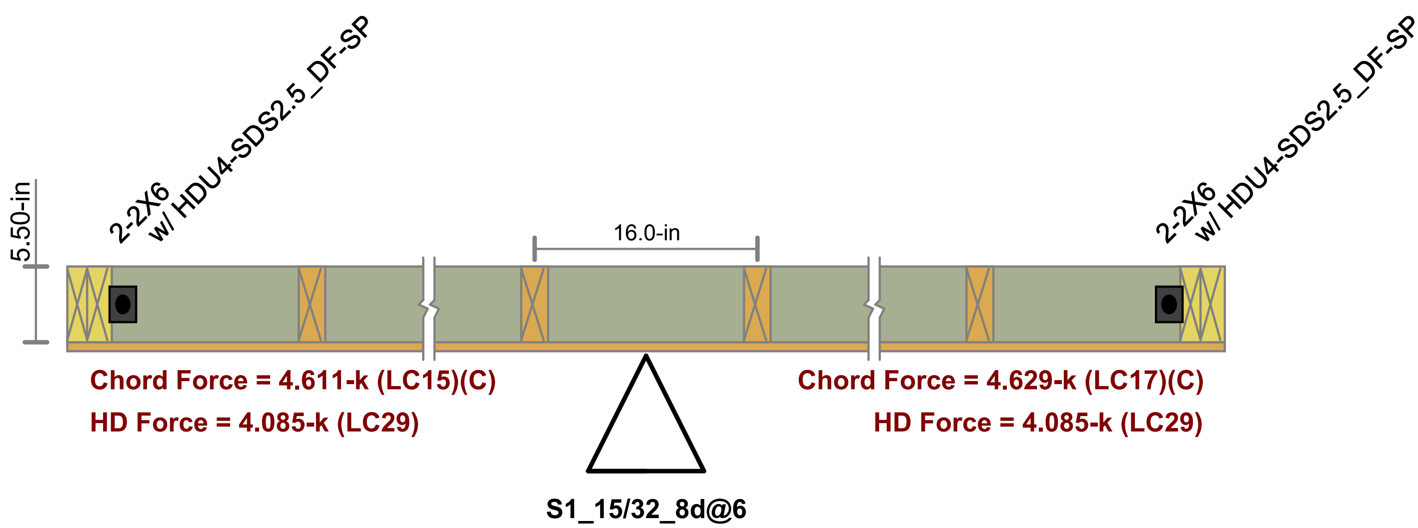
Panel Grade	: St-I		Nail Size	: 8d		Num Sides	: One	
Panel Thick	: 0.313	in	Reqd Pen	: 1.250	in	Over Gyp Brd.	: No	
			Reqd. Spacing	: 6	in	Shear Capacity	: 0.280	k/ft
						Adjusted Cap	: 0.280	k/ft

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

SELECTED HOLD-DOWN : HDU4-SDS2.5_DF-SP

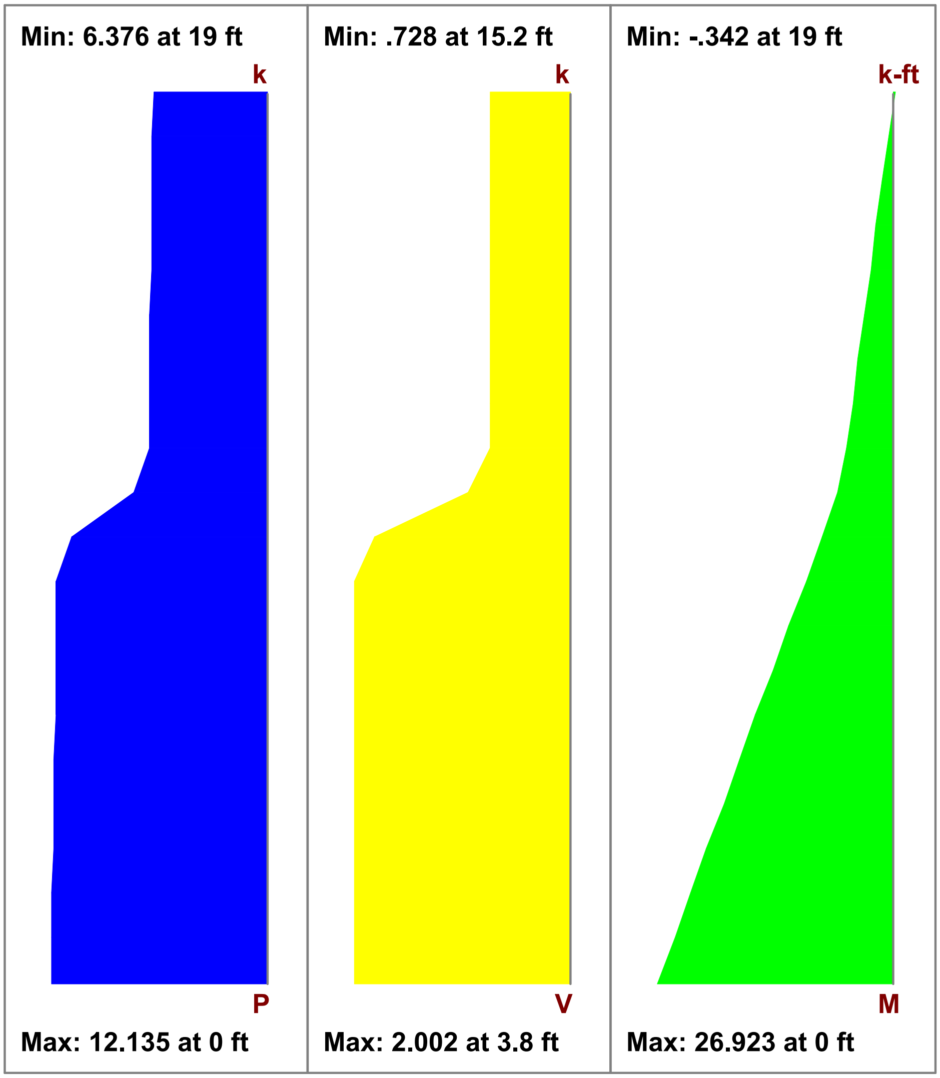
Min Chord Thk	: 3.00	in	Bolt Size:	: n/a	Base Cap(CD=1):	2.853	k
Reqd Chord Mat	: Douglas Fir				CD factor	: 1.6	
					Adjusted Cap	: 4.565	k

CROSS SECTION DETAILING



CRITERIA		MATERIALS		GEOMETRY	
Code	: AWC NDS-15:ASD	Wall Studs	: Spruce-Pine-Fir	Total Height	: 19 ft
		Stud Size	: 2X6	Total Length	: 8.667 ft
Wall Material	: Spruce-Pine-Fir	Chord Material	: Spruce-Pine-Fir	Region H/W	: 2.19
Panel Schedule	: User Selected	Chord Size	: 3-2X6	Cap. Adj. (2w/h)	: 0.91
Optimize HD	: Yes	Top Pl & Sill	: Spruce-Pine-Fir	Stud Spacing	: 16 in
HD Manufacturer	: SIMPSON	Top Pl Size	: 2-2X6	K	: 1.00
		Sill Pl Size	: 2X6	HD Eccentricity	: 5.813 in

ENVELOPE DIAGRAMS



DESIGN SUMMARY

SHEAR PANEL
Required Cap : .231 k/ft
Provided Cap : .255 k/ft
Ratio : .904
Governing LC : 16 (Seismic)

CHORDS
Max Comp Force: 4.227 k
Comp Capacity : 6.13 k
Comp Ratio : .69
Gov Comp LC : 18
Max Tens Force : .876 k
Tens Capacity : 23.166 k
Tens Ratio : .038
Gov Tens LC : 30

STUDS
No gravity-only LC solved.

HOLD-DOWNS
Required Cap : .909 k
Provided Cap : 3.075 k
Ratio : .296
Governing LC : 30

DEFLECTIONS
Flexure Comp : .042 in
Shear Comp : .399 in
HD Elong : 0 in
Tot Deflection : .441 in
Governing LC : 16

DESIGN DETAILS

SELECTED SHEAR PANEL : **S1_15/32_8d@6**

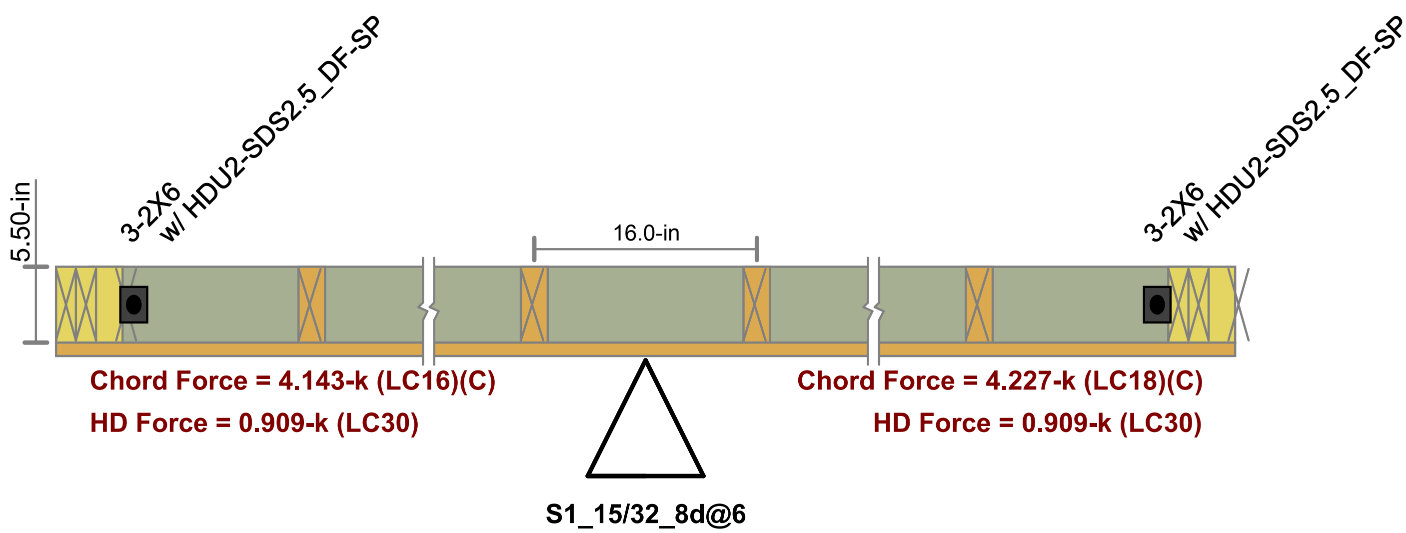
Panel Grade	: St-I		Nail Size	: 8d		Num Sides	: One	
Panel Thick	: 0.469	in	Reqd Pen	: 1.375	in	Over Gyp Brd.	: No	
			Reqd. Spacing	: 6	in	Shear Capacity	: 0.280	k/ft
						Adjusted Cap	: 0.255	k/ft

NOTE: AWC NDS-15 defines a 8d nail as being 2.5" x 0.1310" common, or 2.5" x 0.113" galvanized box

SELECTED HOLD-DOWN : **HDU2-SDS2.5_DF-SP**

Min Chord Thk	: 3.00	in	Bolt Size:	: n/a	Base Cap(CD=1):	1.922	k
Reqd Chord Mat	: Douglas Fir				CD factor	: 1.6	
					Adjusted Cap	: 3.075	k

CROSS SECTION DETAILING



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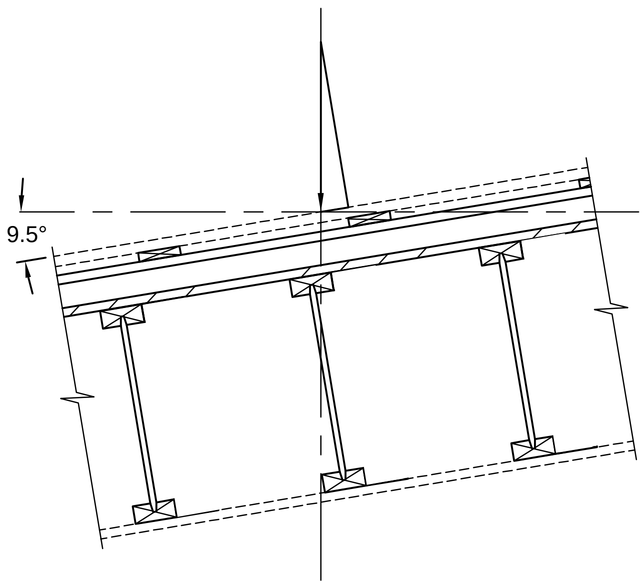
Oblique Angled I-Joist Framing Calculation

19 Duncan St. # 405, Toronto, M5H 3H1 **T 416.593.5300** | 31 King St. N., 2nd Fl., Waterloo, N2J 2W6 **T 519.616.0895** | blackwell.ca

LOOK AT OBLIQUE ANGLED I-JOIST FRAMING

LOOK AT LATERAL COMPONENT



NORMAL TO SURFACE LOADS:

SNOW: 192psf x sin9.5 = 31.7 psf TANGENTIAL

DEAD: 25psf x sin9.5 = 4.1 psf TANGENTIAL

BUILDING WIDTH = 16'-10" THEREFORE
TRIBUTARY WIDTH FOR EACH GRID IS 8'-5"

ALONG GRIDLINES 3&4 DESIGN FOR ADDITIONAL
SPECIFIED LOAD OF SL=267plf DL=34.5plf

LOOK AT ROOF DIAPHRAGM

MAXIMUM SHEAR IN DIAPHRAGM FROM SEISMIC = 5.2kips (10.4/2)
DIAPHRAGM DEPTH IS AXIS OF CONSIDERATION = 55'-0"
UNIT SHEAR FROM SEISMIC = 0.095kips/ft

UNIT SHEAR IN DIAPHRAGM FROM SNOW = 267plf X (1.60/1.15) = 0.371kips/ft
UNIT SHEAR IN DIPAHRAGM FROM DEAD = 34.5plf X (1.60/1) = 0.055kips/ft

**1.60/1.15 ADDED TO REMOVE DURATION FACTOR FOR VERIFYING IN NDS DIAPHRAGM TABLES.

VERFIY COVERNING LOAD COMPINATION FROM ASD DESIGN:

CASE 3: D + S ---------------------------> UNIT SHEAR = 0.426kip/ft

CASE 6b: D + 0.75L + 0.75(0.7E) + 0.75(0.3S) -------> UNIT SHEAR = 0.188kip/ft (GOVERNS)

CASE 8: 0.6D + 0.7E ---------------------------> UNIT SHEAR = 0.100kip/ft

LOOK AT BOTTOM CHORD.

- NO LOADING IS TO BE APPLIED DIRECTLY FROM BOTTOM CHORD.
- ON INSPECTION, BOTTOM CHORD IS INSUFFICIENT FOR WEAK AXIS BEANDING
- PROVIDE LOWER DIAPHRAGM FASTEN DIRECTLY TO JOISTS TO RESIST WEAK AXIS BENDING.

CEILING LOAD = 3psf
1/2 JOISTS WEIGHT = 4.9lb/ft x 1 JOIST x (1/1) SPACING = 4.9psf

Σ = 7.9psf

NORMAL COMPONENT: 7.8psf (RESISTED BY JOISTS)

TANGENTIAL: 1.32psf (RESISTED BY LOWER DIAPHRAGM)

MAX SHEAR IN LOW DIAPHRAGM = SPAN/2 x FORCE = 11.11lbs/ft (ASD)

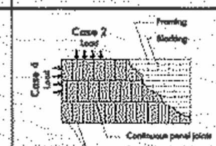
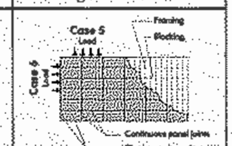
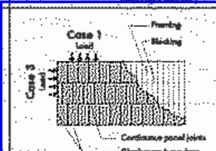
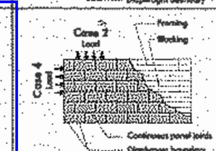
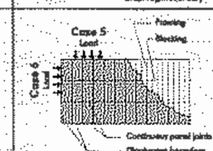
** ON INSPECTION, 5/8" GYPSUM CEILING IS SUFFICIENT TO RESIST LOAD.
** PROVIDE SOLID BLOCKING BETWEEN JOISTS @ 8" c/c FOR ADDITIONAL SUPPORT AND RIGIDITY.

Table 4.2A Nominal Unit Shear Capacities for Wood-Frame Diaphragms

Blocked Wood Structural Panel Diaphragms[1,2,3,4,5]

Sheathing Grade	Common Nail Size	Minimum Fastener Penetration in Framing Member or Blocking (in.)	Minimum Nominal Panel Thickness (in.)	Minimum Nominal Width of Nailed Face at Adjoining Panel Edges and Boundaries (in.)	A SEISMIC — Nail Spacing (in.) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 & 4), and at all panel edges (Cases 5 & 6): 6			4			2-1/2			2			B WIND — Nail Spacing (in.) at diaphragm boundaries (all cases), at continuous panel edges parallel to load (Cases 3 & 4), and at all panel edges (Cases 5 & 6): 6	4	2-1/2	2
					Nail Spacing (in.) at other panel edges (Cases 1, 2, 3, & 4): 6			6			4			3			Nail Spacing (in.) at other panel edges (Cases 1, 2, 3, & 4): 6	6	4	3
					v_s (plf)	G_a (kips/in.) OSB	PLY	v_s (plf)	G_a (kips/in.) OSB	PLY	v_s (plf)	G_a (kips/in.) OSB	PLY	v_s (plf)	G_a (kips/in.) OSB	PLY	v_w (plf)	v_w (plf)	v_w (plf)	v_w (plf)
Structural I	6d	1-1/4	5/16	2	370	15	12	500	8.5	7.5	750	12	10	840	20	15	520	700	1050	1175
				3	420	12	9.5	560	7.0	6.0	840	9.5	8.5	950	17	13	590	785	1175	1330
	8d	1-3/8	3/8	2	540	14	11	720	9.0	7.5	1060	13	10	1200	21	15	755	1010	1485	1680
				3	600	12	10	800	7.5	6.5	1200	10	9.0	1350	18	13	840	1120	1680	1890
	10d	1-1/2	15/32	2	640	24	17	850	15	12	1280	20	15	1460	31	21	895	1190	1790	2045
				3	720	20	15	960	12	9.5	1440	16	13	1640	26	18	1010	1345	2015	2295
Sheathing and Single-Floor	6d	1-1/4	5/16	2	340	15	10	450	9.0	7.0	670	13	9.5	760	21	13	475	630	940	1065
				3	380	12	9.0	500	7.0	6.0	760	10	8.0	860	17	12	530	700	1065	1205
			3/8	2	370	13	9.5	500	7.0	6.0	750	10	8.0	840	18	12	520	700	1050	1175
				3	420	10	8.0	560	5.5	5.0	840	8.5	7.0	950	14	10	590	785	1175	1330
	8d	1-3/8	3/8	2	480	15	11	640	9.5	7.5	960	13	9.5	1090	21	13	670	895	1345	1525
				3	540	12	9.5	720	7.5	6.0	1080	11	8.5	1220	18	12	755	1010	1510	1710
			7/16	2	510	14	10	680	8.5	7.0	1010	12	9.5	1150	20	13	715	950	1415	1610
				3	570	11	9.0	760	7.0	6.0	1140	10	8.0	1290	17	12	800	1065	1595	1805
			15/32	2	540	13	9.5	720	7.5	6.5	1060	11	8.5	1200	19	13	755	1010	1485	1680
				3	600	10	8.5	800	6.0	5.5	1200	9.0	7.5	1350	15	11	840	1120	1680	1890
	10d	1-1/2	15/32	2	580	25	15	770	15	11	1150	21	14	1310	33	18	810	1080	1610	1835
				3	650	21	14	860	12	9.5	1300	17	12	1470	28	16	910	1205	1820	2060
			19/32	2	640	21	14	850	13	9.5	1280	18	12	1460	28	17	895	1190	1790	2045
				3	720	17	12	960	10	8.0	1440	14	11	1640	24	15	1010	1345	2015	2295

1. Nominal unit shear capacities shall be adjusted in accordance with 4.2.3 to determine ASD allowable unit shear capacity and LRFD factored unit resistance. For general construction requirements see 4.2.6. For specific requirements, see 4.2.7.1 for wood structural panel diaphragms. See Appendix A for common nail dimensions.
2. For species and grades of framing other than Douglas-Fir-Larch or Southern Pine, reduced nominal unit shear capacities shall be determined by multiplying the tabulated nominal unit shear capacity by the Specific Gravity Adjustment Factor = [1-(0.5-G)], where G = Specific Gravity of the framing lumber from the *NDS* (Table 12.3.3A). The Specific Gravity Adjustment Factor shall not be greater than 1.
3. Apparent shear stiffness values, G_a, are based on nail slip in framing with moisture content less than or equal to 19% at time of fabrication and panel stiffness values for diaphragms constructed with either OSB or 3-ply plywood panels. When 4-ply or 5-ply plywood panels or composite panels are used, G_a values shall be permitted to be multiplied by 1.2.
4. Where moisture content of the framing is greater than 19% at time of fabrication, G_a values shall be multiplied by 0.5.
5. Diaphragm resistance depends on the direction of continuous panel joints with respect to the loading direction and direction of framing members, and is independent of the panel orientation.

	Cases 1&3: Continuous Panel Joints Perpendicular to Framing	**Cases 2&4**: Continuous Panel Joints Parallel to Framing	**Cases 5&6**: Continuous Panel Joints Perpendicular and Parallel to Framing
Long Panel Direction Perpendicular to Supports			
Long Panel Direction Parallel to Supports[a]			

(a) Panel span rating for out-of-plane loads may be lower than the span rating with the long panel direction perpendicular to supports (See Section 3.2.2 and Section 3.2.3)

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ANCHORAGE DESIGN

Anchorage Design Loads

Blackwell

Title: # Anchorage Design Envelope Loads & Cases

Notes: Using LFRD results

Project Name: Kimmelman May Residence
Project Number: 170266
Date: July 28, 2017

Volume 2, 3 and 4

Joint	X [k]	LC	Y [k]	LC	Z [k]	LC
N124	-0.038	7	4.421	11	-0.002	13
N127	-0.003	9	4.022	12	0	11
N177	-0.004	9	3.131	11	0	11
N179	-0.009	9	2.956	13	0	11
N180	-0.011	9	3.938	13	0	11
N181	0.024	13	23.694	7	0	9
N183	-0.009	9	7.174	11	0	11
N187	-0.028	9	9.196	13	0	7
N207	0	9	-0.302	11	0	9
N128	-5.298	7	-0.784	13	0	13
N107	-20.036	11	-4.601	9	-0.01	9
N107	19.986	9	7.225	11	0	11
N132	0	7	-12.891	12	-10.201	12
N125	-0.059	9	-6.627	11	-0.019	11
N129	-0.032	9	-17.113	11	0	11
N140	0	7	-4.235	12	-0.851	12
N141	0	7	-4.235	14	-1.042	8
N184	-8.923	11	-13.5	13	0	11
N186	-11.948	7	-11.643	13	-0.005	11
N275	-0.001	8	-16.668	13	0	11
N133	0	7	-13.368	14	0	11
N126	0	8	-43.831	13	0	11
N276	-0.022	9	-54.679	7	0	11
N135	-0.007	13	-1.99	13	-0.204	9
N142	-0.088	11	-0.571	11	0	9
N178	-0.023	9	-11.686	11	0	11
N139	-0.036	9	-25.625	11	0	7
N246	-13.551	7	-25.935	13	0	7

Volume 1

Joint	X [k]	LC	Y [k]	LC	Z [k]	LC
N44	-0.223	27	1.776	48	-0.406	44
N46	0.003	41	1.264	44	0.003	28
N47	-0.007	43	0.603	48	-0.003	28

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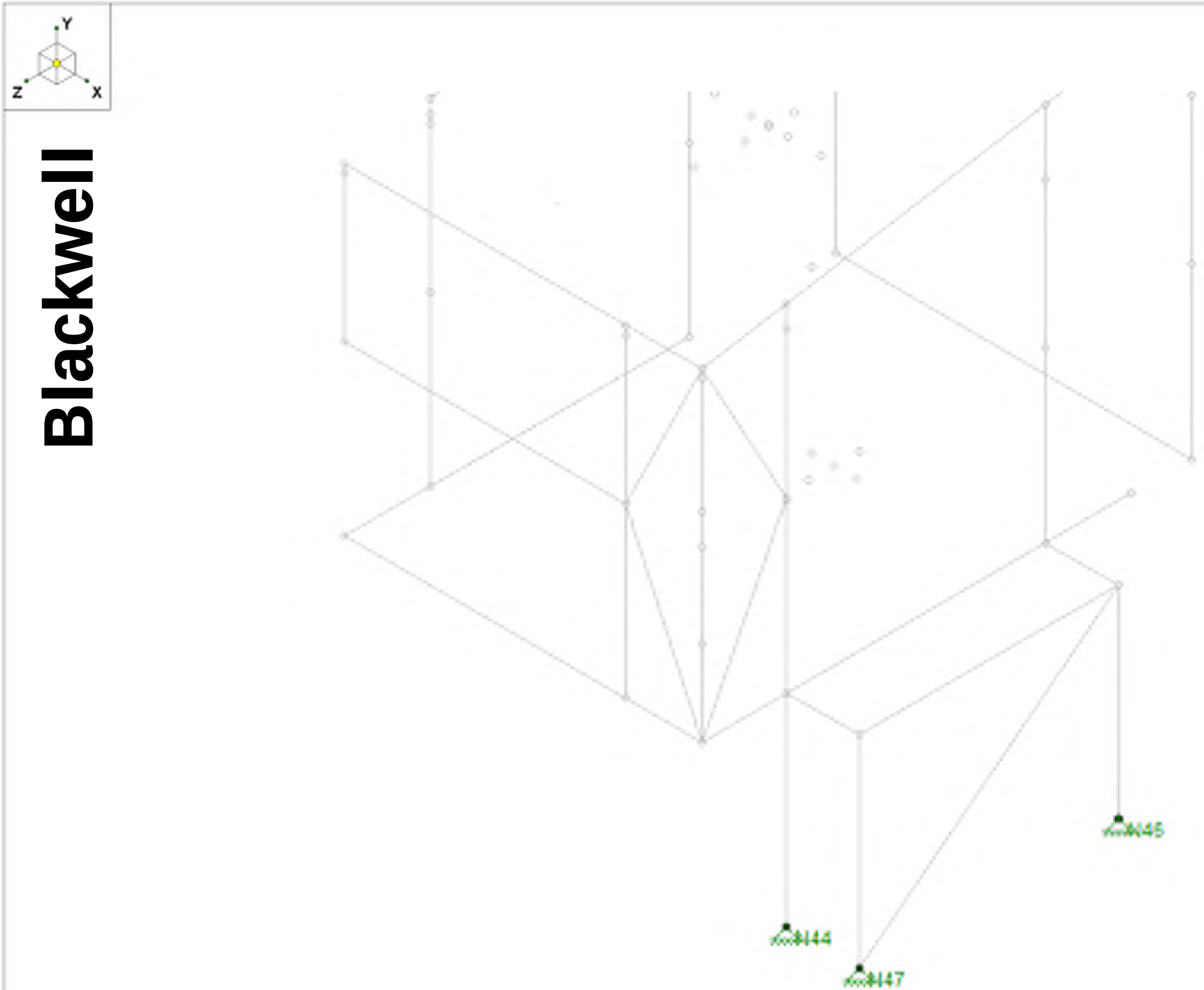
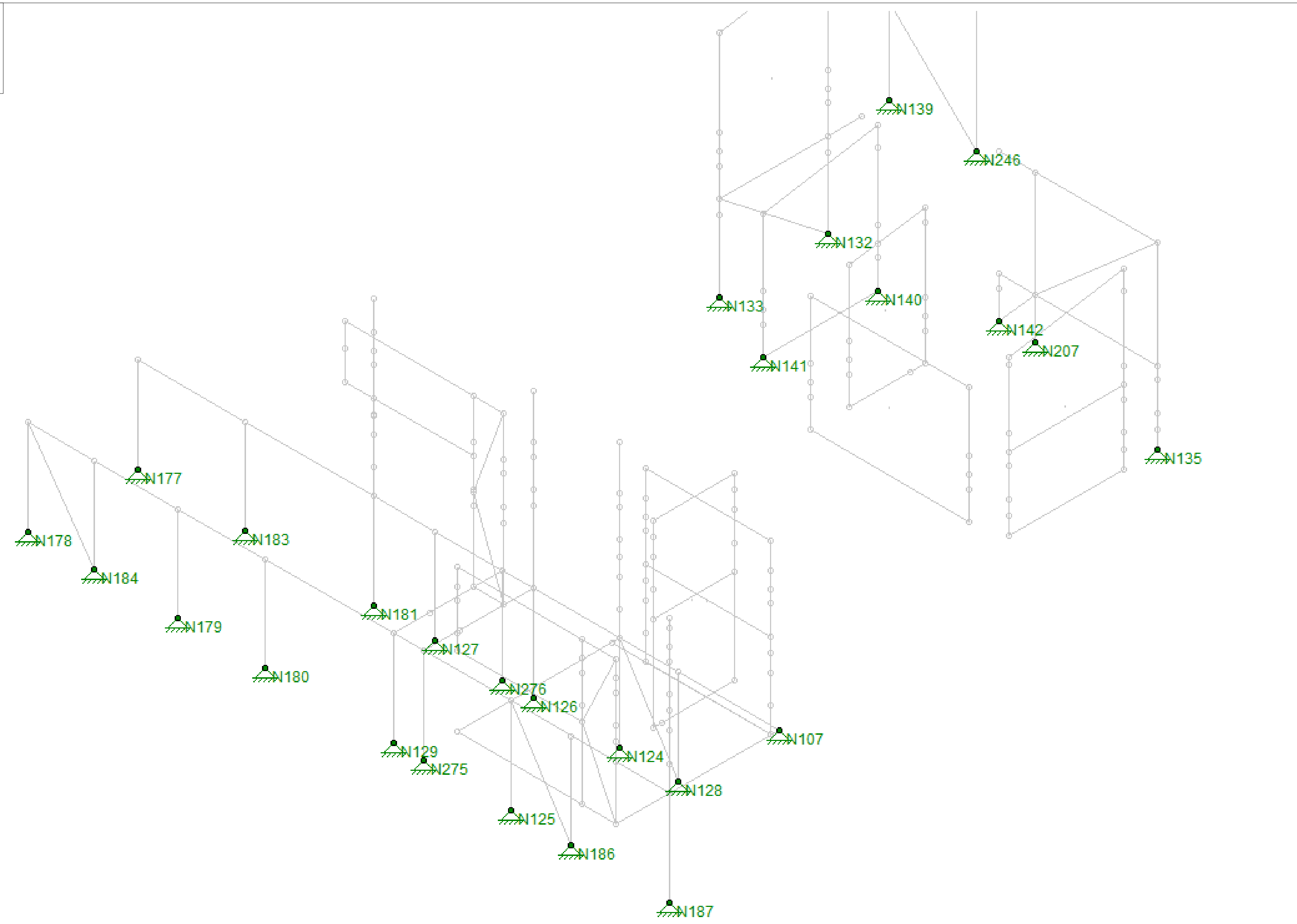


Blackwell Structural Engineers	Kimmelman May Residence Volume 1	BASE PLATE NODES
BG		July 26, 2017 at 6:27 PM
170266		Volume 1.rfl

Blackwell



Blackwell Structural Engineers	KMR V2 V3 V4 Lateral	BASE PLATE NODES
BG		July 27, 2017 at 5:11 PM
170266		KMR V2 V3 V4 Lateral System.r3d

Anchorage Design

BASE PLATE A (NOT IN USE)

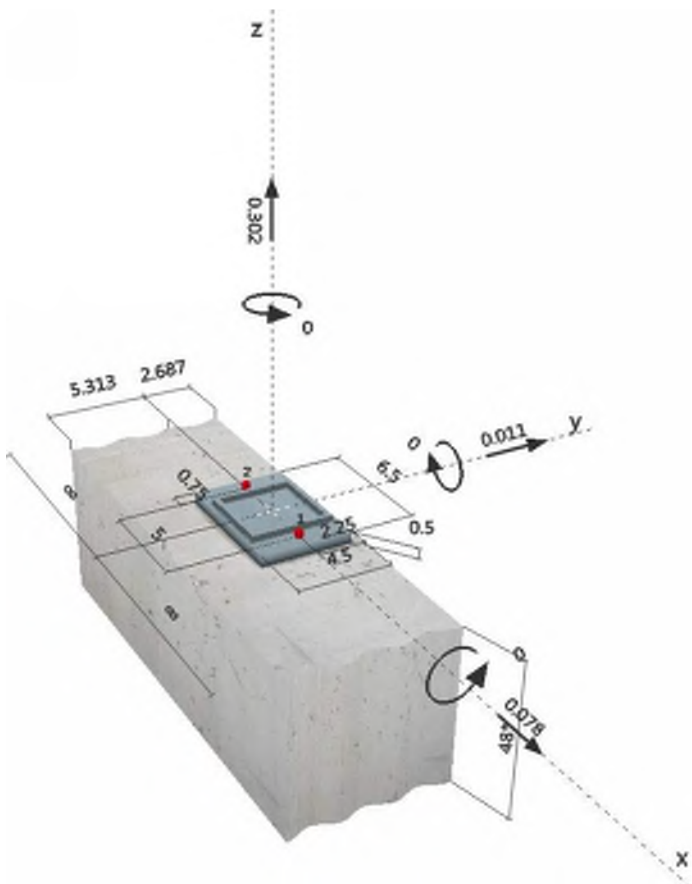
Company:	Blackwell Structural Engineers	Page:	1
Specifier:		Project:	Kimmelman May Res
Address:		Sub-Project I Pos. No.:	170266
Phone I Fax:	|	Date:	7/28/2017
E-Mail:			

Specifier's comments: Base Plate A

1 Input data

Anchor type and diameter:	**HIT-HY 200 + HIT-Z 3/8**
Effective embedment depth:	$h_{ef,opti}$ = 2.375 in. ($h_{ef,limit}$ = 4.500 in.)
Material:	DIN EN ISO 4042
Evaluation Service Report:	ESR-3187
Issued I Valid:	11/1/2016 | 3/1/2018
Proof:	Design method ACI 318-14 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 6.500 in. x 4.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

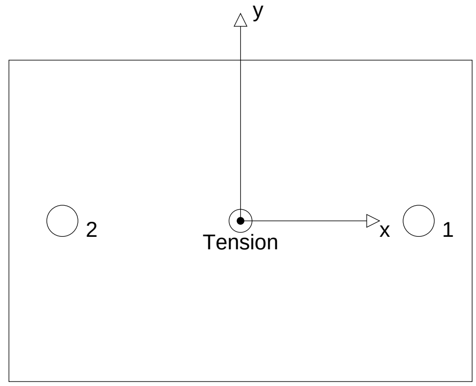
Geometry [in.] & Loading [kip, ft.kip]



Company:	Blackwell Structural Engineers	Page:	2
Specifier:		Project:	Kimmelman May Res
Address:		Sub-Project I Pos. No.:	170266
Phone I Fax:	|	Date:	7/28/2017
E-Mail:			

2 Load case/Resulting anchor forces

Load case: Design loads



Anchor reactions [kip]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	0.151	0.039	0.039	0.005
2	0.151	0.039	0.039	0.005

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 0.302 [kip]
resulting compression force in (x/y)=(0.000/0.000): 0.000 [kip]

3 Tension load

	Load N_{ua} [kip]	Capacity ϕ N_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	0.151	4.749	4	OK
Pullout Strength*	0.151	3.644	5	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Strength**	0.302	2.863	11	OK

* anchor having the highest loading **anchor group (anchors in tension)

3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ESR-3187
$\phi\ N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.08	94200

Calculations

N_{sa} [kip]
7.306

Results

N_{sa} [kip]	ϕ_{steel}	$\phi_{nonductile}$	$\phi\ N_{sa}$ [kip]	N_{ua} [kip]
7.306	0.650	1.000	4.749	0.151

3.2 Pullout Strength

$N_{pn} = N_p\ \lambda_a$ refer to ICC-ES ESR-3187
$\phi\ N_{pn} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

λ_a	N_p [kip]	$\alpha_{N,seis}$
1.000	7.952	0.940

Calculations

-
-

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{pn}$ [kip]	N_{ua} [kip]
7.475	0.650	0.750	1.000	3.644	0.151

3.3 Concrete Breakout Strength

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\, \psi_{ed,N}\, \psi_{c,N}\, \psi_{cp,N}\, N_b$	ACI 318-14 Eq. (17.4.2.1b)
$\phi\ N_{cbg} \geq N_{ua}$	ACI 318-14 Table 17.3.1.1
A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)	
$A_{Nc0} = 9\ h_{ef}^2$	ACI 318-14 Eq. (17.4.2.1c)
$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e_N'}{3\ h_{ef}}}\right) \leq 1.0$	ACI 318-14 Eq. (17.4.2.4)
$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$	ACI 318-14 Eq. (17.4.2.5b)
$\psi_{cp,N} = \mathrm{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$	ACI 318-14 Eq. (17.4.2.7b)
$N_b = k_c\, \lambda_a \sqrt{f_c'}\, h_{ef}^{1.5}$	ACI 318-14 Eq. (17.4.2.2a)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
2.375	0.000	0.000	2.687	1.000

c_{ac} [in.]	k_c	λ_a	f_c' [psi]
3.563	17	1.000	3500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
75.78	50.77	1.000	1.000	0.926	1.000	3.681

Results

N_{cbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{cbg}$ [kip]	N_{ua} [kip]
5.089	0.750	0.750	1.000	2.863	0.302

4 Shear load

	Load V_{ua} [kip]	Capacity ϕ V_n [kip]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	0.039	1.929	3	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Concrete Breakout Strength controls)**	0.079	3.563	3	OK
Concrete edge failure in direction y+**	0.079	1.963	5	OK

* anchor having the highest loading **anchor group (relevant anchors)

4.1 Steel Strength

$V_{sa} = \alpha_{V,seis} (0.6\ A_{se,V}\ f_{uta})$ refer to ICC-ES ESR-3187

$\phi\ V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]	$\alpha_{V,seis}$	$(0.6\ A_{se,V}\ f_{uta})$ [kip]
0.08	94200	1.000	3.215

Calculations

$V_{sa,eq}$ [kip]
3.215

Results

$V_{sa,eq}$ [kip]	ϕ_{steel}	$\phi_{nonductile}$	$\phi\ V_{sa}$ [kip]	V_{ua} [kip]
3.215	0.600	1.000	1.929	0.039

4.2 Pryout Strength (Concrete Breakout Strength controls)

$V_{cpg} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}} \right) \psi_{ec,N}\ \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b \right]$ ACI 318-14 Eq. (17.5.3.1b)

$\phi\ V_{cpg} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e'_N}{3\ h_{ef}}} \right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}} \right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}} \right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\ \lambda_a \sqrt{f'_c}\ h_{ef}^{1.5}$ ACI 318-14 Eq. (17.4.2.2a)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
1	2.375	0.000	0.000	2.687

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
1.000	3.563	17	1.000	3500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
75.78	50.77	1.000	1.000	0.926	1.000	3.681

Results

V_{cpg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cpg}$ [kip]	V_{ua} [kip]
5.089	0.700	1.000	1.000	3.563	0.079

4.3 Concrete edge failure in direction y+

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ec,V} \psi_{ed,V} \psi_{c,V} \psi_{h,V} \psi_{parallel,V} V_b$ — ACI 318-14 Eq. (17.5.2.1b)

$\phi\ V_{cbg} \geq V_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Vc} see ACI 318-14, Section 17.5.2.1, Fig. R 17.5.2.1(b)

$A_{Vc0} = 4.5\ c_{a1}^2$ — ACI 318-14 Eq. (17.5.2.1c)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{2e_V'}{3c_{a1}}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.5)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.6b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ — ACI 318-14 Eq. (17.5.2.8)

$V_b = \left(7 \left(\frac{l_e}{d_a}\right)^{0.2} \sqrt{d_a}\right) \lambda_a \sqrt{f_c'}\ c_{a1}^{1.5}$ — ACI 318-14 Eq. (17.5.2.2a)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
2.687	-	0.000	1.000	48.000

l_e [in.]	λ_a	d_a [in.]	f_c' [psi]	$\psi_{parallel,V}$
2.375	1.000	0.375	3500	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [kip]
52.64	32.49	1.000	1.000	1.000	1.616

Results

V_{cbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cbg}$ [kip]	V_{ua} [kip]
2.618	0.750	1.000	1.000	1.963	0.079

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.105	0.040	5/3	3	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

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6 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-14, Section 17.8.1.

Fastening meets the design criteria!

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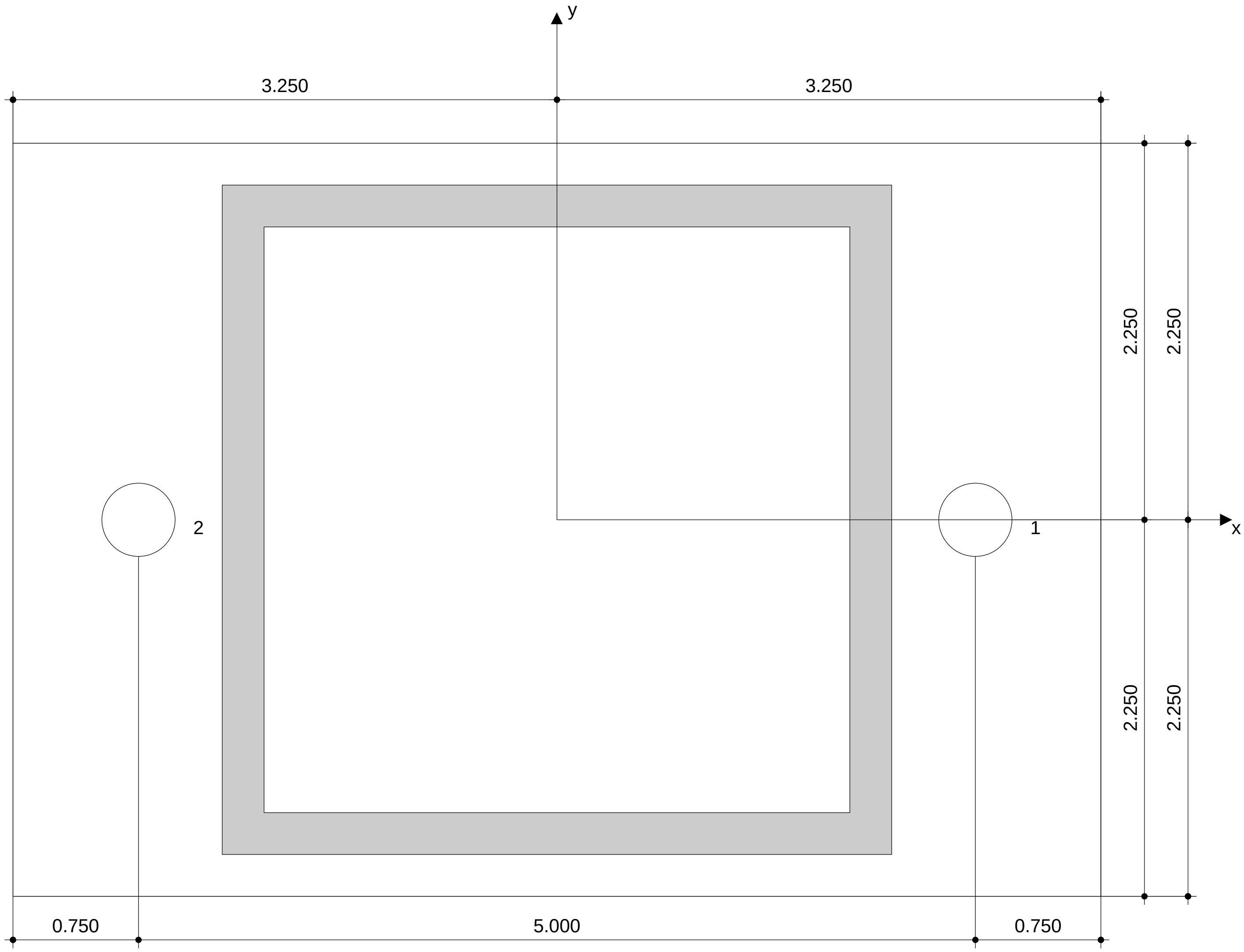
7 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.438 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: Hammer drilled
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: HIT-HY 200 + HIT-Z 3/8
Installation torque: 0.015 ft.kip
Hole diameter in the base material: 0.438 in.
Hole depth in the base material: 3.375 in.
Minimum thickness of the base material: 4.625 in.

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• No accessory required	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	2.500	0.000	-	-	5.313	2.687
2	-2.500	0.000	-	-	5.313	2.687

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8 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

BASE PLATE B

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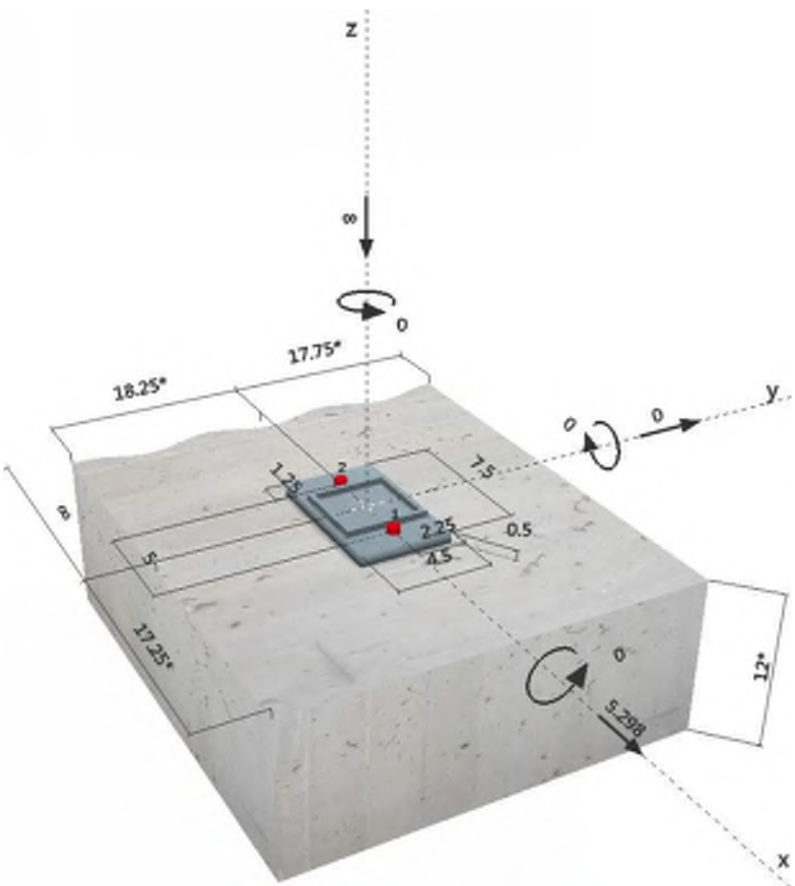
Specifier's comments: Base Plate B

1 Input data

Anchor type and diameter:	**HIT-HY 200 + HIT-Z 5/8**
Effective embedment depth:	$h_{ef,opti}$ = 3.750 in. ($h_{ef,limit}$ = 7.500 in.)
Material:	DIN EN ISO 4042
Evaluation Service Report:	ESR-3187
Issued I Valid:	11/1/2016 | 3/1/2018
Proof:	Design method ACI 318-14 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 7.500 in. x 4.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 12.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition B, shear: condition B; no supplemental splitting reinforcement present
	edge reinforcement: > No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



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2 Load case/Resulting anchor forces

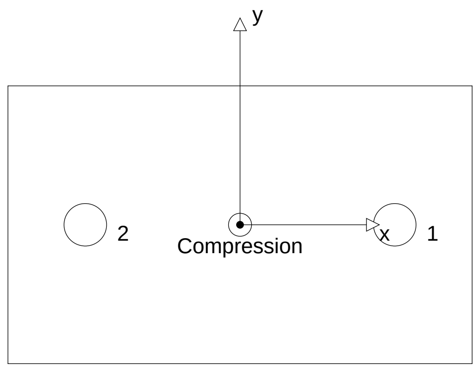
Load case: Design loads

Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	0.000	2.649	2.649	0.000
2	0.000	2.649	2.649	0.000

max. concrete compressive strain: 0.05 [‰]
max. concrete compressive stress: 237 [psi]
resulting tension force in (x/y)=(0.000/0.000): 0.000 [kip]
resulting compression force in (x/y)=(0.000/0.000): 8.000 [kip]



3 Tension load

	Load N_{ua} [kip]	Capacity ϕ N_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Pullout Strength*	N/A	N/A	N/A	N/A
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Strength**	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (anchors in tension)

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4 Shear load

	Load V_{ua} [kip]	Capacity ϕV_n [kip]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	2.649	3.656	73	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Concrete Breakout Strength controls)**	5.298	14.769	36	OK
Concrete edge failure in direction x+**	5.298	13.247	40	OK

* anchor having the highest loading **anchor group (relevant anchors)

4.1 Steel Strength

$V_{sa} = \alpha_{V,seis}\,(0.6\,A_{se,V}\,f_{uta})$ refer to ICC-ES ESR-3187

$\phi\ V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]	$\alpha_{V,seis}$	$(0.6\,A_{se,V}\,f_{uta})$ [kip]
0.23	94200	0.650	9.375

Calculations

$V_{sa,eq}$ [kip]
6.094

Results

$V_{sa,eq}$ [kip]	ϕ_{steel}	$\phi_{nonductile}$	$\phi\ V_{sa}$ [kip]	V_{ua} [kip]
6.094	0.600	1.000	3.656	2.649

4.2 Pryout Strength (Concrete Breakout Strength controls)

$V_{cpg} = k_{cp}\left[\left(\frac{A_{Nc}}{A_{Nc0}}\right)\psi_{ec,N}\,\psi_{ed,N}\,\psi_{c,N}\,\psi_{cp,N}\,N_b\right]$ ACI 318-14 Eq. (17.5.3.1b)

$\phi\ V_{cpg} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\,h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\,e_N'}{3\,h_{ef}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\,\lambda_a\,\sqrt{f_c'}\,h_{ef}^{1.5}$ ACI 318-14 Eq. (17.4.2.2a)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
2	3.750	0.000	0.000	14.750

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f_c' [psi]
1.000	5.625	17	1.000	3500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
182.81	126.56	1.000	1.000	1.000	1.000	7.303

Results

V_{cpg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cpg}$ [kip]	V_{ua} [kip]
21.099	0.700	1.000	1.000	14.769	5.298

4.3 Concrete edge failure in direction x+

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ec,V}\, \psi_{ed,V}\, \psi_{c,V}\, \psi_{h,V}\, \psi_{parallel,V}\, V_b$ — ACI 318-14 Eq. (17.5.2.1b)

$\phi\ V_{cbg} \geq V_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Vc} see ACI 318-14, Section 17.5.2.1, Fig. R 17.5.2.1(b)

$A_{Vc0} = 4.5\ c_{a1}^2$ — ACI 318-14 Eq. (17.5.2.1c)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{2e_V'}{3c_{a1}}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.5)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.6b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ — ACI 318-14 Eq. (17.5.2.8)

$V_b = \left(7 \left(\frac{l_e}{d_a}\right)^{0.2} \sqrt{d_a}\right) \lambda_a \sqrt{f_c'}\ c_{a1}^{1.5}$ — ACI 318-14 Eq. (17.5.2.2a)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
12.167	17.750	0.000	1.200	12.000

l_e [in.]	λ_a	d_a [in.]	f_c' [psi]	$\psi_{parallel,V}$
3.750	1.000	0.625	3500	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [kip]
432.00	666.13	1.000	0.992	1.233	19.882

Results

V_{cbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cbg}$ [kip]	V_{ua} [kip]
18.925	0.700	1.000	1.000	13.247	5.298

5 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-14, Section 17.8.1.

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Fastening meets the design criteria!

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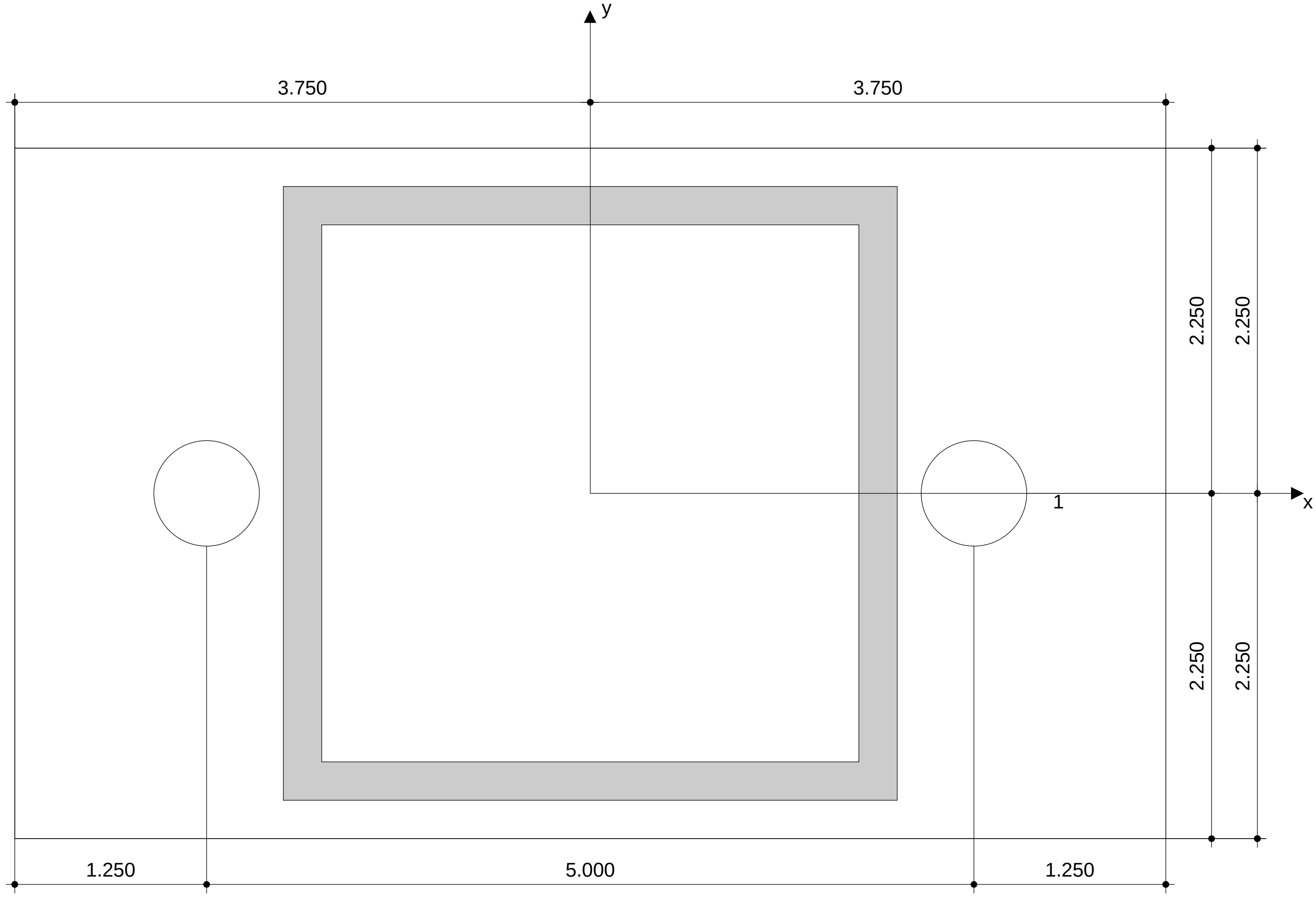
6 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.688 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: Hammer drilled
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: HIT-HY 200 + HIT-Z 5/8
Installation torque: 0.059 ft.kip
Hole diameter in the base material: 0.750 in.
Hole depth in the base material: 6.000 in.
Minimum thickness of the base material: 7.750 in.

6.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• No accessory required	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	2.500	0.000	-	14.750	18.250	17.750
2	-2.500	0.000	-	19.750	18.250	17.750

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7 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

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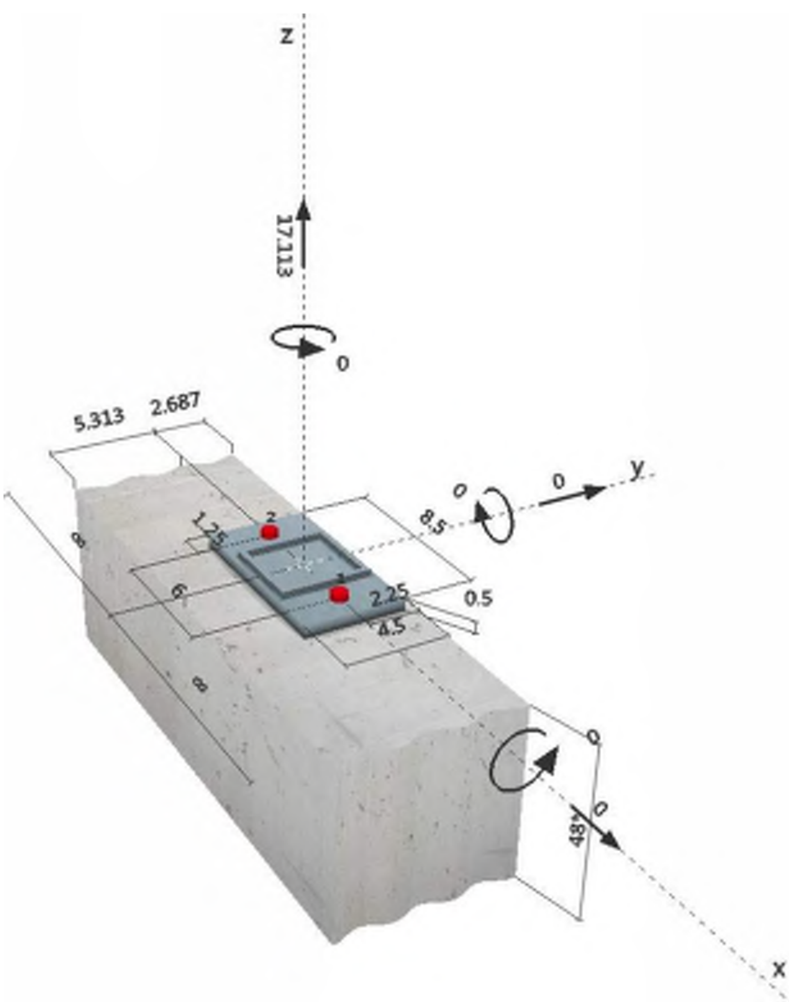
Specifier's comments: Base Plate C

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 3/4**
Effective embedment depth:	h_{ef} = 6.000 in.
Material:	ASTM F 1554
Proof:	Design method ACI 318-14 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 8.500 in. x 4.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in.
Reinforcement:	tension: condition A, shear: condition A; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b)) Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



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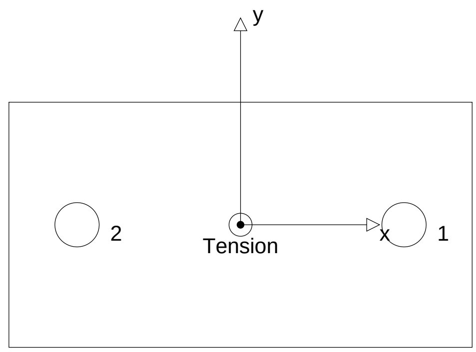
2 Load case/Resulting anchor forces

Load case: Design loads



Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	8.556	0.000	0.000	0.000
2	8.556	0.000	0.000	0.000

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 17.113 [kip]
resulting compression force in (x/y)=(0.000/0.000): 0.000 [kip]

3 Tension load

	Load N_{ua} [kip]	Capacity ϕN_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	8.556	14.529	59	OK
Pullout Strength*	8.556	13.392	64	OK
Concrete Breakout Strength**[1]	N/A	N/A	N/A	N/A
Concrete Side-Face Blowout, direction **	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (anchors in tension)
[1] Tension Anchor Reinforcement has been selected!

3.1 Steel Strength

$N_{sa} = A_{se,N} f_{uta}$ ACI 318-14 Eq. (17.4.1.2)
$\phi N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.33	58000

Calculations

N_{sa} [kip]
19.372

Results

N_{sa} [kip]	ϕ_{steel}	ϕN_{sa} [kip]	N_{ua} [kip]
19.372	0.750	14.529	8.556

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3.2 Pullout Strength

$N_{pN} = \psi_{c,p} N_p$ ACI 318-14 Eq. (17.4.3.1)

$N_p = 8 A_{brg} f'_c$ ACI 318-14 Eq. (17.4.3.4)

$\phi N_{pN} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$\psi_{c,p}$	A_{brg} [in.^{2}]	λ_a	f'_c [psi]
1.000	0.91	1.000	3500

Calculations

N_p [kip]
25.508

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕN_{pn} [kip]	N_{ua} [kip]
25.508	0.700	0.750	1.000	13.392	8.556

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4 Shear load

	Load V_{ua} [kip]	Capacity $\phi\, V_n$ [kip]	Utilization $\beta_V = V_{ua}/\phi\, V_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **[1]	N/A	N/A	N/A	N/A

* anchor having the highest loading   **anchor group (relevant anchors)

[1] Shear Anchor Reinforcement has been selected!

5 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.4.2.9 for information about Anchor Reinforcement.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.5.2.9 for information about Anchor Reinforcement.
- Anchor Reinforcement has been selected as a design option, calculations should be compared with PROFIS Anchor calculations.

Fastening meets the design criteria!

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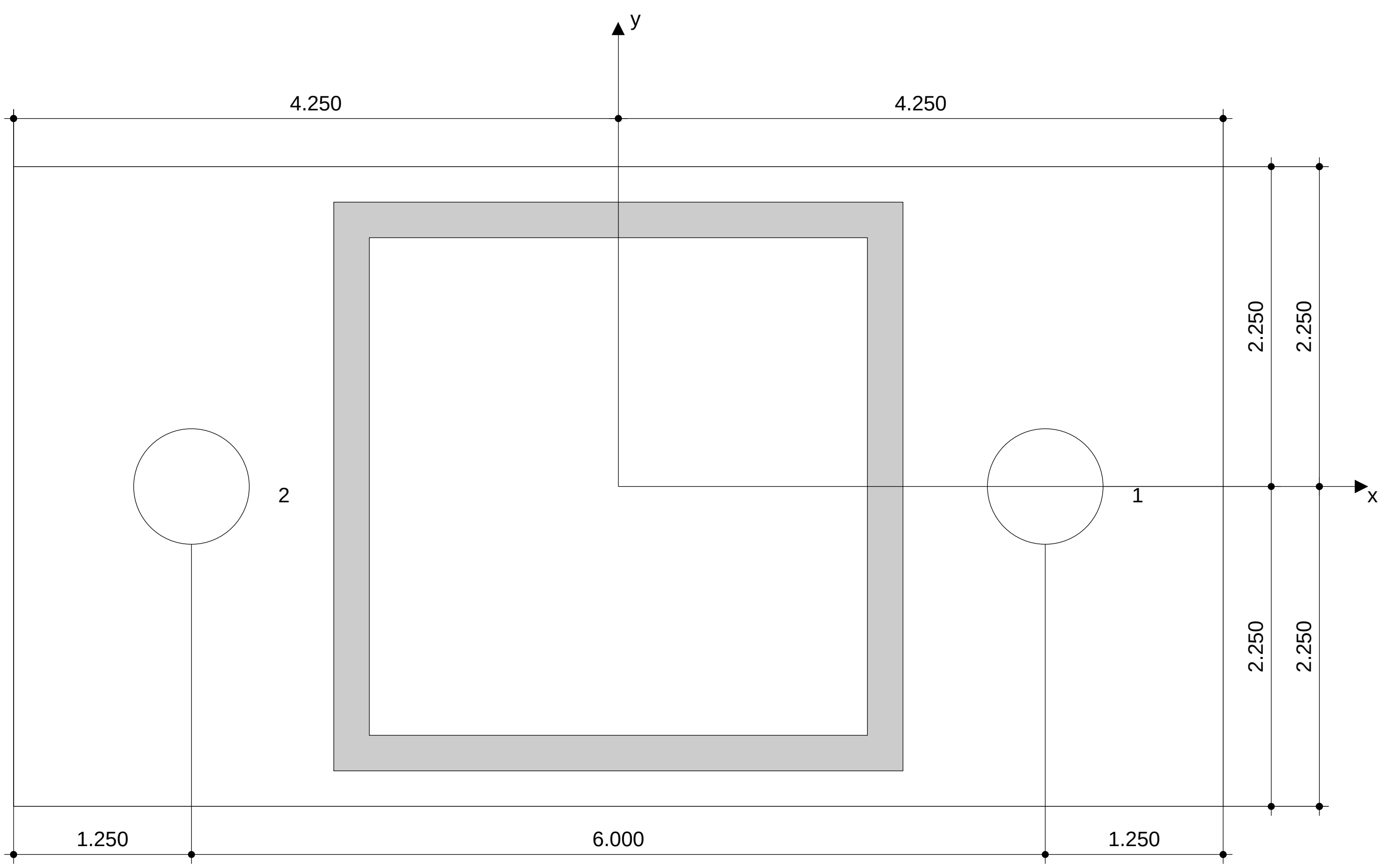
6 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.813 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: -
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: Heavy Hex Head ASTM F 1554 GR. 36 3/4
Installation torque: -
Hole diameter in the base material: - in.
Hole depth in the base material: 6.000 in.
Minimum thickness of the base material: 7.000 in.



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	3.000	0.000	-	-	5.313	2.687
2	-3.000	0.000	-	-	5.313	2.687

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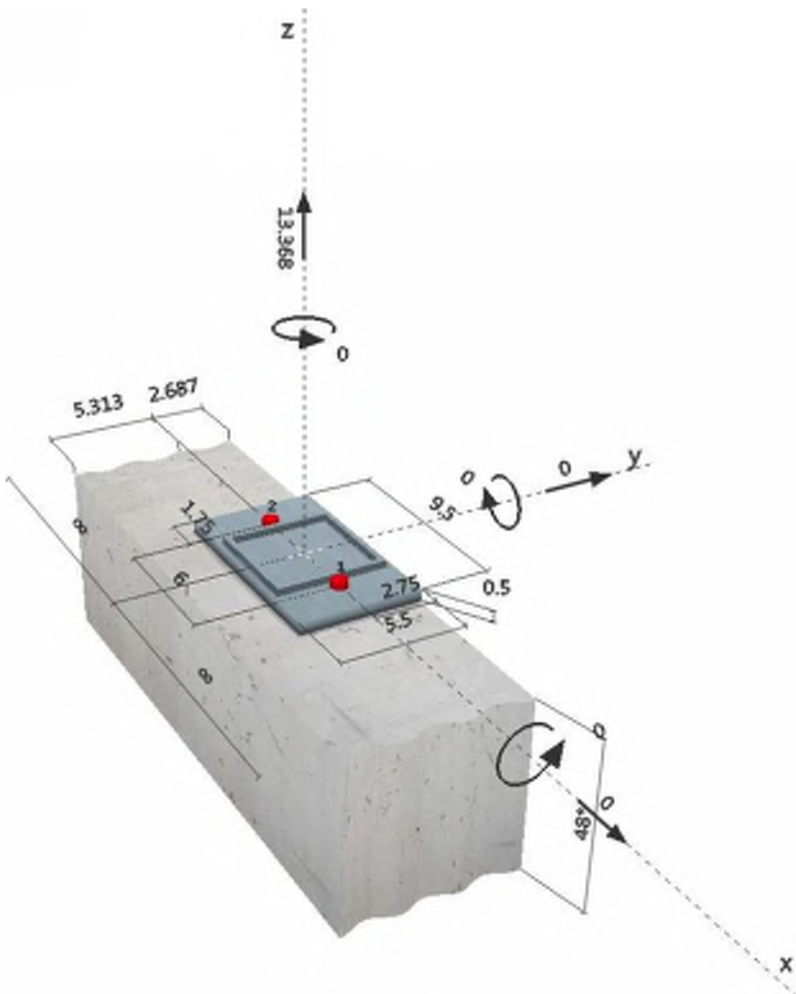
Specifier's comments: Base Plate C HSS5x5

1 Input data

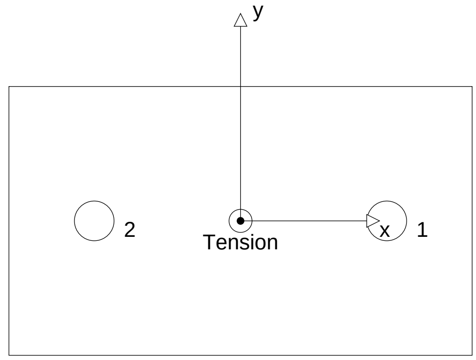
Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 3/4**
Effective embedment depth:	h_{ef} = 6.000 in.
Material:	ASTM F 1554
Proof:	Design method ACI 318-14 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 9.500 in. x 5.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 5.000 in. x 5.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in.
Reinforcement:	tension: condition A, shear: condition A; anchor reinforcement: tension, shear
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



2 Load case/Resulting anchor forces

Load case: Design loads



Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	6.684	0.000	0.000	0.000
2	6.684	0.000	0.000	0.000

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 13.368 [kip]
resulting compression force in (x/y)=(0.000/0.000): 0.000 [kip]

3 Tension load

	Load N_{ua} [kip]	Capacity ϕN_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	6.684	14.529	47	OK
Pullout Strength*	6.684	13.392	50	OK
Concrete Breakout Strength**[1]	N/A	N/A	N/A	N/A
Concrete Side-Face Blowout, direction **	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (anchors in tension)

[1] Tension Anchor Reinforcement has been selected!

3.1 Steel Strength

$N_{sa} = A_{se,N} f_{uta}$ ACI 318-14 Eq. (17.4.1.2)

$\phi N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.33	58000

Calculations

N_{sa} [kip]
19.372

Results

N_{sa} [kip]	ϕ_{steel}	ϕN_{sa} [kip]	N_{ua} [kip]
19.372	0.750	14.529	6.684

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3.2 Pullout Strength

$N_{pN} = \psi_{c,p} N_p$	ACI 318-14 Eq. (17.4.3.1)
$N_p = 8 A_{brg} f'_c$	ACI 318-14 Eq. (17.4.3.4)
$\phi\ N_{pN} \geq N_{ua}$	ACI 318-14 Table 17.3.1.1

Variables

$\psi_{c,p}$	A_{brg} [in.^{2}]	λ_a	f'_c [psi]
1.000	0.91	1.000	3500

Calculations

N_p [kip]
25.508

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{pn}$ [kip]	N_{ua} [kip]
25.508	0.700	0.750	1.000	13.392	6.684

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4 Shear load

	Load V_{ua} [kip]	Capacity ϕV_n [kip]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **[1]	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (relevant anchors)

[1] Shear Anchor Reinforcement has been selected!

5 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.4.2.9 for information about Anchor Reinforcement.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.5.2.9 for information about Anchor Reinforcement.
- Anchor Reinforcement has been selected as a design option, calculations should be compared with PROFIS Anchor calculations.

Fastening meets the design criteria!

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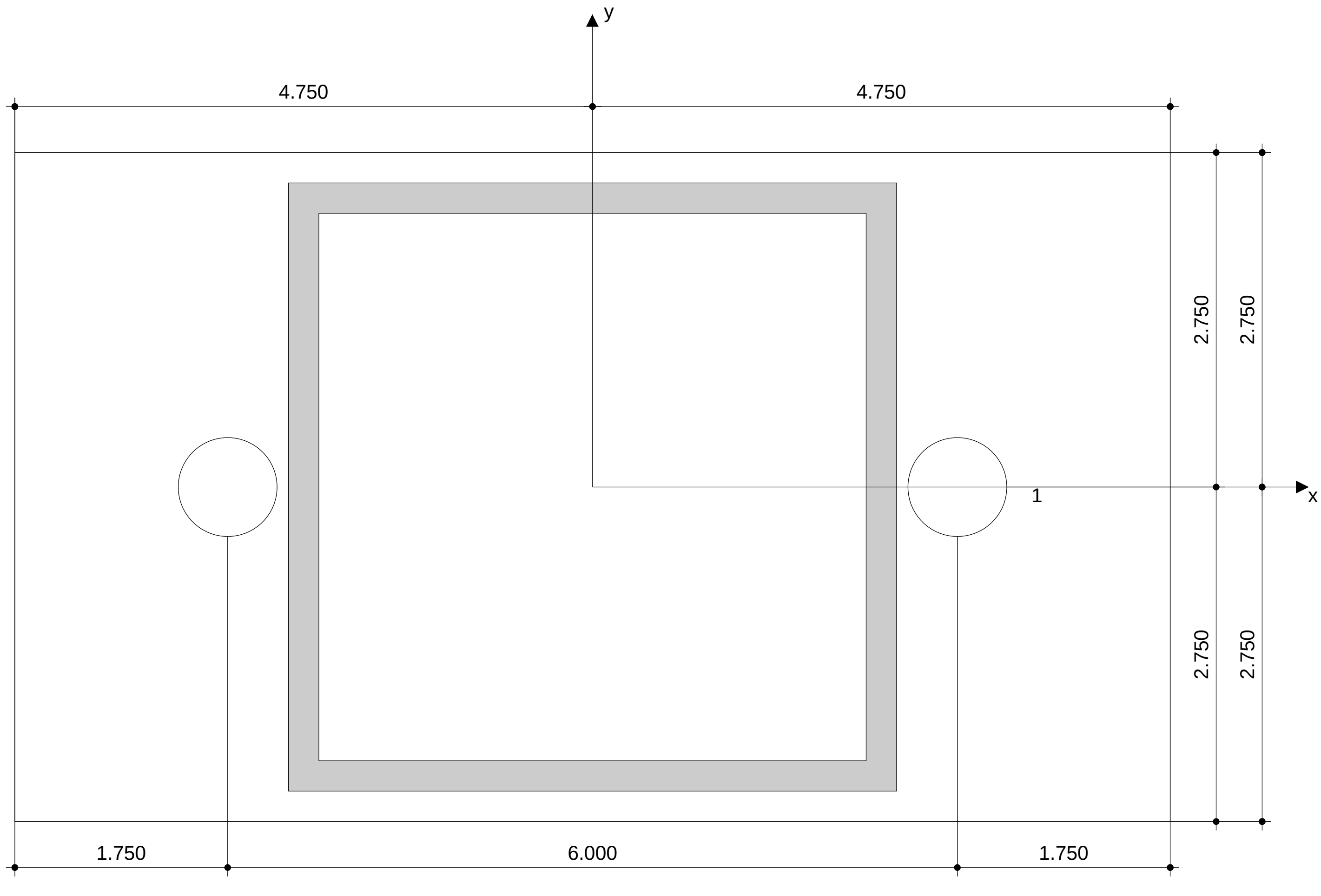
6 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 5.000 x 5.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.813 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: -
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: Heavy Hex Head ASTM F 1554 GR. 36 3/4
Installation torque: -
Hole diameter in the base material: - in.
Hole depth in the base material: 6.000 in.
Minimum thickness of the base material: 7.000 in.



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	3.000	0.000	-	-	5.313	2.687
2	-3.000	0.000	-	-	5.313	2.687

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BASE PLATE D

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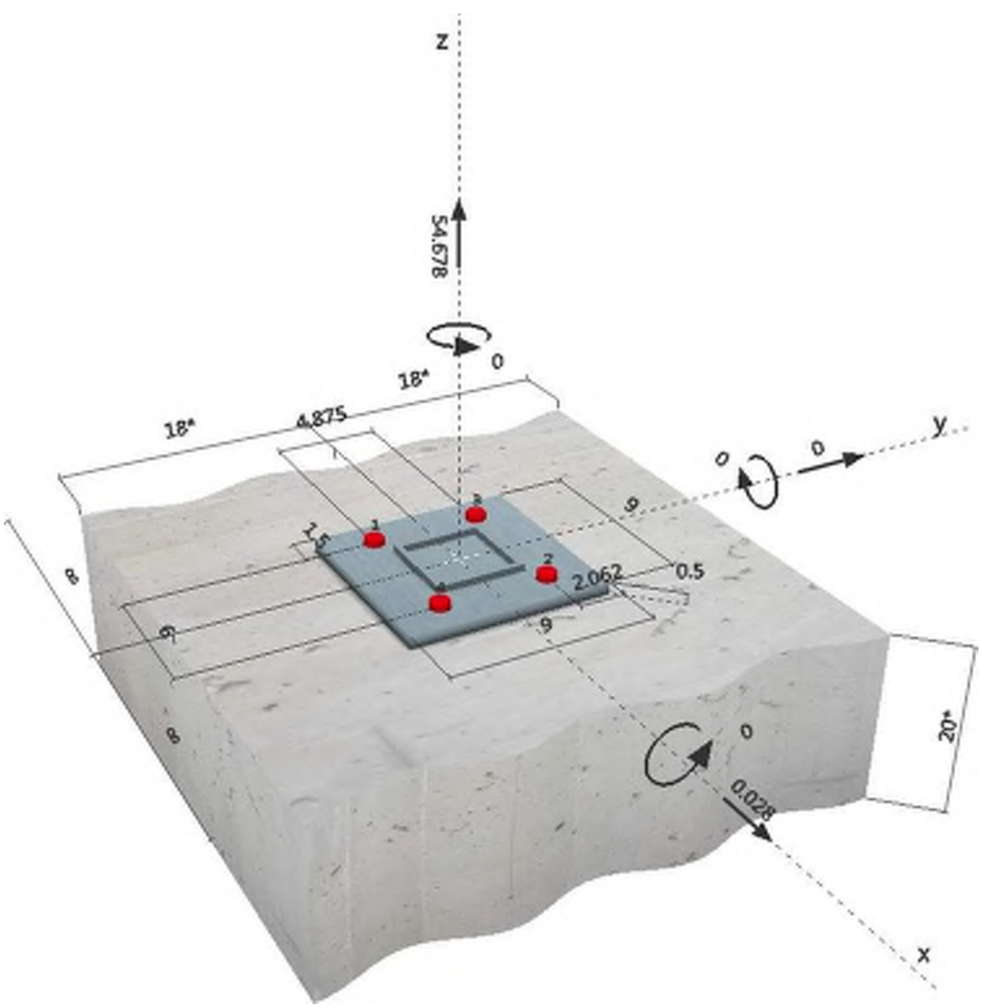
Specifier's comments: Base Plate D

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 7/8**
Effective embedment depth:	h_{ef} = 6.000 in.
Material:	ASTM F 1554
Proof:	Design method ACI 318-14 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 9.000 in. x 9.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 20.000 in.
Reinforcement:	tension: condition A, shear: condition B; anchor reinforcement: tension
	edge reinforcement: > No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



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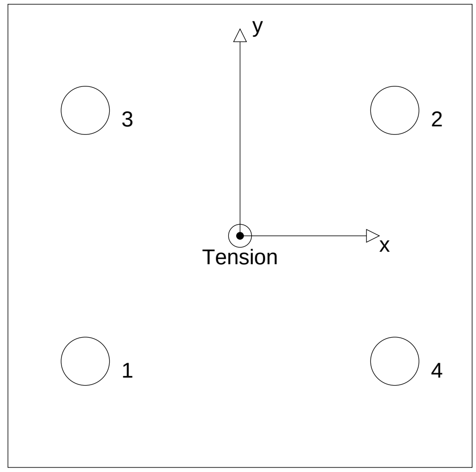
2 Load case/Resulting anchor forces



Load case: Design loads

Anchor reactions [kip]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	13.672	0.007	0.007	0.000
2	13.667	0.007	0.007	0.000
3	13.667	0.007	0.007	0.000
4	13.672	0.007	0.007	0.000

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 54.678 [kip]
resulting compression force in (x/y)=(0.000/0.000): 0.000 [kip]

3 Tension load

	Load N_{ua} [kip]	**Capacity $\phi\, N_n$ [kip]**	**Utilization $\beta_N = N_{ua}/\phi\, N_n$**	**Status**
Steel Strength*	13.672	20.097	69	OK
Pullout Strength*	13.672	17.464	79	OK
Concrete Breakout Strength**[1]	N/A	N/A	N/A	N/A
Concrete Side-Face Blowout, direction **	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (anchors in tension)
[1] Tension Anchor Reinforcement has been selected!

3.1 Steel Strength

$N_{sa} = A_{se,N}\, f_{uta}$ ACI 318-14 Eq. (17.4.1.2)
$\phi\, N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.46	58000

Calculations

N_{sa} [kip]
26.796

Results

N_{sa} [kip]	ϕ_{steel}	$\phi\, N_{sa}$ [kip]	N_{ua} [kip]
26.796	0.750	20.097	13.672

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3.2 Pullout Strength

$N_{pN} = \psi_{c,p} N_p$ ACI 318-14 Eq. (17.4.3.1)

$N_p = 8 A_{brg} f'_c$ ACI 318-14 Eq. (17.4.3.4)

$\phi N_{pN} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$\psi_{c,p}$	A_{brg} [in.^{2}]	λ_a	f'_c [psi]
1.000	1.19	1.000	3500

Calculations

N_p [kip]
33.264

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕN_{pn} [kip]	N_{ua} [kip]
33.264	0.700	0.750	1.000	17.464	13.672

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4 Shear load

	Load V_{ua} [kip]	Capacity ϕV_n [kip]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	0.007	10.450	1	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength**	0.028	49.500	1	OK
Concrete edge failure in direction y+**	0.028	28.681	1	OK

* anchor having the highest loading **anchor group (relevant anchors)

4.1 Steel Strength

$V_{sa} = 0.6\, A_{se,V}\, f_{uta}$ ACI 318-14 Eq. (17.5.1.2b)

$\phi\, V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.46	58000

Calculations

V_{sa} [kip]
16.078

Results

V_{sa} [kip]	ϕ_{steel}	$\phi\, V_{sa}$ [kip]	V_{ua} [kip]
16.078	0.650	10.450	0.007

4.2 Pryout Strength

$V_{cpg} = k_{cp} \left[\left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\, \psi_{ed,N}\, \psi_{c,N}\, \psi_{cp,N}\, N_b\right]$ ACI 318-14 Eq. (17.5.3.1b)

$\phi\, V_{cpg} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\, h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\, e'_N}{3\, h_{ef}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \mathrm{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\, \lambda_a \sqrt{f'_c}\, h_{ef}^{1.5}$ ACI 318-14 Eq. (17.4.2.2a)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
2	6.000	0.000	0.001	15.562

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f'_c [psi]
1.000	-	24	1.000	3500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
549.00	324.00	1.000	1.000	1.000	1.000	20.868

Results

V_{cpg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\, V_{cpg}$ [kip]	V_{ua} [kip]
70.714	0.700	1.000	1.000	49.500	0.028

4.3 Concrete edge failure in direction y+

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ec,V}\, \psi_{ed,V}\, \psi_{c,V}\, \psi_{h,V}\, \psi_{parallel,V}\, V_b$ ACI 318-14 Eq. (17.5.2.1b)

$\phi\ V_{cbg} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Vc} see ACI 318-14, Section 17.5.2.1, Fig. R 17.5.2.1(b)

$A_{Vc0} = 4.5\ c_{a1}^2$ ACI 318-14 Eq. (17.5.2.1c)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{2e_V'}{3c_{a1}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.5.2.5)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ ACI 318-14 Eq. (17.5.2.6b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ ACI 318-14 Eq. (17.5.2.8)

$V_b = 9\ \lambda_a \sqrt{f_c'}\ c_{a1}^{1.5}$ ACI 318-14 Eq. (17.5.2.2b)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
15.562	-	0.000	1.200	20.000

l_e [in.]	λ_a	d_a [in.]	f_c' [psi]	$\psi_{parallel,V}$
6.000	1.000	0.875	3500	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [kip]
1053.72	1089.79	1.000	1.000	1.080	32.687

Results

V_{cbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cbg}$ [kip]	V_{ua} [kip]
40.973	0.700	1.000	1.000	28.681	0.028

5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.783	-	1.000	66	OK

$\beta_{NV} = (\beta_N + \beta_V) / 1.2 <= 1$

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6 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.4.2.9 for information about Anchor Reinforcement.
- Anchor Reinforcement has been selected as a design option, calculations should be compared with PROFIS Anchor calculations.

Fastening meets the design criteria!

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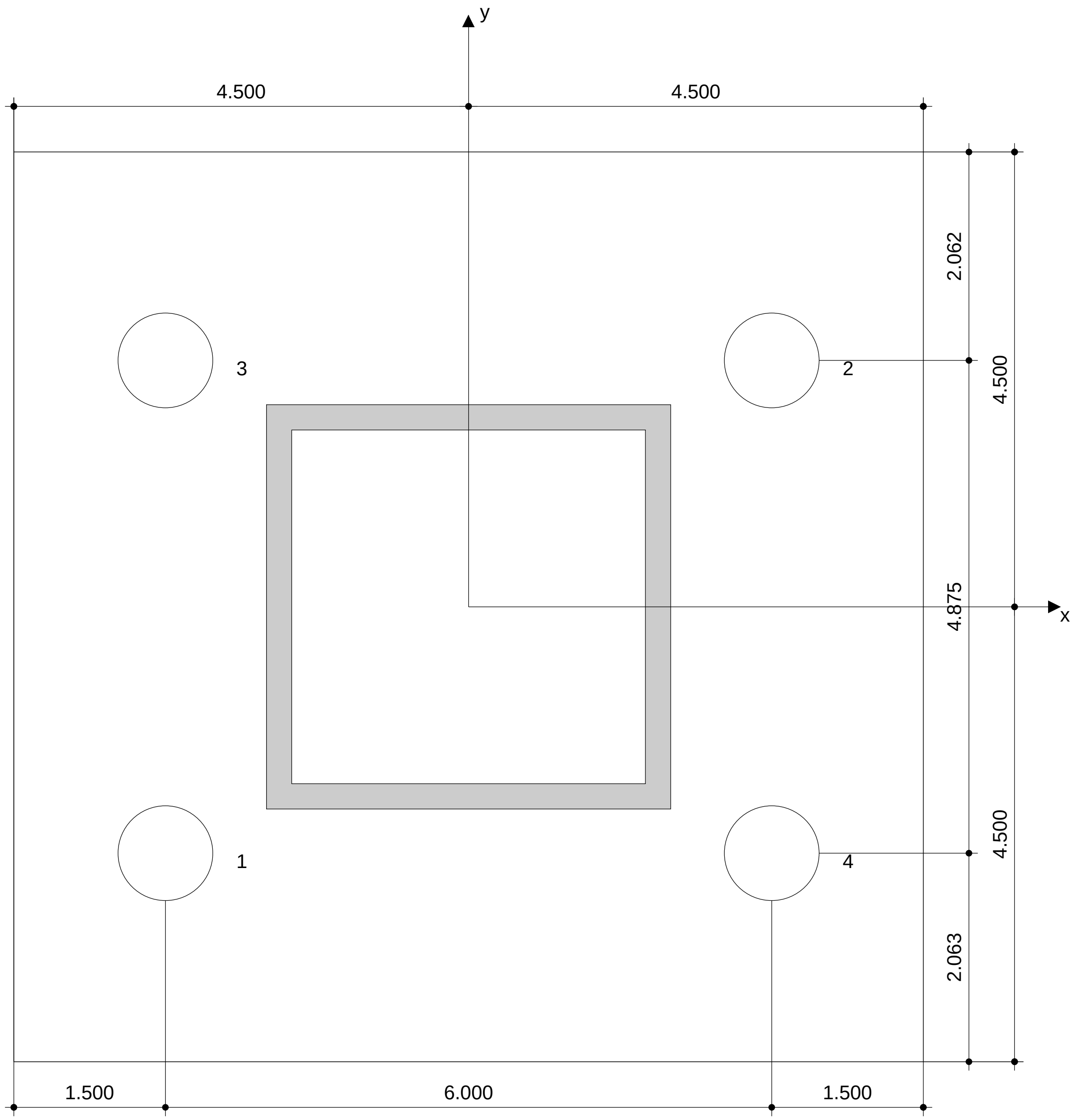
7 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.938 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: -
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: Heavy Hex Head ASTM F 1554 GR. 36 7/8
Installation torque: -
Hole diameter in the base material: - in.
Hole depth in the base material: 6.000 in.
Minimum thickness of the base material: 7.052 in.



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-3.000	-2.437	-	-	15.563	20.437
2	3.000	2.438	-	-	20.438	15.562
3	-3.000	2.438	-	-	20.438	15.562
4	3.000	-2.437	-	-	15.563	20.437

8 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

BASE PLATE E

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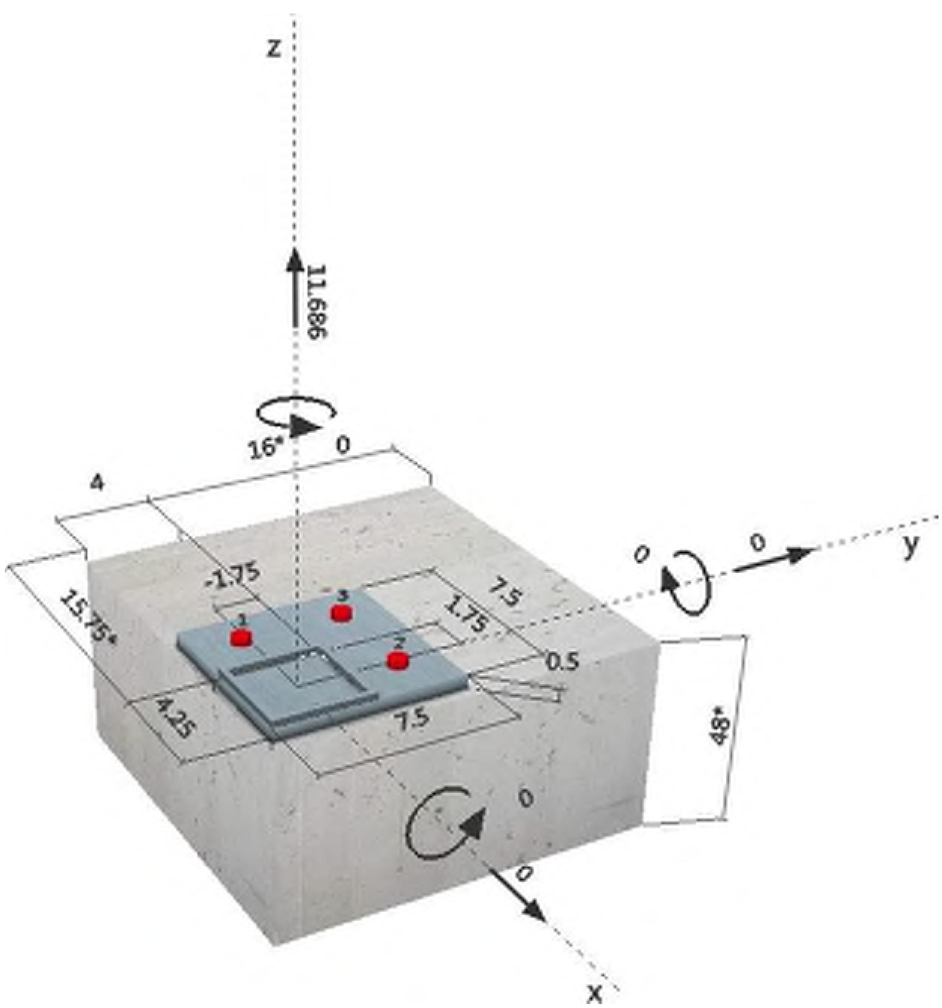
Specifier's comments: Base Plate E

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 3/4**
Effective embedment depth:	h_{ef} = 6.000 in.
Material:	ASTM F 1554
Proof:	Design method ACI 318-14 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 7.500 in. x 7.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in.
Reinforcement:	tension: condition A, shear: condition A; anchor reinforcement: tension, shear
	edge reinforcement: > No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



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2 Load case/Resulting anchor forces

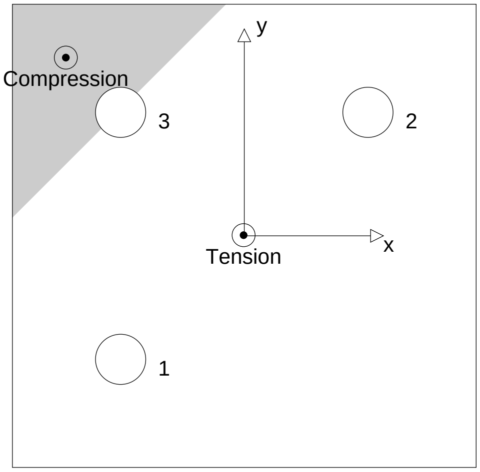
Load case: Design loads

Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	9.370	0.000	0.000	0.000
2	9.370	0.000	0.000	0.000
3	0.103	0.000	0.000	0.000

max. concrete compressive strain: 0.83 [‰]
max. concrete compressive stress: 3596 [psi]
resulting tension force in (x/y)=(-0.011/0.011): 18.843 [kip]
resulting compression force in (x/y)=(-2.886/2.886): 7.157 [kip]



3 Tension load

	Load N_{ua} [kip]	Capacity ϕ N_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	9.370	14.529	65	OK
Pullout Strength*	9.370	13.392	70	OK
Concrete Breakout Strength**[1]	N/A	N/A	N/A	N/A
Concrete Side-Face Blowout, direction y-**	9.370	10.164	93	OK

* anchor having the highest loading **anchor group (anchors in tension)
[1] Tension Anchor Reinforcement has been selected!

3.1 Steel Strength

$N_{sa} = A_{se,N} f_{uta}$ ACI 318-14 Eq. (17.4.1.2)
$\phi N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.33	58000

Calculations

N_{sa} [kip]
19.372

Results

N_{sa} [kip]	ϕ_{steel}	ϕ N_{sa} [kip]	N_{ua} [kip]
19.372	0.750	14.529	9.370

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3.2 Pullout Strength

$N_{pN} = \psi_{c,p} N_p$ ACI 318-14 Eq. (17.4.3.1)

$N_p = 8 A_{brg} f'_c$ ACI 318-14 Eq. (17.4.3.4)

$\phi\ N_{pN} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$\psi_{c,p}$	A_{brg} [in.^{2}]	λ_a	f'_c [psi]
1.000	0.91	1.000	3500

Calculations

N_p [kip]
25.508

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{pn}$ [kip]	N_{ua} [kip]
25.508	0.700	0.750	1.000	13.392	9.370

3.3 Concrete Side-Face Blowout, direction y-

$N_{sb} = 160\ c_{a1} \sqrt{A_{brg}}\ \lambda_a \sqrt{f'_c}$ ACI 318-14 Eq. (17.4.4.1)

$N_{sbg} = \alpha_{group} N_{sb}$ ACI 318-14 Eq. (17.4.4.2)

$\phi\ N_{sbg} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

$\alpha_{group} = \left(1 + \frac{s}{6\ c_{a1}}\right)$ see ACI 318-14, Section 17.4.4.2, Eq. (17.4.4.2)

Variables

c_{a1} [in.]	c_{a2} [in.]	A_{brg} [in.^{2}]	λ_a	f'_c [psi]	s [in.]
2.000	6.250	0.00	1.000	3500	-

Calculations

α_{group}	N_{sb} [kip]
1.000	18.069

Results

N_{sbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{sbg}$ [kip]	$N_{ua,edge}$ [kip]
18.069	0.750	0.750	1.000	10.164	9.370

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4 Shear load

	Load V_{ua} [kip]	Capacity $\phi\, V_n$ [kip]	Utilization $\beta_V = V_{ua}/\phi\, V_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **[1]	N/A	N/A	N/A	N/A

* anchor having the highest loading   **anchor group (relevant anchors)

[1] Shear Anchor Reinforcement has been selected!

5 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.4.2.9 for information about Anchor Reinforcement.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.5.2.9 for information about Anchor Reinforcement.
- Anchor Reinforcement has been selected as a design option, calculations should be compared with PROFIS Anchor calculations.

Fastening meets the design criteria!

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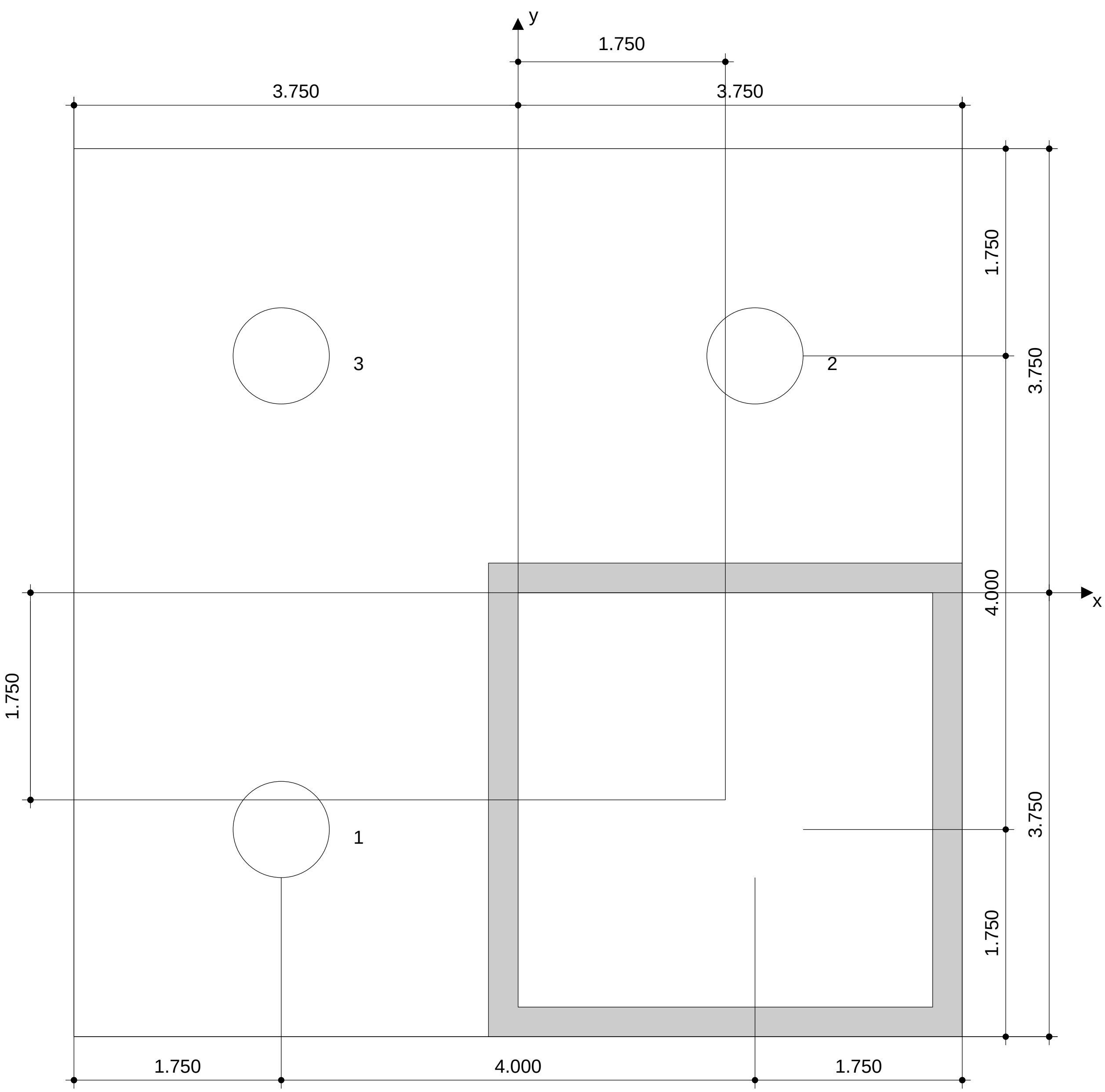
6 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.813 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: -
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: Heavy Hex Head ASTM F 1554 GR. 36 3/4
Installation torque: -
Hole diameter in the base material: - in.
Hole depth in the base material: 6.000 in.
Minimum thickness of the base material: 7.000 in.



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-2.000	-2.000	13.750	6.250	2.000	18.000
2	2.000	2.000	17.750	2.250	6.000	14.000
3	-2.000	2.000	13.750	6.250	6.000	14.000

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7 Remarks; Your Cooperation Duties

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BASE PLATE F

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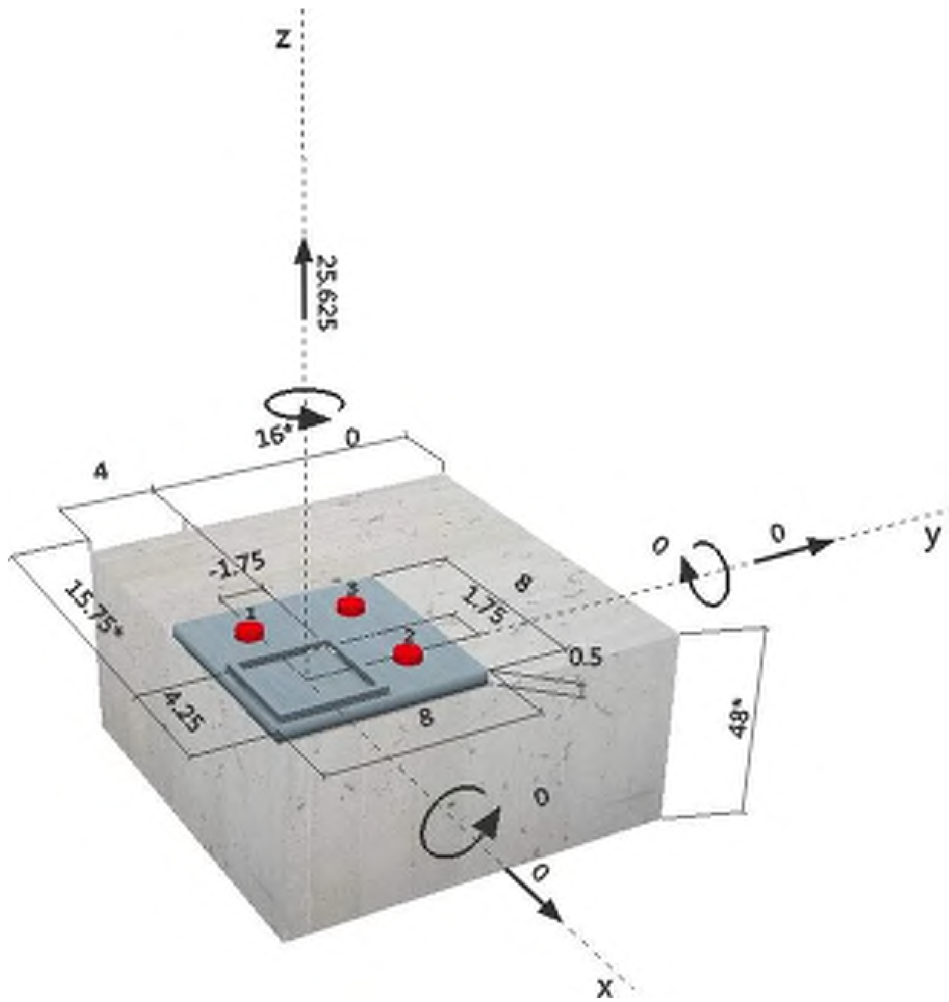
Specifier's comments: Base Plate F

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 1**
Effective embedment depth:	h_{ef} = 6.000 in.
Material:	ASTM F 1554
Proof:	Design method ACI 318-14 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 8.000 in. x 8.000 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in.
Reinforcement:	tension: condition A, shear: condition A; anchor reinforcement: tension
	edge reinforcement: > No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



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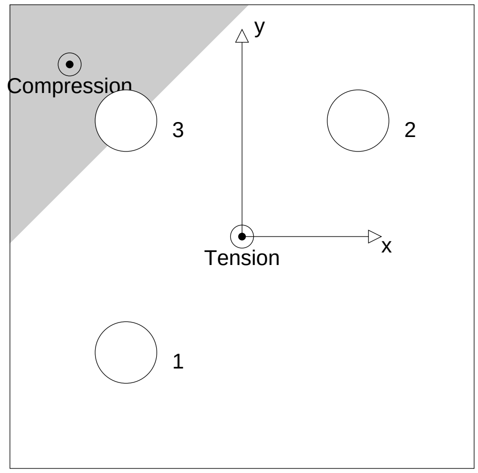
2 Load case/Resulting anchor forces



Load case: Design loads

Anchor reactions [kip]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	20.360	0.000	0.000	0.000
2	20.360	0.000	0.000	0.000
3	0.000	0.000	0.000	0.000

max. concrete compressive strain: 1.23 [‰]
max. concrete compressive stress: 5343 [psi]
resulting tension force in (x/y)=(0.000/0.000): 40.720 [kip]
resulting compression force in (x/y)=(-2.971/2.971): 15.095 [kip]

3 Tension load

	Load N_{ua} [kip]	Capacity ϕ N_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	20.360	26.361	78	OK
Pullout Strength*	20.360	22.065	93	OK
Concrete Breakout Strength**[1]	N/A	N/A	N/A	N/A
~~Concrete Side-Face Blowout, direction y-**~~	~~20.360~~	~~13.047~~	~~157~~	~~not recommended~~

* anchor having the highest loading **anchor group (anchors in tension)
[1] Tension Anchor Reinforcement has been selected!

Concrete failure modes do not govern as wall reinforcing will prevent concrete side blowout failure.

3.1 Steel Strength

$N_{sa} = A_{se,N} f_{uta}$ ACI 318-14 Eq. (17.4.1.2)
$\phi N_{sa} \ge N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.61	58000

Calculations

N_{sa} [kip]
35.148

Results

N_{sa} [kip]	ϕ_{steel}	ϕ N_{sa} [kip]	N_{ua} [kip]
35.148	0.750	26.361	20.360

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3.2 Pullout Strength

$N_{pN} = \psi_{c,p} N_p$ ACI 318-14 Eq. (17.4.3.1)
$N_p = 8 A_{brg} f'_c$ ACI 318-14 Eq. (17.4.3.4)
$\phi\ N_{pN} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$\psi_{c,p}$	A_{brg} [in.^{2}]	λ_a	f'_c [psi]
1.000	1.50	1.000	3500

Calculations

N_p [kip]
42.028

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{pn}$ [kip]	N_{ua} [kip]
42.028	0.700	0.750	1.000	22.065	20.360

3.3 Concrete Side-Face Blowout, direction y-

$N_{sb} = 160\ c_{a1} \sqrt{A_{brg}}\ \lambda_a \sqrt{f'_c}$ ACI 318-14 Eq. (17.4.4.1)
$N_{sbg} = \alpha_{group} N_{sb}$ ACI 318-14 Eq. (17.4.4.2)
$\phi\ N_{sbg} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1
$\alpha_{group} = \left(1 + \frac{s}{6\ c_{a1}}\right)$ see ACI 318-14, Section 17.4.4.2, Eq. (17.4.4.2)

Variables

c_{a1} [in.]	c_{a2} [in.]	A_{brg} [in.^{2}]	λ_a	f'_c [psi]	s [in.]
2.000	6.250	0.00	1.000	3500	-

Calculations

α_{group}	N_{sb} [kip]
1.000	23.194

Results

N_{sbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{sbg}$ [kip]	$N_{ua,edge}$ [kip]
23.194	0.750	0.750	1.000	13.047	20.360

4 Shear load

	Load V_{ua} [kip]	Capacity ϕ V_n [kip]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (relevant anchors)

5 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.4.2.9 for information about Anchor Reinforcement.
- Anchor Reinforcement has been selected as a design option, calculations should be compared with PROFIS Anchor calculations.

Fastening does not meet the design criteria!

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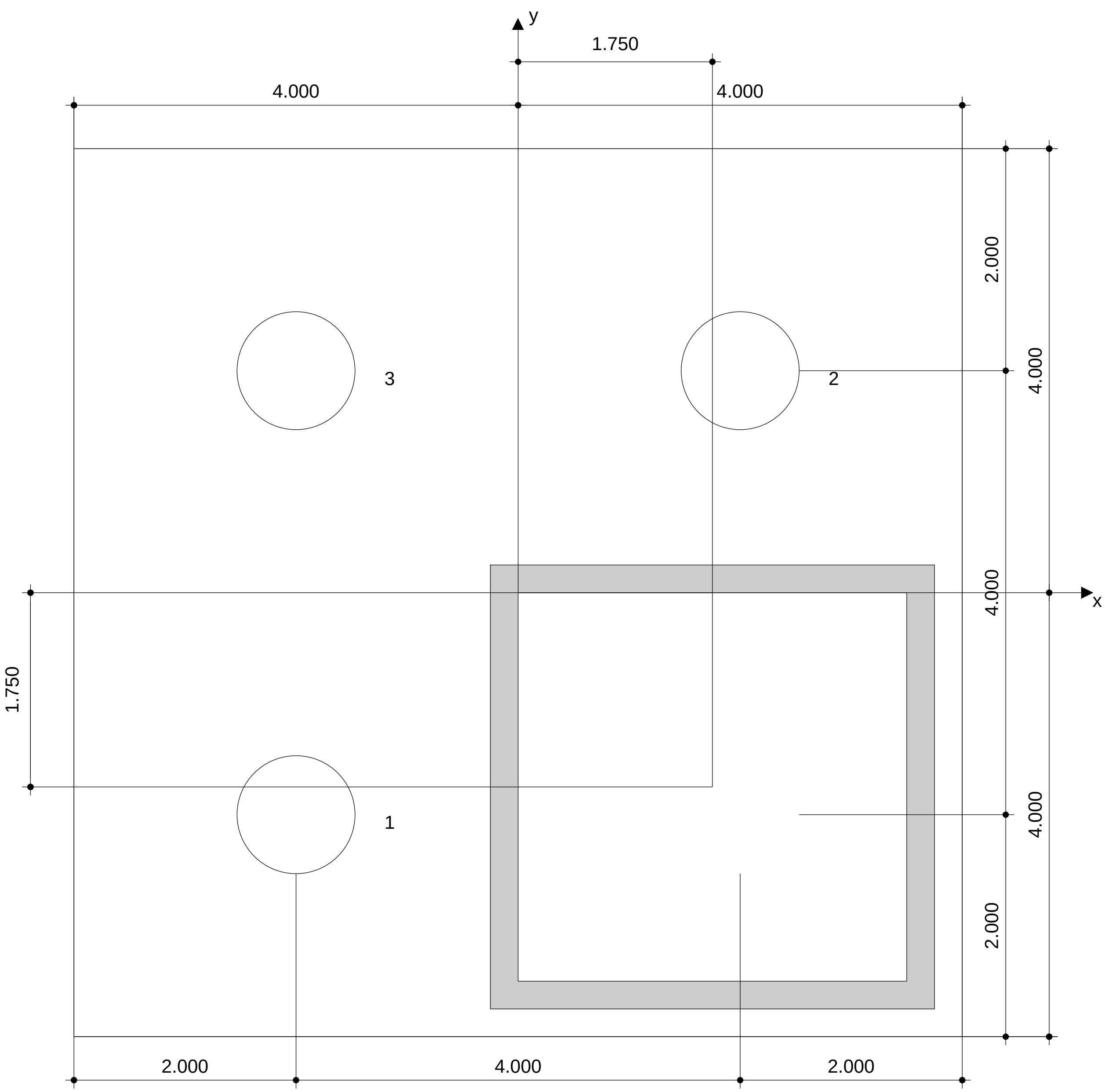
6 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 1.063 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: -
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: Heavy Hex Head ASTM F 1554 GR. 36 1
Installation torque: -
Hole diameter in the base material: - in.
Hole depth in the base material: 6.000 in.
Minimum thickness of the base material: 7.172 in.



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-2.000	-2.000	13.750	6.250	2.000	18.000
2	2.000	2.000	17.750	2.250	6.000	14.000
3	-2.000	2.000	13.750	6.250	6.000	14.000

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7 Remarks; Your Cooperation Duties

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- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

BASE PLATE G

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Address:		Sub-Project I Pos. No.:	170266
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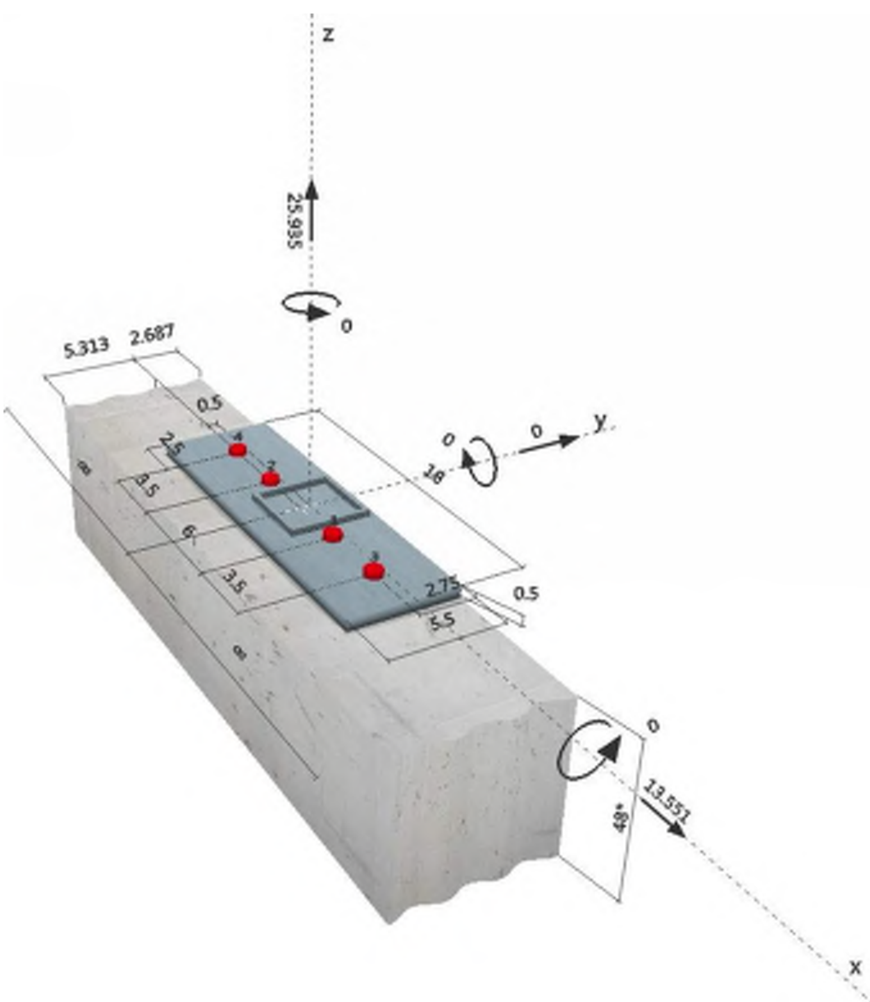
E-Mail:			

Specifier's comments: Base Plate G

1 Input data

Anchor type and diameter:	**Heavy Hex Head ASTM F 1554 GR. 36 7/8**
Effective embedment depth:	h_{ef} = 14.000 in.
Material:	ASTM F 1554
Proof:	Design method ACI 318-14 / CIP
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 18.000 in. x 5.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in.
Reinforcement:	tension: condition A, shear: condition A; anchor reinforcement: tension, shear edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b)) Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



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2 Load case/Resulting anchor forces

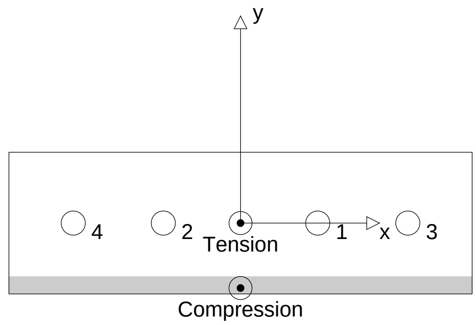
Load case: Design loads

Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	7.769	3.394	3.388	-0.198
2	7.769	3.394	3.388	0.198
3	7.769	3.415	3.388	-0.430
4	7.769	3.415	3.388	0.430

max. concrete compressive strain: 0.19 [‰]
max. concrete compressive stress: 835 [psi]
resulting tension force in (x/y)=(0.000/0.000): 31.077 [kip]
resulting compression force in (x/y)=(0.000/-2.522): 5.142 [kip]



3 Tension load

	Load N_{ua} [kip]	Capacity ϕN_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	7.769	20.097	39	OK
Pullout Strength*	7.769	17.464	45	OK
Concrete Breakout Strength**[1]	N/A	N/A	N/A	N/A
~~Concrete Side-Face Blowout, direction y+**~~	~~31.077~~	~~28.168~~	~~111~~	~~not recommended~~

* anchor having the highest loading **anchor group (anchors in tension)

[1] Tension Anchor Reinforcement has been selected!

Concrete failure modes do not govern as wall reinforcing will prevent concrete side blowout failure.

3.1 Steel Strength

$N_{sa} = A_{se,N}\, f_{uta}$ ACI 318-14 Eq. (17.4.1.2)

$\phi\ N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.46	58000

Calculations

N_{sa} [kip]
26.796

Results

N_{sa} [kip]	ϕ_{steel}	$\phi\ N_{sa}$ [kip]	N_{ua} [kip]
26.796	0.750	20.097	7.769

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3.2 Pullout Strength

$N_{pN} = \psi_{c,p} N_p$ ACI 318-14 Eq. (17.4.3.1)

$N_p = 8 A_{brg} f'_c$ ACI 318-14 Eq. (17.4.3.4)

$\phi N_{pN} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$\psi_{c,p}$	A_{brg} [in.^{2}]	λ_a	f'_c [psi]
1.000	1.19	1.000	3500

Calculations

N_p [kip]
33.264

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕN_{pn} [kip]	N_{ua} [kip]
33.264	0.700	0.750	1.000	17.464	7.769

3.3 Concrete Side-Face Blowout, direction y+

$N_{sb} = 160\, c_{a1} \sqrt{A_{brg}}\, \lambda_a \sqrt{f'_c}$ ACI 318-14 Eq. (17.4.4.1)

$N_{sbg} = \alpha_{group} N_{sb}$ ACI 318-14 Eq. (17.4.4.2)

$\phi N_{sbg} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

$\alpha_{group} = \left(1 + \frac{s}{6\, c_{a1}}\right)$ see ACI 318-14, Section 17.4.4.2, Eq. (17.4.4.2)

Variables

c_{a1} [in.]	c_{a2} [in.]	A_{brg} [in.^{2}]	λ_a	f'_c [psi]	s [in.]
2.687	-	0.00	1.000	3500	13.000

Calculations

α_{group}	N_{sb} [kip]
1.806	27.722

Results

N_{sbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	ϕN_{sbg} [kip]	$N_{ua,edge}$ [kip]
50.076	0.750	0.750	1.000	28.168	31.077

4 Shear load

	Load V_{ua} [kip]	Capacity $\phi\ V_n$ [kip]	Utilization $\beta_V = V_{ua}/\phi\ V_n$	Status
Steel Strength*	3.415	10.450	33	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength*	3.394	4.541	75	OK
Concrete edge failure in direction **[1]	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (relevant anchors)
[1] Shear Anchor Reinforcement has been selected!

4.1 Steel Strength

$V_{sa} = 0.6\ A_{se,V}\ f_{uta}$ ACI 318-14 Eq. (17.5.1.2b)
$\phi\ V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.46	58000

Calculations

V_{sa} [kip]
16.078

Results

V_{sa} [kip]	ϕ_{steel}	$\phi\ V_{sa}$ [kip]	V_{ua} [kip]
16.078	0.650	10.450	3.415

4.2 Pryout Strength

$V_{cp} = k_{cp}\left[\left(\frac{A_{Nc}}{A_{Nc0}}\right)\psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b\right]$ ACI 318-14 Eq. (17.5.3.1a)
$\phi\ V_{cp} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1
A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)
$A_{Nc0} = 9\ h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)
$\psi_{ec,N} = \left(\frac{1}{1+\frac{2\ e_N'}{3\ h_{ef}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)
$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)
$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)
$N_b = 16\ \lambda_a\ \sqrt{f_c'}\ h_{ef}^{5/3}$ ACI 318-14 Eq. (17.4.2.2b)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
2	14.000	0.000	0.000	2.687

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f_c' [psi]
1.000	-	16	1.000	3500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
100.67	1764.00	1.000	1.000	0.738	1.000	76.978

Results

V_{cp} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cp}$ [kip]	V_{ua} [kip]
6.487	0.700	1.000	1.000	4.541	3.394

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5 Combined tension and shear loads

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.45	0.747	1.000	99.75	OK

$\beta_{NV} = (\beta_N + \beta_V) / 1.2 <= 1$

6 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.4.2.9 for information about Anchor Reinforcement.
- The design of Anchor Reinforcement is beyond the scope of PROFIS Anchor. Refer to ACI 318-14, Section 17.5.2.9 for information about Anchor Reinforcement.
- Anchor Reinforcement has been selected as a design option, calculations should be compared with PROFIS Anchor calculations.

Fastening does not meet the design criteria!

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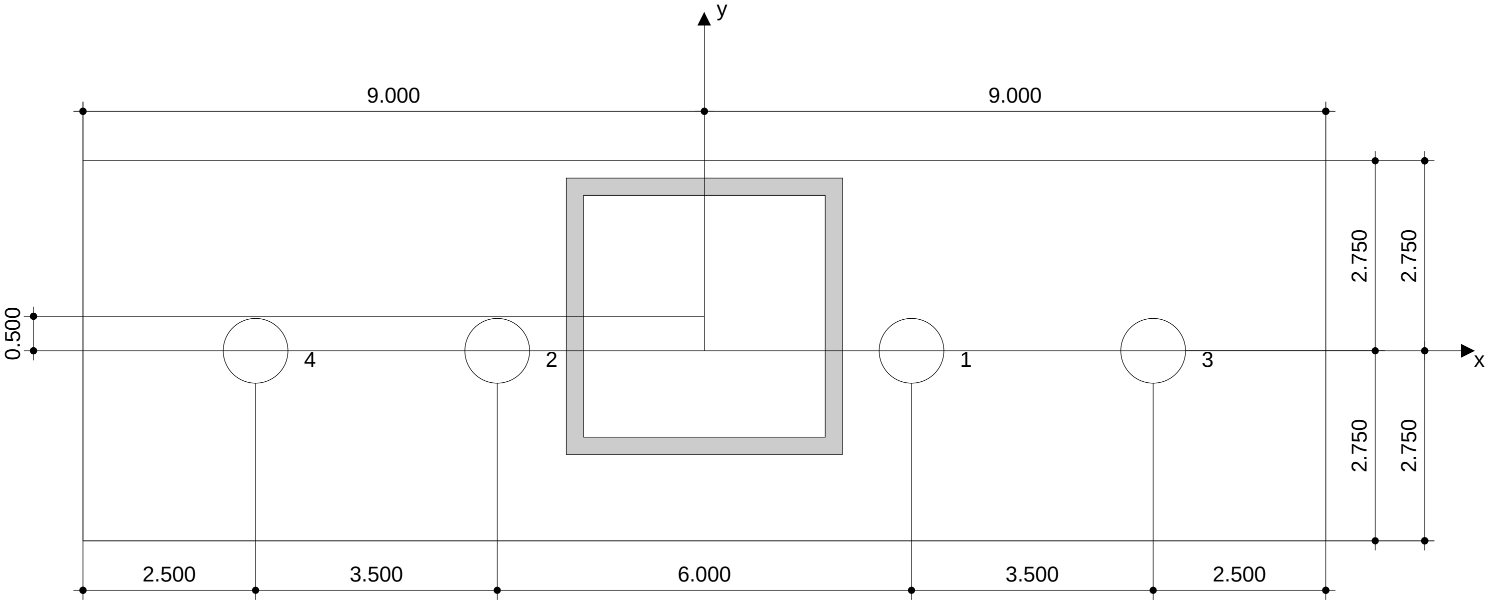
7 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.938 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: -
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: Heavy Hex Head ASTM F 1554 GR. 36 7/8
Installation torque: -
Hole diameter in the base material: - in.
Hole depth in the base material: 14.000 in.
Minimum thickness of the base material: 15.052 in.



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	3.000	0.000	-	-	5.313	2.687
2	-3.000	0.000	-	-	5.313	2.687
3	6.500	0.000	-	-	5.313	2.687
4	-6.500	0.000	-	-	5.313	2.687

8 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

BASE PLATE H

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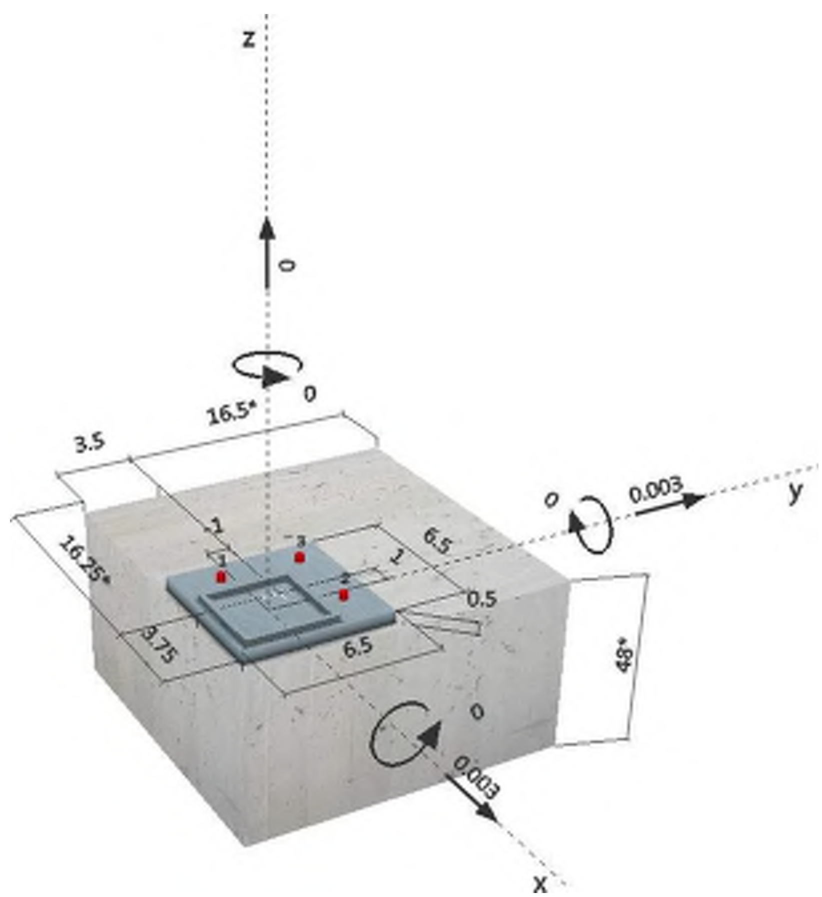
Specifier's comments: Base Plate H

1 Input data

Anchor type and diameter:	**HIT-HY 200 + HIT-Z 3/8**
Effective embedment depth:	$h_{ef,opti}$ = 2.375 in. ($h_{ef,limit}$ = 4.500 in.)
Material:	DIN EN ISO 4042
Evaluation Service Report:	ESR-3187
Issued I Valid:	11/1/2016 | 3/1/2018
Proof:	Design method ACI 318-14 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 6.500 in. x 6.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Square HSS (AISC); (L x W x T) = 4.000 in. x 4.000 in. x 0.250 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present
	edge reinforcement: > No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



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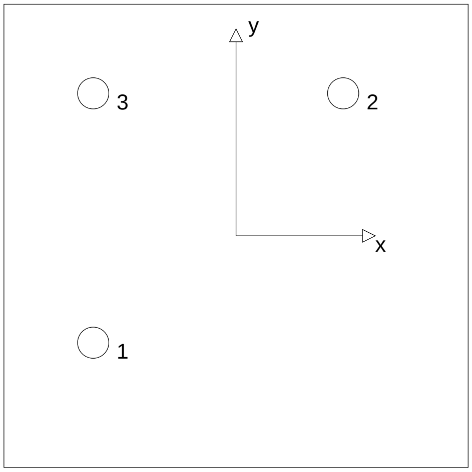
2 Load case/Resulting anchor forces

Load case: Design loads

Anchor reactions [kip]
Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	0.000	0.003	0.003	0.000
2	0.000	0.003	0.000	0.003
3	0.000	0.000	0.000	0.000

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 0.000 [kip]
resulting compression force in (x/y)=(0.000/0.000): 0.000 [kip]



3 Tension load

	Load N_{ua} [kip]	Capacity ϕ N_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Pullout Strength*	N/A	N/A	N/A	N/A
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Strength**	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (anchors in tension)

4 Shear load

	Load V_{ua} [kip]	Capacity ϕV_n [kip]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	0.003	1.929	1	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Concrete Breakout Strength controls)**	0.004	1.540	1	OK
Concrete edge failure in direction x+**	0.004	1.114	1	OK

* anchor having the highest loading **anchor group (relevant anchors)

4.1 Steel Strength

$V_{sa} = \alpha_{V,seis}\,(0.6\,A_{se,V}\,f_{uta})$ refer to ICC-ES ESR-3187

$\phi\ V_{steel} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]	$\alpha_{V,seis}$	$(0.6\,A_{se,V}\,f_{uta})$ [kip]
0.08	94200	1.000	3.215

Calculations

$V_{sa,eq}$ [kip]
3.215

Results

$V_{sa,eq}$ [kip]	ϕ_{steel}	$\phi_{nonductile}$	$\phi\ V_{sa}$ [kip]	V_{ua} [kip]
3.215	0.600	1.000	1.929	0.003

4.2 Pryout Strength (Concrete Breakout Strength controls)

$V_{cpg} = k_{cp}\left[\left(\frac{A_{Nc}}{A_{Nc0}}\right)\psi_{ec,N}\,\psi_{ed,N}\,\psi_{c,N}\,\psi_{cp,N}\,N_b\right]$ ACI 318-14 Eq. (17.5.3.1b)

$\phi\ V_{cpg} \geq V_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\,h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1+\frac{2\,e_N'}{3\,h_{ef}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \mathrm{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\,\lambda_a\,\sqrt{f_c'}\,h_{ef}^{1.5}$ ACI 318-14 Eq. (17.4.2.2a)

Variables

k_{cp}	h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]
1	2.375	1.833	1.833	2.000

$\psi_{c,N}$	c_{ac} [in.]	k_c	λ_a	f_c' [psi]
1.000	3.563	17	1.000	3500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
80.16	50.77	0.660	0.660	0.868	1.000	3.681

Results

V_{cpg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cpg}$ [kip]	V_{ua} [kip]
2.200	0.700	1.000	1.000	1.540	0.004

4.3 Concrete edge failure in direction x+

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ec,V} \psi_{ed,V} \psi_{c,V} \psi_{h,V} \psi_{parallel,V} V_b$ — ACI 318-14 Eq. (17.5.2.1b)

$\phi V_{cbg} \geq V_{ua}$ — ACI 318-14 Table 17.3.1.1

A_{Vc} see ACI 318-14, Section 17.5.2.1, Fig. R 17.5.2.1(b)

$A_{Vc0} = 4.5\, c_{a1}^2$ — ACI 318-14 Eq. (17.5.2.1c)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{2e_V'}{3c_{a1}}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.5)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ — ACI 318-14 Eq. (17.5.2.6b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ — ACI 318-14 Eq. (17.5.2.8)

$V_b = \left(7 \left(\frac{l_e}{d_a}\right)^{0.2} \sqrt{d_a}\right) \lambda_a \sqrt{f_c'}\, c_{a1}^{1.5}$ — ACI 318-14 Eq. (17.5.2.2a)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
2.250	5.500	0.000	1.200	48.000

l_e [in.]	λ_a	d_a [in.]	f_c' [psi]	$\psi_{parallel,V}$
2.375	1.000	0.375	3500	1.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [kip]
22.78	22.78	1.000	1.000	1.000	1.238

Results

V_{cbg} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ V_{cbg}$ [kip]	V_{ua} [kip]
1.486	0.750	1.000	1.000	1.114	0.004

5 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-14, Section 17.8.1.

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Fastening meets the design criteria!

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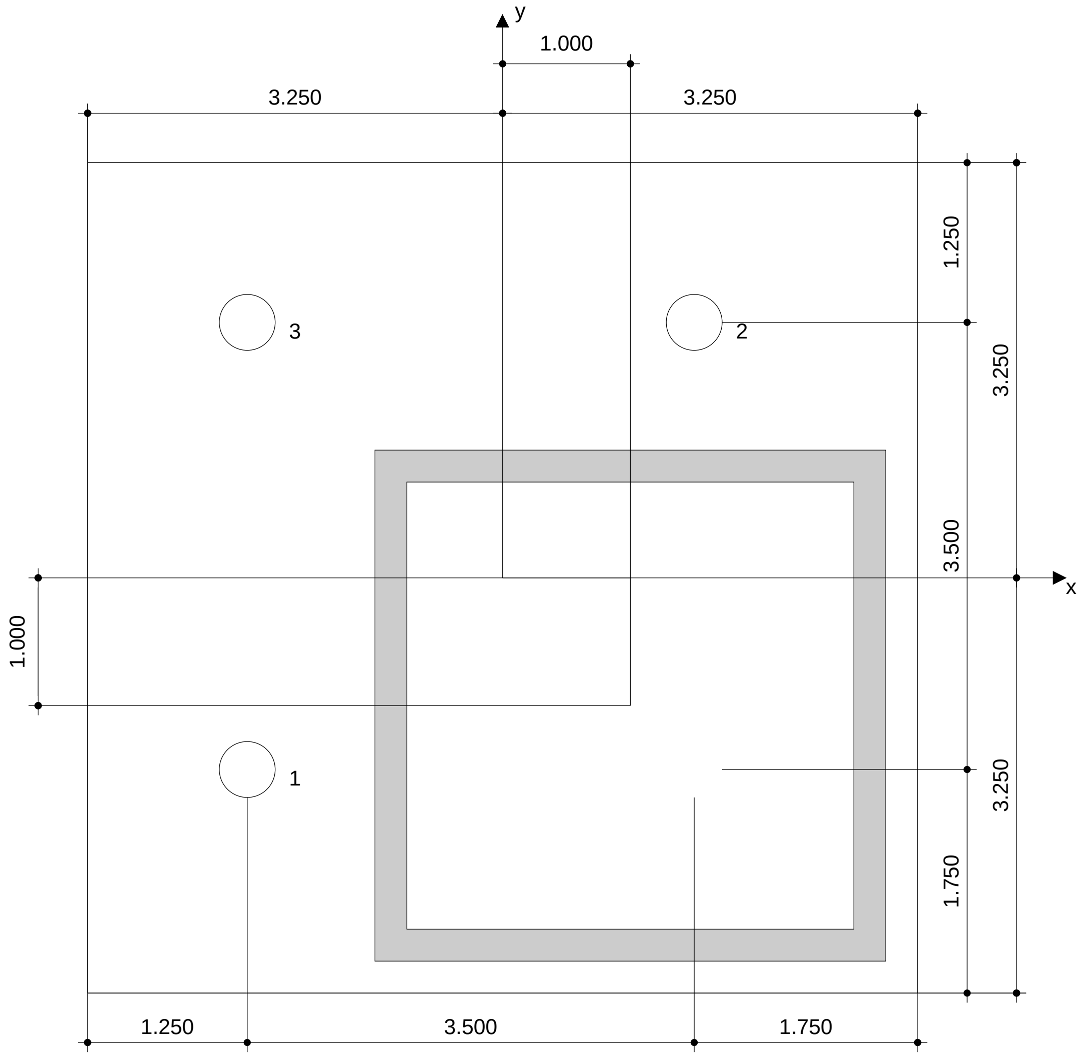
6 Installation data

Anchor plate, steel: -
Profile: Square HSS (AISC); 4.000 x 4.000 x 0.250 in.
Hole diameter in the fixture: d_f = 0.438 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: Hammer drilled
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: HIT-HY 200 + HIT-Z 3/8
Installation torque: 0.015 ft.kip
Hole diameter in the base material: 0.438 in.
Hole depth in the base material: 3.375 in.
Minimum thickness of the base material: 4.625 in.

6.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer	• No accessory required	• Dispenser including cassette and mixer
• Properly sized drill bit		• Torque wrench



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-2.000	-1.500	14.250	5.750	2.000	18.000
2	1.500	2.000	17.750	2.250	5.500	14.500
3	-2.000	2.000	14.250	5.750	5.500	14.500

7 Remarks; Your Cooperation Duties

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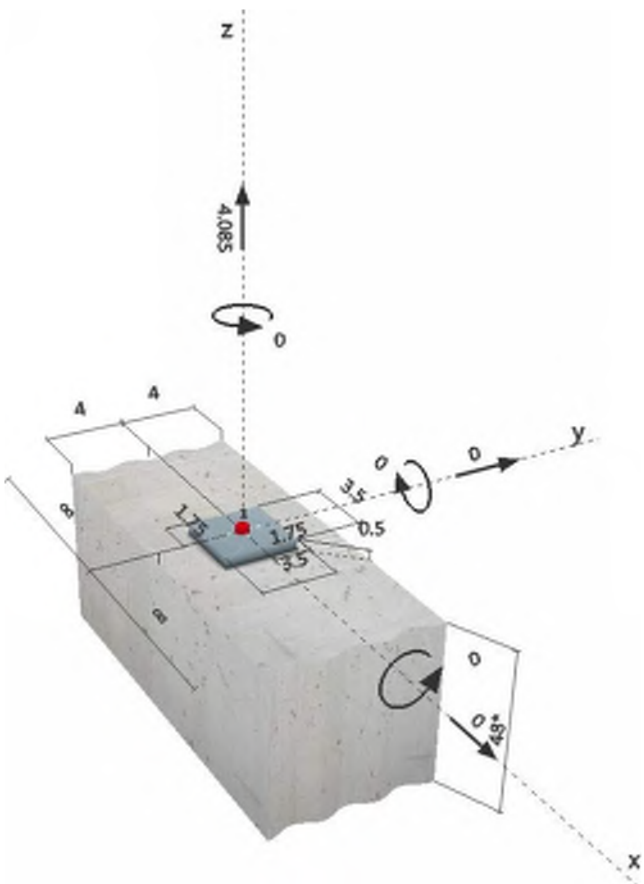
Specifier's comments: Shear Wall Hold Down Anchorage 5/8"

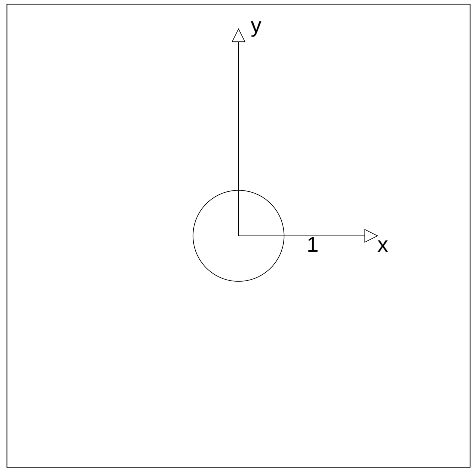
1 Input data

Anchor type and diameter:	**HIT-HY 200 + HIT-Z 5/8**
Effective embedment depth:	$h_{ef,act}$ = 6.000 in. ($h_{ef,limit}$ = - in.)
Material:	DIN EN ISO 4042
Evaluation Service Report:	ESR-3187
Issued I Valid:	11/1/2016 | 3/1/2018
Proof:	Design method ACI 318-14 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate:	l_x x l_y x t = 3.500 in. x 3.500 in. x 0.500 in.; (Recommended plate thickness: not calculated
Profile:	Round bars (AISC); (L x W x T) = 0.125 in. x 0.125 in. x 0.000 in.
Base material:	cracked concrete, , f_c' = 3500 psi; h = 48.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: condition A, shear: condition A; no supplemental splitting reinforcement present
	edge reinforcement: none or < No. 4 bar
Seismic loads (cat. C, D, E, or F)	Tension load: yes (17.2.3.4.3 (b))
	Shear load: yes (17.2.3.5.3 (a))

Geometry [in.] & Loading [kip, ft.kip]



2 Load case/Resulting anchor forces



Load case: Design loads

Anchor reactions [kip]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	4.085	0.000	0.000	0.000

max. concrete compressive strain: - [‰]
max. concrete compressive stress: - [psi]
resulting tension force in (x/y)=(0.000/0.000): 4.085 [kip]
resulting compression force in (x/y)=(0.000/0.000): 0.000 [kip]

3 Tension load

	Load N_{ua} [kip]	Capacity ϕ N_n [kip]	Utilization $\beta_N = N_{ua}/\phi N_n$	Status
Steel Strength*	4.085	13.848	30	OK
Pullout Strength*	4.085	10.428	40	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Strength**	4.085	3.079	133	not recommended

* anchor having the highest loading **anchor group (anchors in tension)

3.1 Steel Strength

N_{sa} = ESR value refer to ICC-ES ESR-3187
$\phi\ N_{sa} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.23	94200

Calculations

N_{sa} [kip]
21.305

Results

N_{sa} [kip]	ϕ_{steel}	$\phi_{nonductile}$	$\phi\ N_{sa}$ [kip]	N_{ua} [kip]
21.305	0.650	1.000	13.848	4.085

3.2 Pullout Strength

N_{pn} = $N_p\ \lambda_a$ refer to ICC-ES ESR-3187
$\phi\ N_{pn} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

Variables

λ_a	N_p [kip]	$\alpha_{N,seis}$
1.000	21.391	1.000

Calculations

-
-

Results

N_{pn} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\ N_{pn}$ [kip]	N_{ua} [kip]
21.391	0.650	0.750	1.000	10.428	4.085

3.3 Concrete Breakout Strength

$N_{cb} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ed,N}\, \psi_{c,N}\, \psi_{cp,N}\, N_b$ ACI 318-14 Eq. (17.4.2.1a)

$\phi\; N_{cb} \geq N_{ua}$ ACI 318-14 Table 17.3.1.1

A_{Nc} see ACI 318-14, Section 17.4.2.1, Fig. R 17.4.2.1(b)

$A_{Nc0} = 9\, h_{ef}^2$ ACI 318-14 Eq. (17.4.2.1c)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\, e'_N}{3\, h_{ef}}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.4)

$\psi_{ed,N} = 0.7 + 0.3 \left(\frac{c_{a,min}}{1.5 h_{ef}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.5b)

$\psi_{cp,N} = \mathrm{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5 h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-14 Eq. (17.4.2.7b)

$N_b = k_c\, \lambda_a \sqrt{f'_c}\, h_{ef}^{1.5}$ ACI 318-14 Eq. (17.4.2.2a)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
6.000	0.000	0.000	4.000	1.000

c_{ac} [in.]	k_c	λ_a	f'_c [psi]
9.000	17	1.000	3500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [kip]
144.00	324.00	1.000	1.000	0.833	1.000	14.781

Results

N_{cb} [kip]	$\phi_{concrete}$	$\phi_{seismic}$	$\phi_{nonductile}$	$\phi\; N_{cb}$ [kip]	N_{ua} [kip]
5.475	0.750	0.750	1.000	3.079	4.085

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4 Shear load

	Load V_{ua} [kip]	Capacity ϕV_n [kip]	Utilization $\beta_V = V_{ua}/\phi V_n$	Status
Steel Strength*	N/A	N/A	N/A	N/A
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Bond Strength controls)*	N/A	N/A	N/A	N/A
Concrete edge failure in direction **	N/A	N/A	N/A	N/A

* anchor having the highest loading **anchor group (relevant anchors)

5 Warnings

- The anchor design methods in PROFIS Anchor require rigid anchor plates per current regulations (ETAG 001/Annex C, EOTA TR029, etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Anchor calculates the minimum required anchor plate thickness with FEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid base plate assumption is valid is not carried out by PROFIS Anchor. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies when supplementary reinforcement is used. The Φ factor is increased for non-steel Design Strengths except Pullout Strength and Pryout strength. Condition B applies when supplementary reinforcement is not used and for Pullout Strength and Pryout Strength. Refer to your local standard.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions
- Checking the transfer of loads into the base material and the shear resistance are required in accordance with ACI 318 or the relevant standard!
- An anchor design approach for structures assigned to Seismic Design Category C, D, E or F is given in ACI 318-14, Chapter 17, Section 17.2.3.4.3 (a) that requires the governing design strength of an anchor or group of anchors be limited by ductile steel failure. If this is NOT the case, the connection design (tension) shall satisfy the provisions of Section 17.2.3.4.3 (b), Section 17.2.3.4.3 (c), or Section 17.2.3.4.3 (d). The connection design (shear) shall satisfy the provisions of Section 17.2.3.5.3 (a), Section 17.2.3.5.3 (b), or Section 17.2.3.5.3 (c).
- Section 17.2.3.4.3 (b) / Section 17.2.3.5.3 (a) require the attachment the anchors are connecting to the structure be designed to undergo ductile yielding at a load level corresponding to anchor forces no greater than the controlling design strength. Section 17.2.3.4.3 (c) / Section 17.2.3.5.3 (b) waive the ductility requirements and require the anchors to be designed for the maximum tension / shear that can be transmitted to the anchors by a non-yielding attachment. Section 17.2.3.4.3 (d) / Section 17.2.3.5.3 (c) waive the ductility requirements and require the design strength of the anchors to equal or exceed the maximum tension / shear obtained from design load combinations that include E, with E increased by ω_0.
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-14, Section 17.8.1.

Fastening does not meet the design criteria!

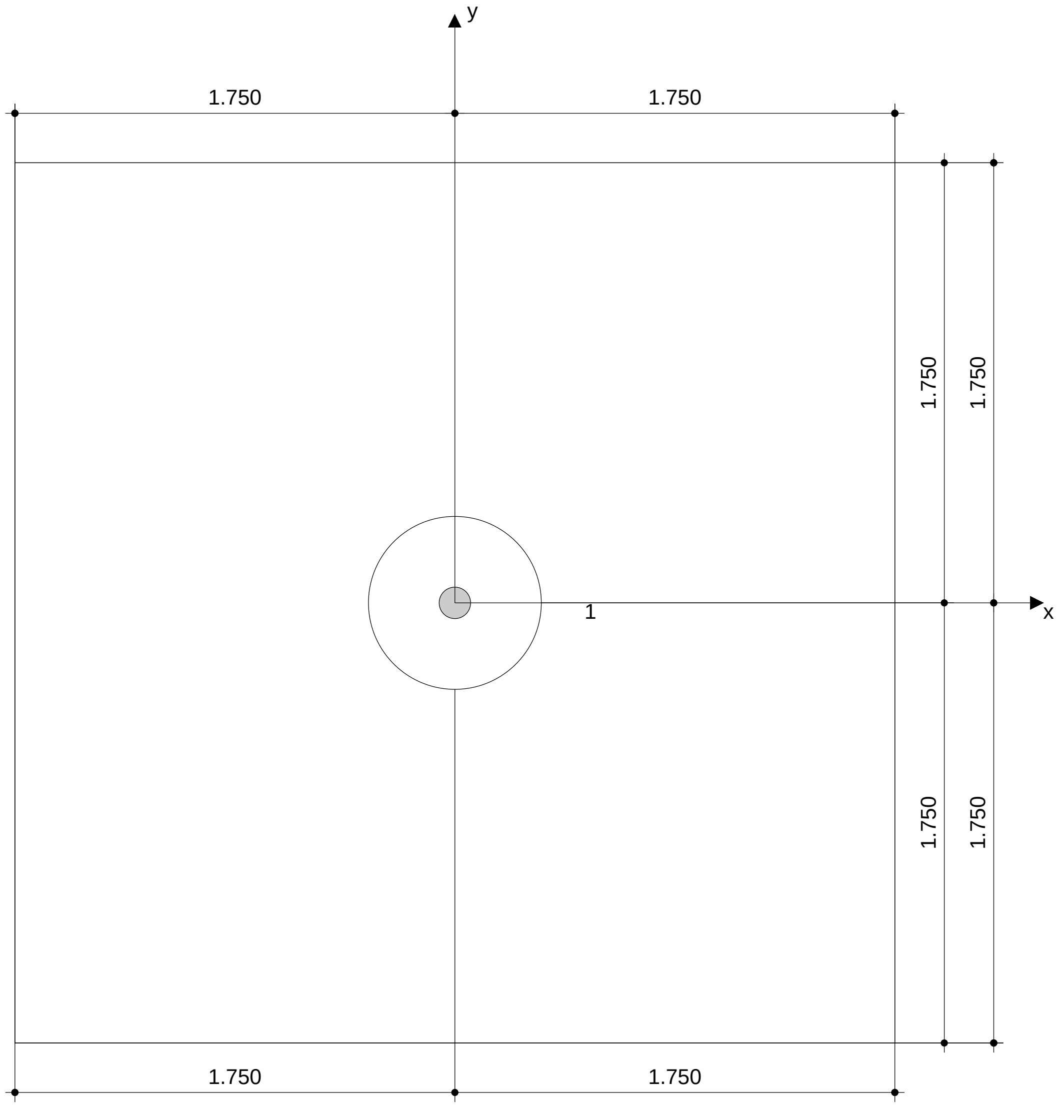
6 Installation data

Anchor plate, steel: -
Profile: Round bars (AISC); 0.125 x 0.125 x 0.000 in.
Hole diameter in the fixture: d_f = 0.688 in.
Plate thickness (input): 0.500 in.
Recommended plate thickness: not calculated
Drilling method: Hammer drilled
Cleaning: No cleaning of the drilled hole is required

Anchor type and diameter: HIT-HY 200 + HIT-Z 5/8
Installation torque: 0.059 ft.kip
Hole diameter in the base material: 0.750 in.
Hole depth in the base material: 8.250 in.
Minimum thickness of the base material: 10.000 in.

6.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• No accessory required	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor in.

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	0.000	0.000	-	-	4.000	4.000

Company:	Blackwell Structural Engineers	Page:	6
Specifier:		Project:	Kimmelman May Res
Address:		Sub-Project I Pos. No.:	170266
Phone I Fax:	|	Date:	7/28/2017
E-Mail:			

7 Remarks; Your Cooperation Duties

- Any and all information and data contained in the Software concern solely the use of Hilti products and are based on the principles, formulas and security regulations in accordance with Hilti's technical directions and operating, mounting and assembly instructions, etc., that must be strictly complied with by the user. All figures contained therein are average figures, and therefore use-specific tests are to be conducted prior to using the relevant Hilti product. The results of the calculations carried out by means of the Software are based essentially on the data you put in. Therefore, you bear the sole responsibility for the absence of errors, the completeness and the relevance of the data to be put in by you. Moreover, you bear sole responsibility for having the results of the calculation checked and cleared by an expert, particularly with regard to compliance with applicable norms and permits, prior to using them for your specific facility. The Software serves only as an aid to interpret norms and permits without any guarantee as to the absence of errors, the correctness and the relevance of the results or suitability for a specific application.
- You must take all necessary and reasonable steps to prevent or limit damage caused by the Software. In particular, you must arrange for the regular backup of programs and data and, if applicable, carry out the updates of the Software offered by Hilti on a regular basis. If you do not use the AutoUpdate function of the Software, you must ensure that you are using the current and thus up-to-date version of the Software in each case by carrying out manual updates via the Hilti Website. Hilti will not be liable for consequences, such as the recovery of lost or damaged data or programs, arising from a culpable breach of duty by you.

Blackwell
Structural Engineers

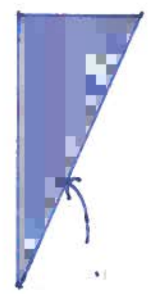
CONCRETE FOUNDATION DESIGN

Toronto 416.593.5300 | **Waterloo** 519.616.0895 | **Victoria** 778.817.1010 | **Halifax** 902.593.0125 | **blackwell.ca**

Foundation Wall Design Loads

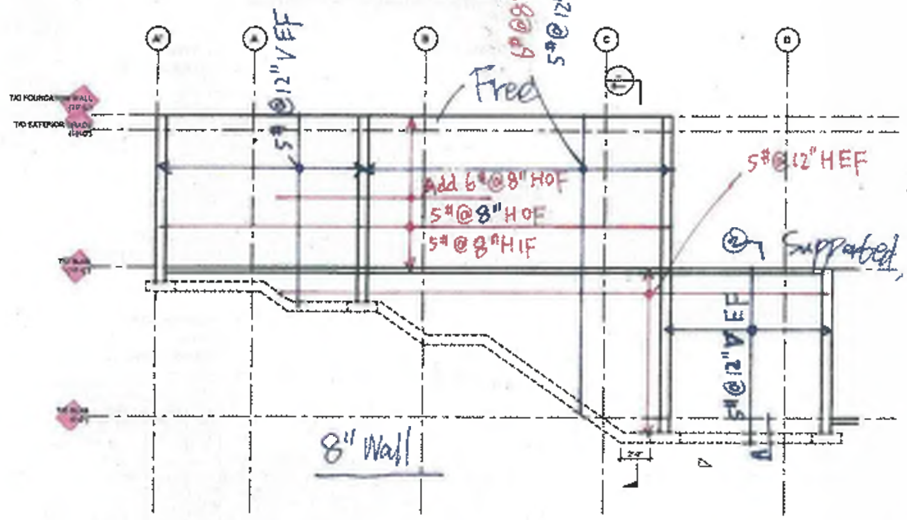
Excerpt from Intermountain GeoEnvironmental Services Inc. (IGES) report titled
Geotechnical and Geological Hazard Investigation Lot 16 of Summit Eden Phase 1A

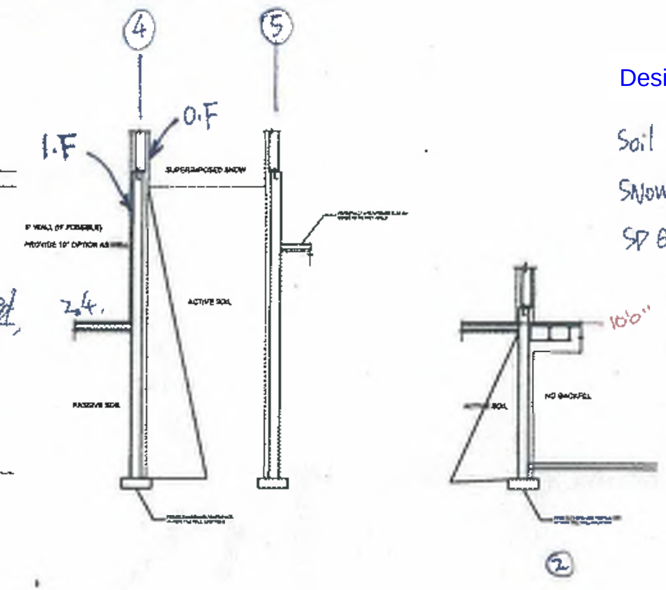
			[redacted]	
	[redacted]	(pcf)	[redacted]	
[redacted]				
[redacted]	[redacted]	5	[redacted]	
[redacted]				



©

Along grid line 4 between A' and D+





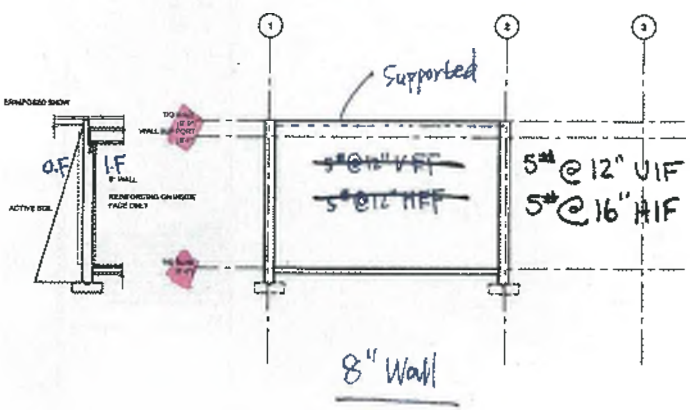
Design Parameters

Soil Density = 130 pcf = 20.42 kN/m^3

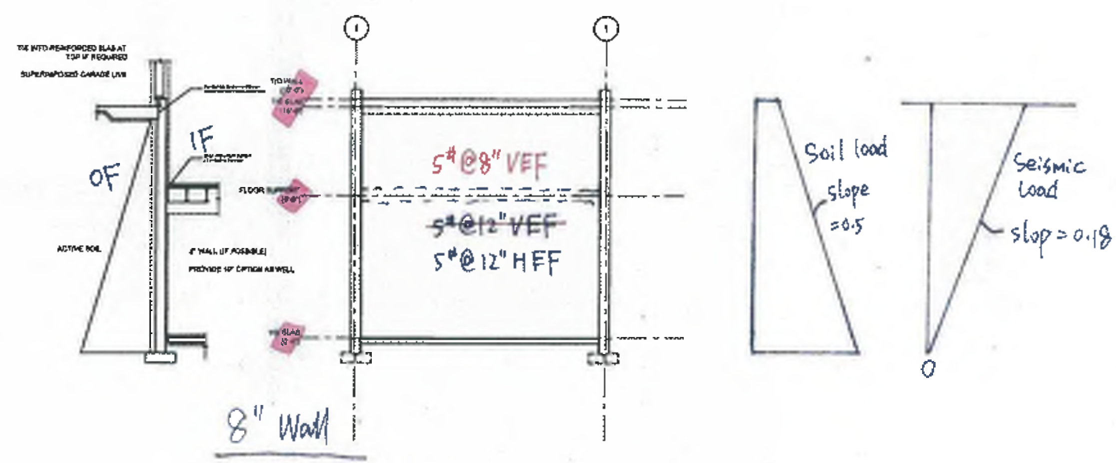
Snow 274 psf = 13.12 KPa. Ground Snow as Per IBC2015

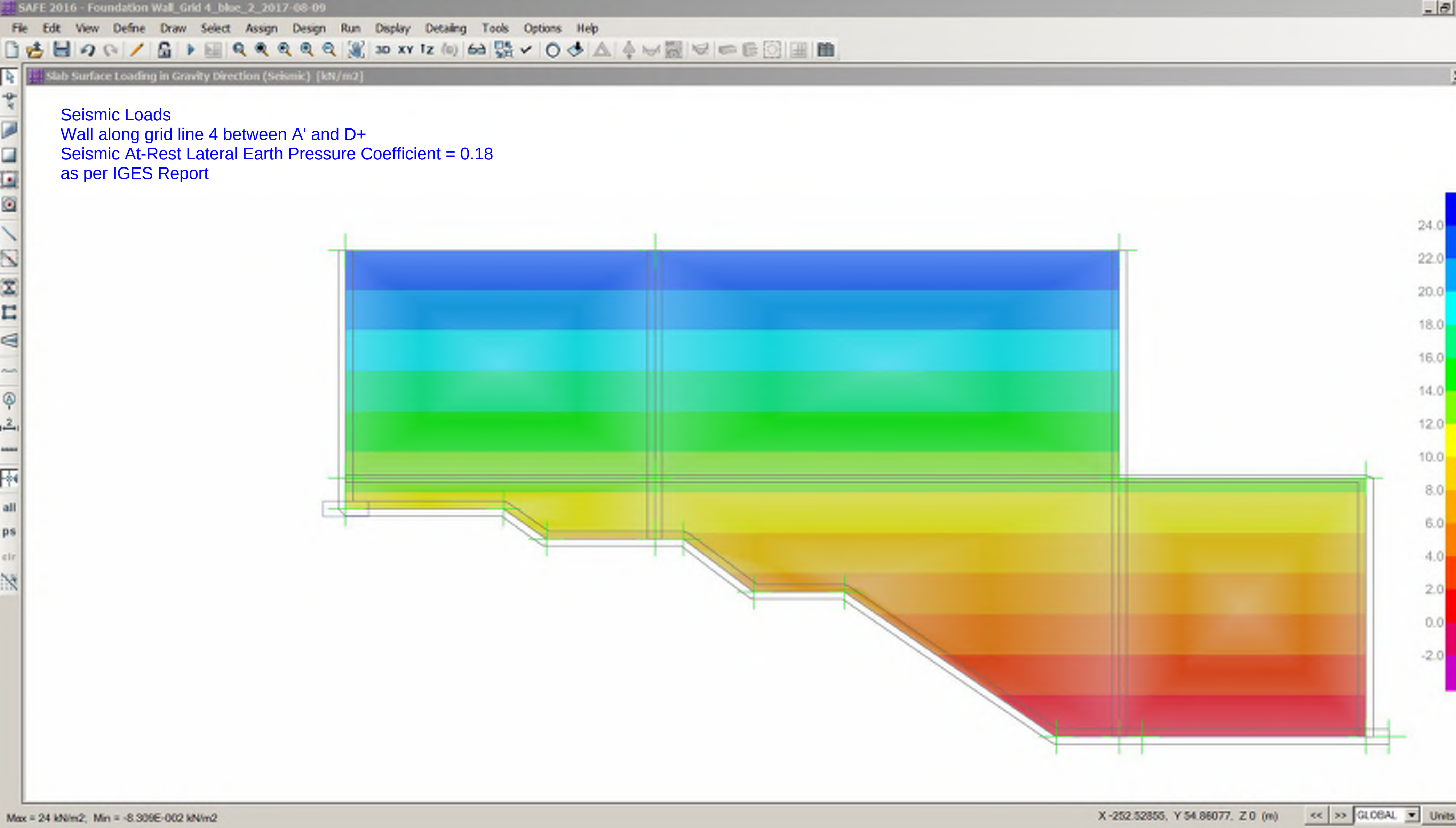
SD Garage 50 psf = 2.4 KPa

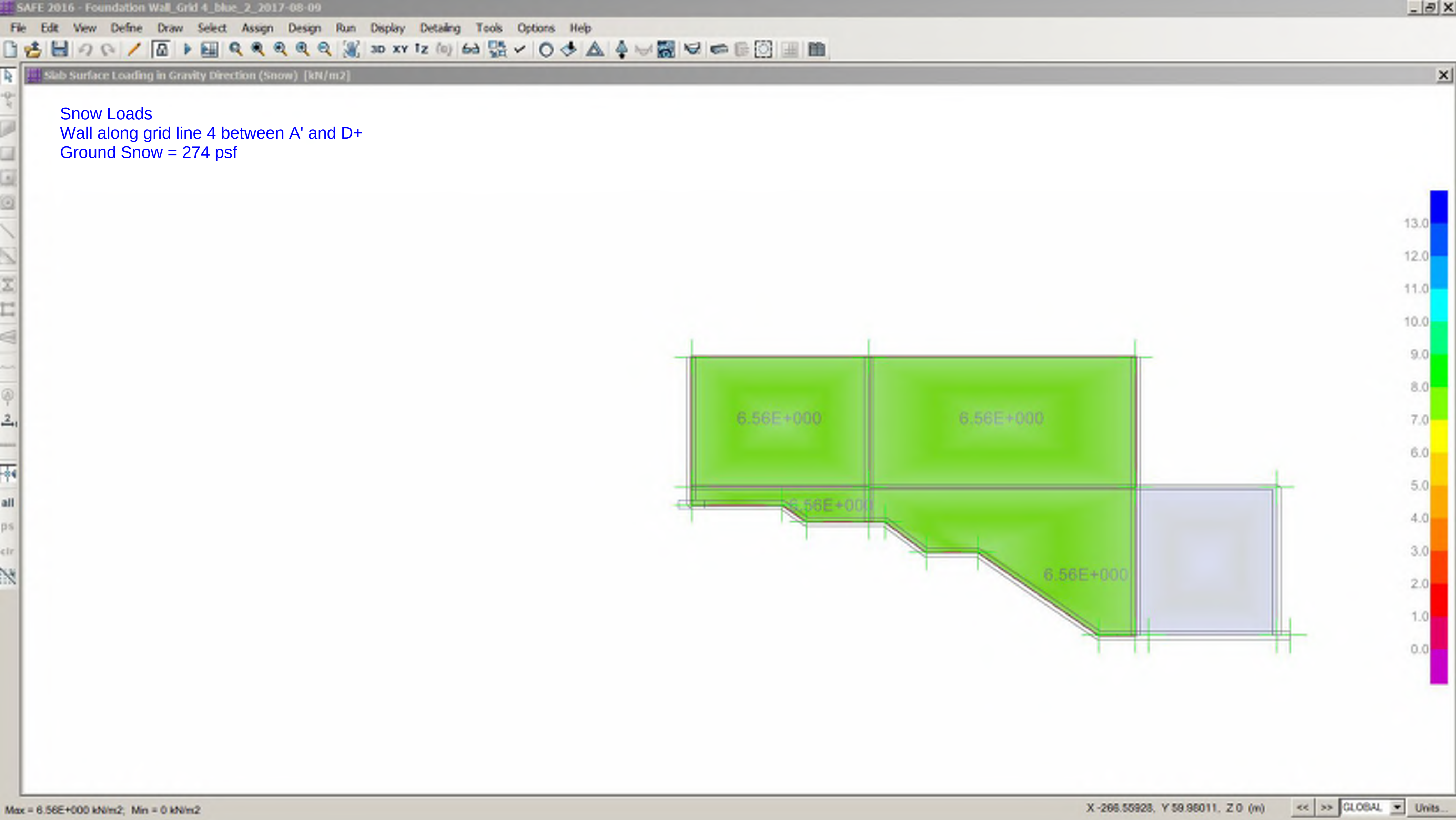
Along grid line D+ between 1 and 3

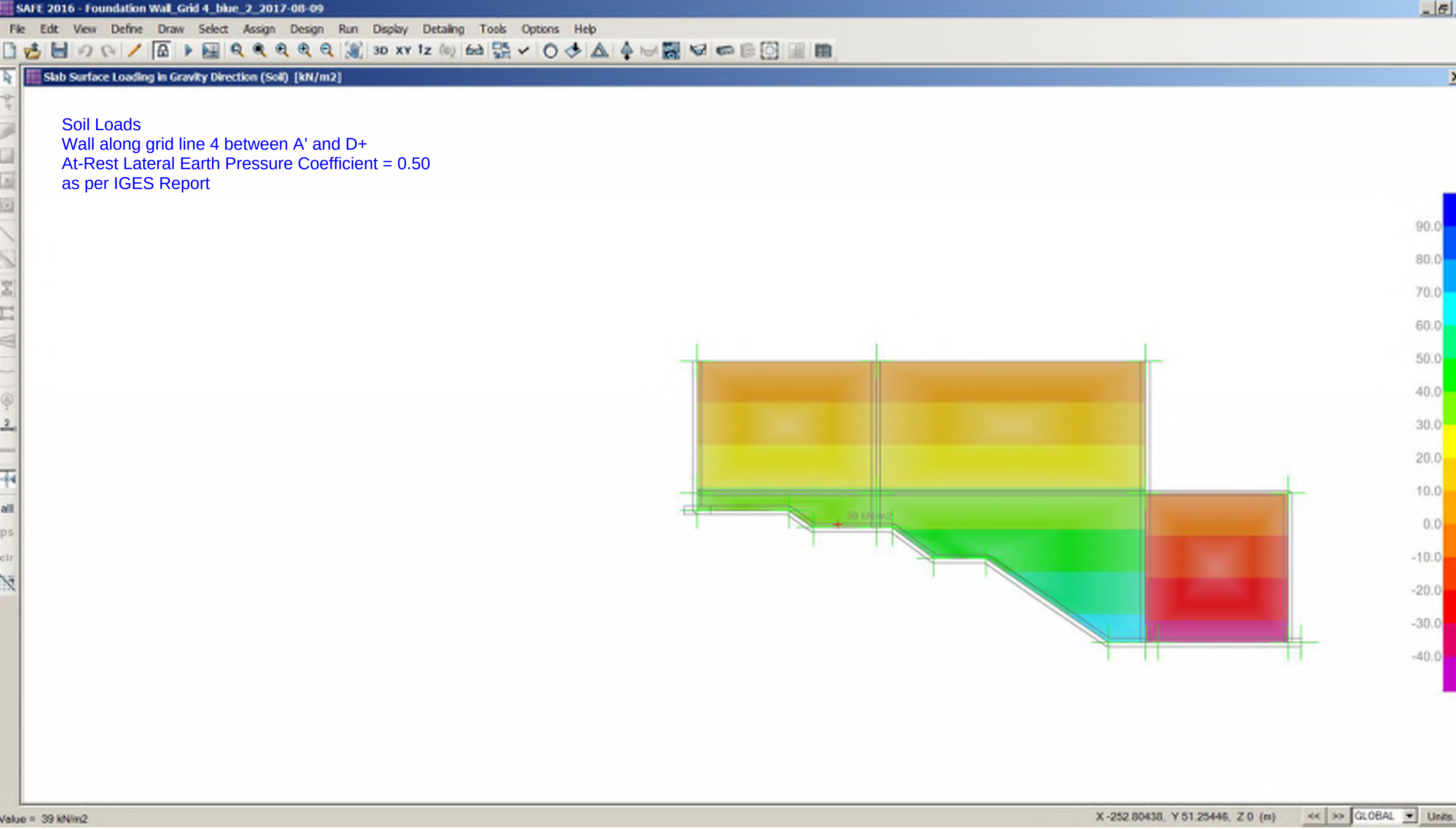


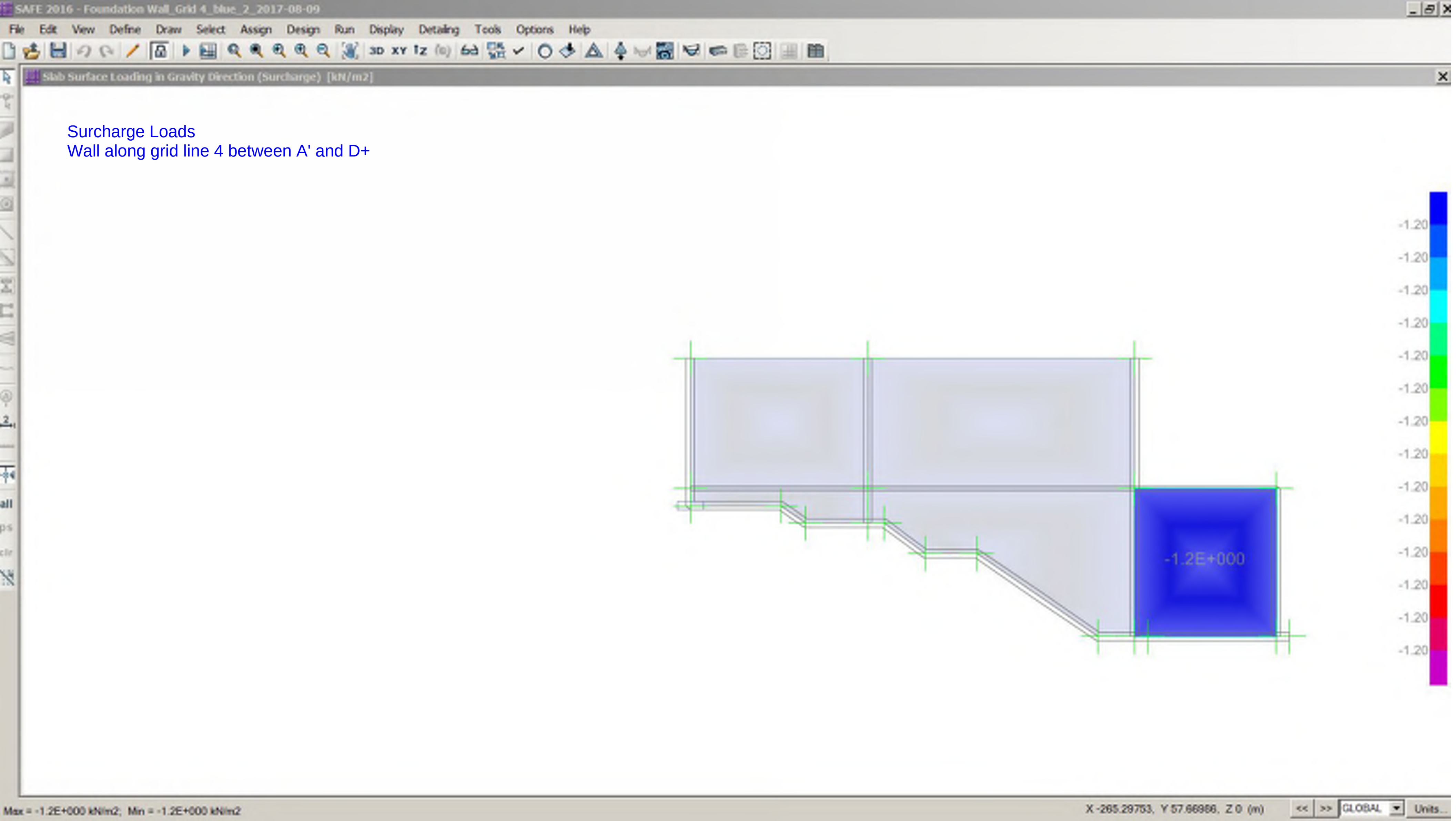
Along grid line C+ between 5 and 6

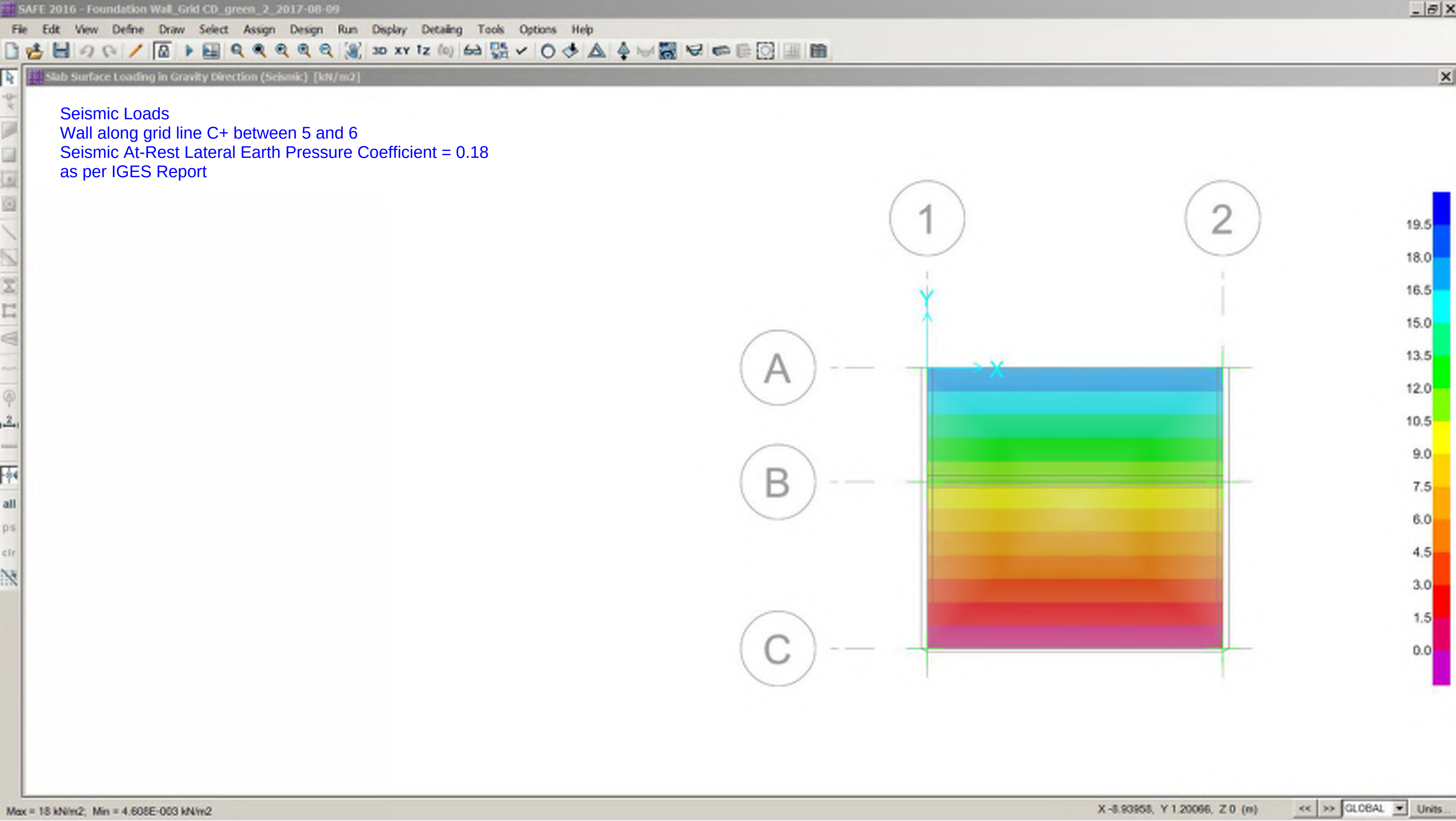


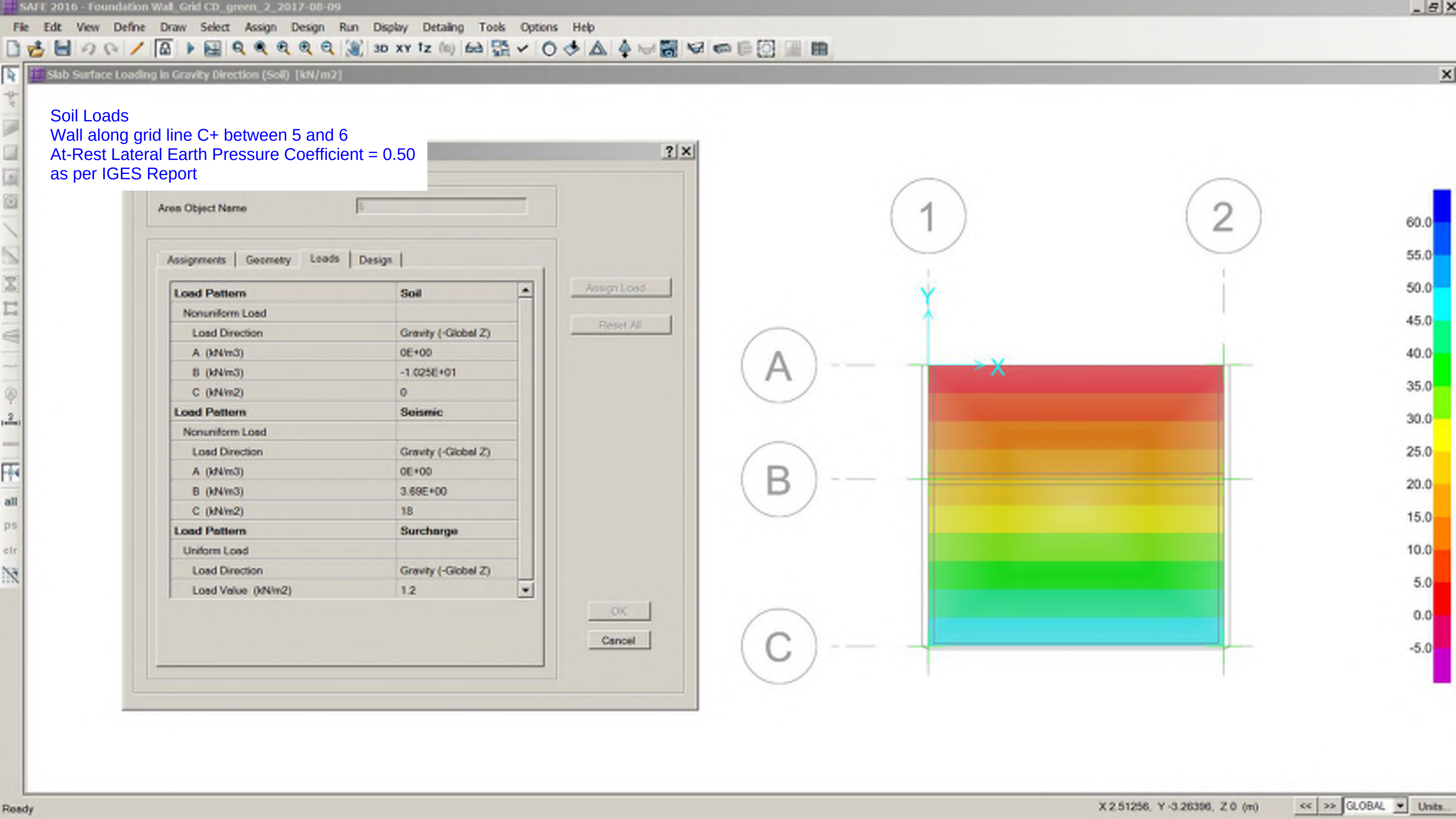

SAFE 2016 - Foundation Wall_Grid 4_blue_2_2017-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Seismic) [kN/m2]
Seismic Loads
Wall along grid line 4 between A' and D+
Seismic At-Rest Lateral Earth Pressure Coefficient = 0.18
as per IGES Report
24.0
22.0
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
-2.0
Max = 24 kN/m2, Min = -8.309E-002 kN/m2
X -252.52855, Y 54.86077, Z 0 (m)
GLOBAL
Units...

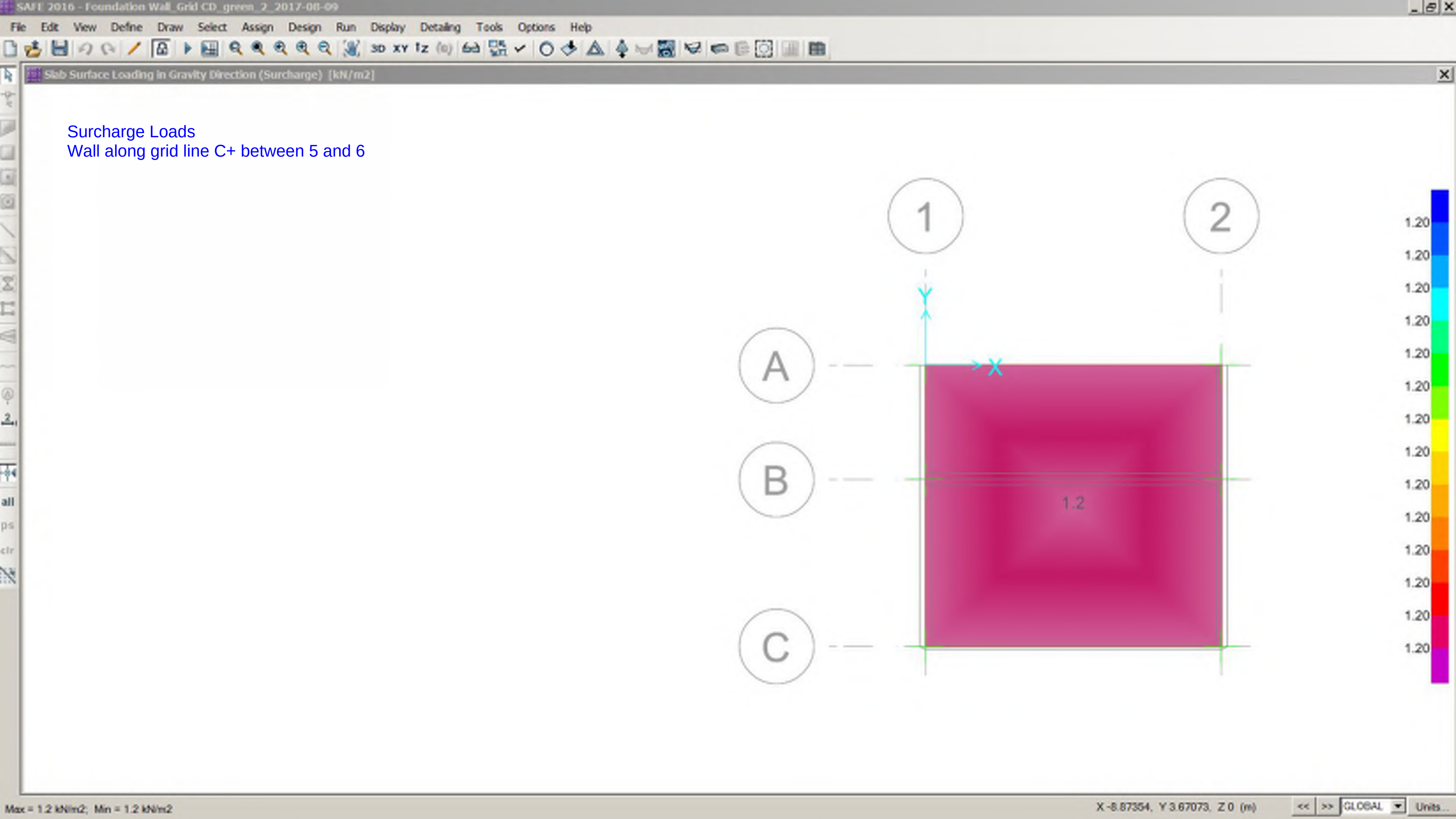

SAFE 2016 - Foundation Wall_Grid 4_blue_2_2017-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Snow) [kN/m2]
Snow Loads
Wall along grid line 4 between A' and D+
Ground Snow = 274 psf
6.56E+000
6.56E+000
6.56E+000
6.56E+000
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Max = 6.56E+000 kN/m2; Min = 0 kN/m2
X -266.55928, Y 59.98011, Z 0 (m)
GLOBAL
Units...

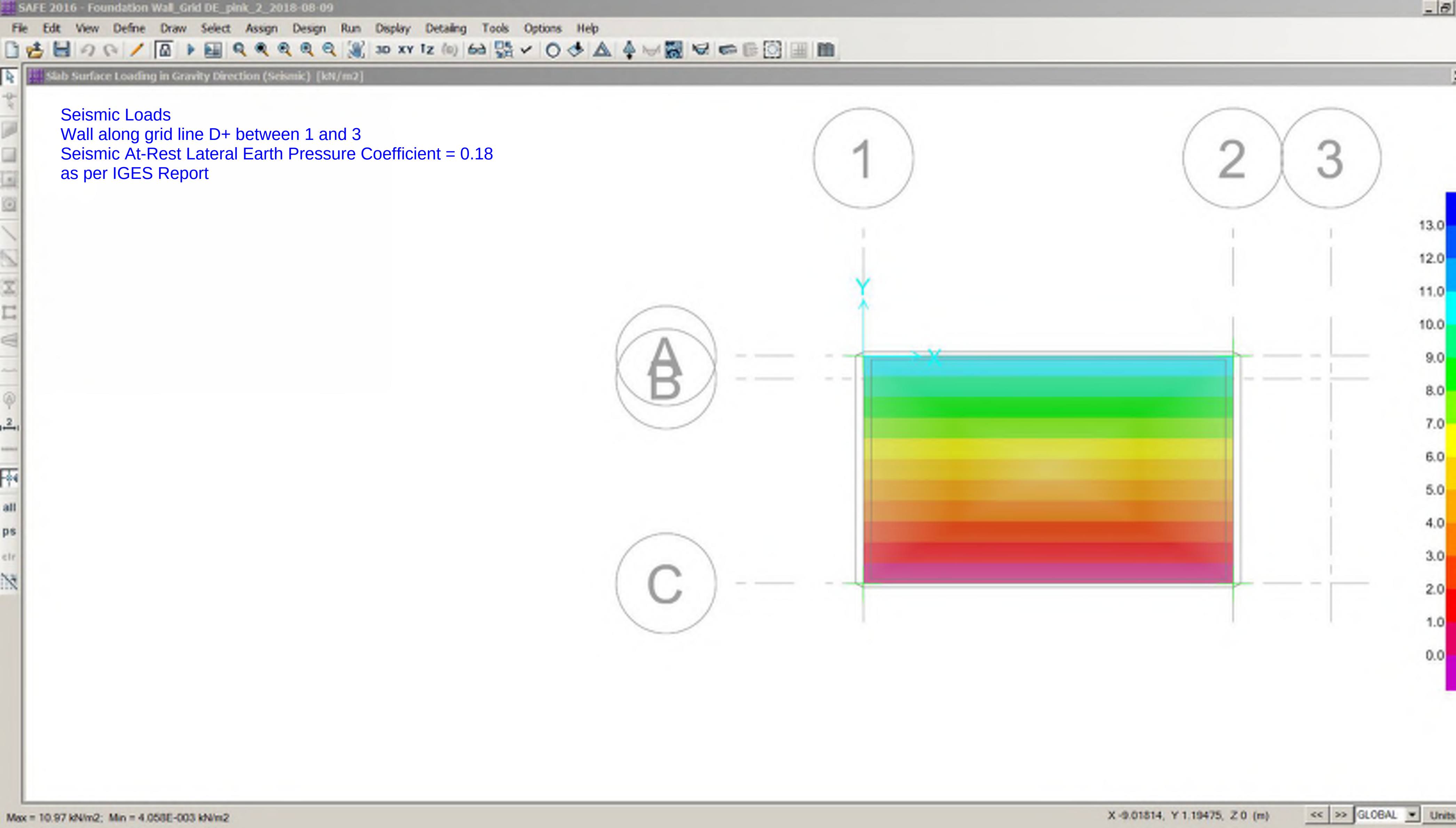

SAFE 2016 - Foundation Wall_Grid 4_blue_2_2017-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Soil) [kN/m2]
Soil Loads
Wall along grid line 4 between A' and D+
At-Rest Lateral Earth Pressure Coefficient = 0.50
as per IGES Report
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
Value = 39 kN/m2
X -252.80438, Y 51.25446, Z 0 (m)
GLOBAL
Units...

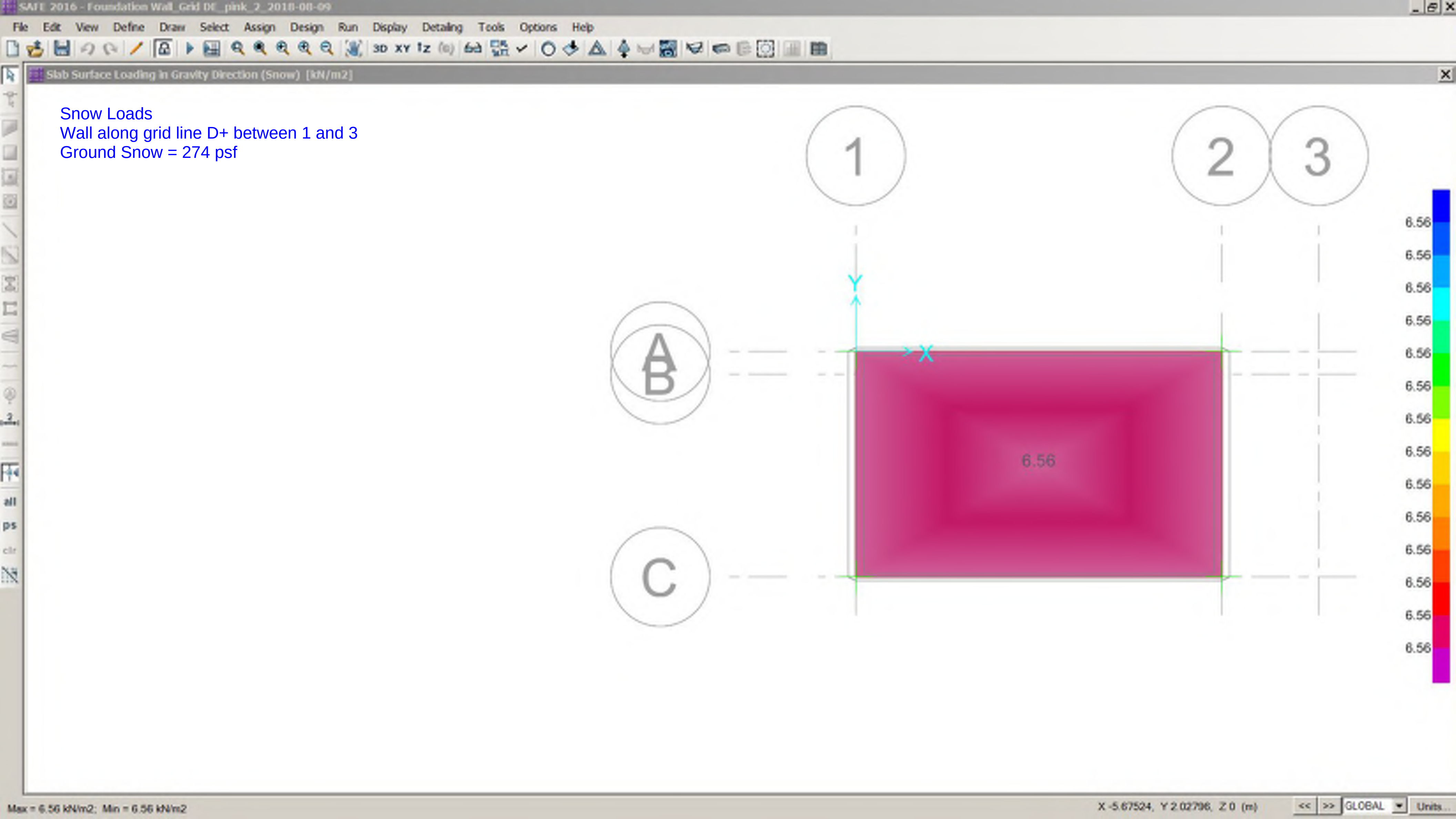

SAFE 2016 - Foundation Wall_Grid 4_blue_2_2017-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Surcharge) [kN/m2]
Surcharge Loads
Wall along grid line 4 between A' and D+
-1.2E+000
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
-1.20
Max = -1.2E+000 kN/m2; Min = -1.2E+000 kN/m2
X -265.29753, Y 57.66986, Z 0 (m)
GLOBAL
Units...


SAFE 2016 - Foundation Wall_Grid CD_green_2_2017-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Seismic) [kN/m2]
Seismic Loads
Wall along grid line C+ between 5 and 6
Seismic At-Rest Lateral Earth Pressure Coefficient = 0.18
as per IGES Report
1
2
A
B
C
19.5
18.0
16.5
15.0
13.5
12.0
10.5
9.0
7.5
6.0
4.5
3.0
1.5
0.0
Max = 18 kN/m2, Min = 4.608E-003 kN/m2
X -8.93958, Y 1.20066, Z 0 (m)
GLOBAL
Units...

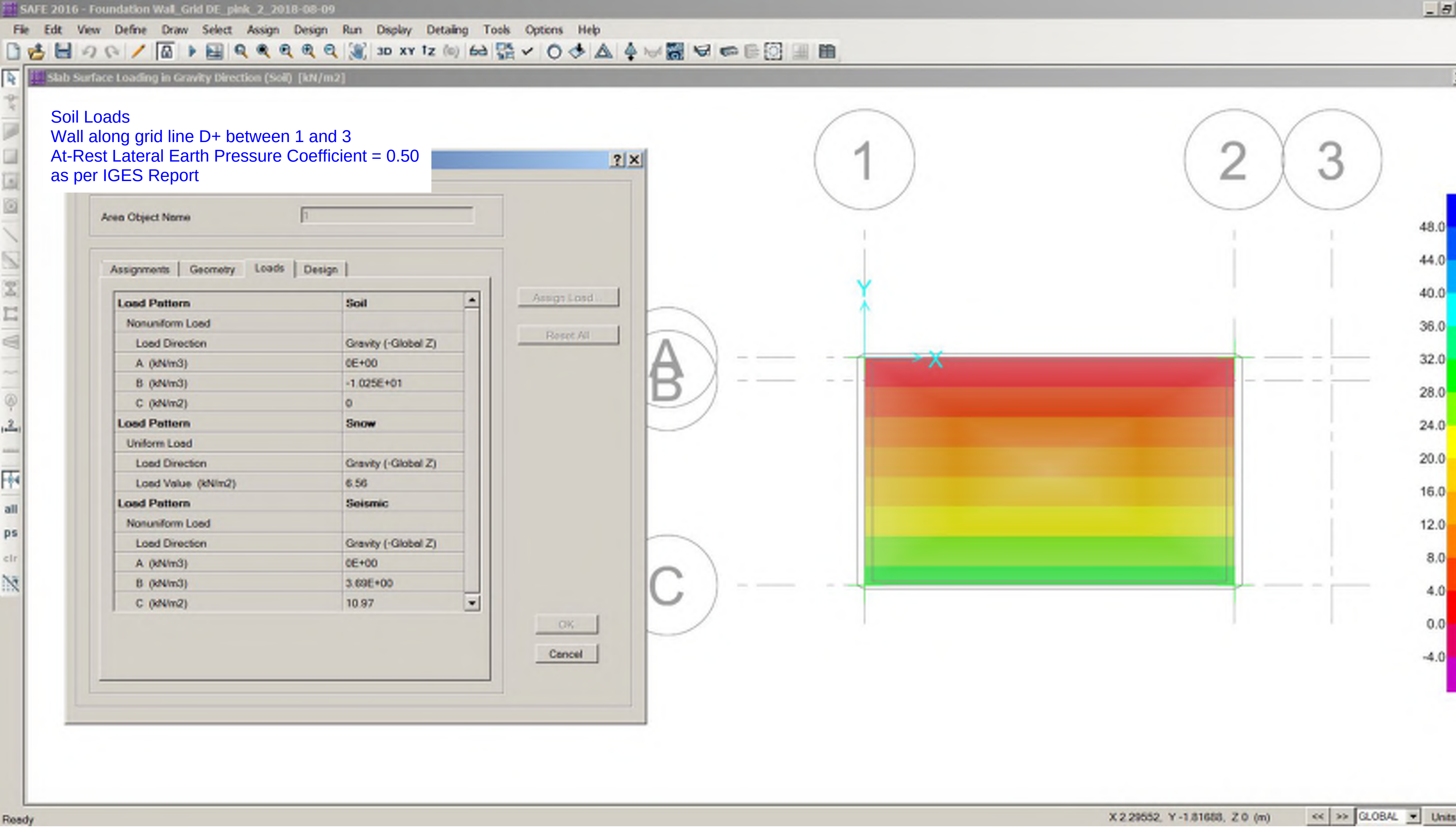

SAFE 2016 - Foundation Wall_Grid CD_green_2_2017-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Soil) [kN/m2]
Soil Loads
Wall along grid line C+ between 5 and 6
At-Rest Lateral Earth Pressure Coefficient = 0.50
as per IGES Report
Area Object Name
Assignments
Geometry
Loads
Design
Load Pattern | Soil
Nonuniform Load
Load Direction | Gravity (-Global Z)
A (kN/m3) | 0E+00
B (kN/m3) | -1.025E+01
C (kN/m2) | 0
Load Pattern | Seismic
Nonuniform Load
Load Direction | Gravity (-Global Z)
A (kN/m3) | 0E+00
B (kN/m3) | 3.69E+00
C (kN/m2) | 18
Load Pattern | Surcharge
Uniform Load
Load Direction | Gravity (-Global Z)
Load Value (kN/m2) | 1.2
Assign Load
Reset All
OK
Cancel
1
2
A
B
C
Y
X
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
Ready
X 2.51256, Y -3.26396, Z 0 (m)
GLOBAL
Units...


SAFE 2016 - Foundation Wall_Grid CD_green_2_2017-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Surcharge) [kN/m2]
Surcharge Loads
Wall along grid line C+ between 5 and 6
1
2
A
B
C
1.2
1.20
Max = 1.2 kN/m2; Min = 1.2 kN/m2
X -8.87354, Y 3.67073, Z 0 (m)
GLOBAL
Units...


SAFE 2016 - Foundation Wall_Grid DE_pink_2_2018-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Seismic) [kN/m2]
Seismic Loads
Wall along grid line D+ between 1 and 3
Seismic At-Rest Lateral Earth Pressure Coefficient = 0.18
as per IGES Report
1
2
3
A
B
C
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Max = 10.97 kN/m2; Min = 4.058E-003 kN/m2
X -9.01814, Y 1.19475, Z 0 (m)
GLOBAL
Units...


SAFE 2016 - Foundation Wall_Grid DE_pink_2_2018-08-09
File Edit View Define Draw Select Assign Design Run Display Detailing Tools Options Help
Slab Surface Loading in Gravity Direction (Snow) [kN/m2]
Snow Loads
Wall along grid line D+ between 1 and 3
Ground Snow = 274 psf
1
2
3
A
B
C
6.56
Max = 6.56 kN/m2; Min = 6.56 kN/m2
X -5.67524, Y 2.02796, Z 0 (m)
GLOBAL
Units...

Soil Loads
Wall along grid line D+ between 1 and 3
At-Rest Lateral Earth Pressure Coefficient = 0.50
as per IGES Report



Title:	**Concrete Flexure**
Master Created By:	J. David Bowick
Date:	8/8/2016
Master Last modified by:	
Date:	2017.07.29
Notes:	DESIGN FOR PAD FOOTING IN BASEMENT SUPPORTING VOLUME 2 BRACED FRAME SEISMIC LOADING
Project Name:	KIMMELMAN RESIDENC
Project Number:	170266
Name:	AVB
Date:	2017.07.29

Load		
Mf	112	kNm

Material		
ϕ_s	0.85	
fy	400	MPa
ϕ_c	0.65	
f'_c	30	MPa
α_1	0.805	

Geometry		
b	1000	mm
h	400	mm
Cover	75	mm
Aggregate	20	mm

Trial		
Bar Size	#6	
d_b	19.05	mm
A_b	284	mm^2
d	315.475	mm
A_{sreq}	1085	mm^2
No. Bars	4	

Reinforcing		
Min. Clear	41.9	mm
s_{min}	71.8	mm
s	75	mm
Row 1		
Bar Size	#6	
Bars	6	
A_s	1704	mm^2
d	315.475	mm
Row 2		
Bar Size	30M	
Bars		
A_s		mm^2
d	240.475	mm
Row 3		
Bar Size	35M	
Bars		
A_s		mm^2
d	165.475	mm

Calculations		
T	579.36	kN
d	315.5	mm
$\beta_1 c$	36.9	mm
Mr	172.1	kNm
Mf/Mr	0.65	

Bar Size	d_b (mm)	A_b (mm^2)
10M	11.3	100.0
15M	16	200.0
20M	19.5	300.0
25M	25.2	500.0
30M	29.9	700.0
35M	35.7	1000.0
45M	45	1500.0
55M	55	2500.0
#3	9.525	71.0
#4	12.7	129.0
#5	15.875	200.0
#6	19.05	284.0
#7	22.225	387.0
#8	25.4	509.0
#9	28.65	645.0
#10	32.26	819.0
#11	35.81	1006.0
#14	43	1452.0
#18	57.3	2581.0
#18J	59.4	2678.0

Blackwell
Structural Engineers

APPENDIX A - Design Loads

SULLAWAY ENGINEERING

10815 Rancho Bernardo RD., SD, CA 92127
projectmanager@sullawayeng.com
Phone: 858-312-5150 Fax: 858-777-3534

Design Loads

for
The Kimmelman Residence

Summit Powder Mountain
Eden, UT

Project # 14663

date;
2017-8-14

PROFESSIONAL STRUCTURAL ENGINEER
No. 6985627-2203
MICHAEL F
SULLAWAY
STATE OF UTAH

SULLAWAY ENGINEERING

10815 Rancho Bernardo RD., SD, CA 92127
projectmanager@sullawayeng.com
Phone: 858-312-5150 Fax: 858-777-3534

PROJECT: Kimmelman Residence DATE: 6/1/2017
PROJ. NO.: 14663 ENGINEER: mfs
CLIENT: Blackwell

building code; IBC 2015 units; pounds, feet unless noted otherwise

Seismic Analysis- Building Structure

Design Force (ASCE 12)

Latitude 41.3007
Longitude -111.8127

S_1= 0.304 (from USGS) I= 1.0
S_{DS}= 0.683 Risk Category II
S_{D1}= 0.363 Seismic Design Cat. D
Ss= 0.898
F_a= 1.14
F_v= 1.80

R	Ω	Cd	
3.25	2	3.25	ASCE Table 12.2-1 B.3. "Steel ordinary concentrically braced frame"
6.5	3	4	ASCE Table 12.2-1 B.3. "Wood frame sheer wall"

$V=C_sW$ $C_s=S_{DS}/(R/I)$

Vertical Seismic Loads

$E_v=0.2S_{DS}DL$

Live Loads

Typical L_o= 40 psf Roof 20 psf

Reduction

$L=L_o(0.25+15/\text{sqrt}(K_{LL}A_T))$ R1= 0.6
K_{LL}= 1 R2= 0.6
A_T= 1044 $L_r=L_oR_1R_2$= 7.20 psf

A_T (sf)	L (psf)
1000	28.57
1500	25.49
2000	23.42
2500	22.00

SULLAWAY
ENGINEERING

10815 Rancho Bernardo RD., SD, CA 92127
projectmanager@sullawayeng.com
Phone: 858-312-5150 Fax: 858-777-3534

PROJECT: Kimmelman Residence — DATE: 6/1/2017
PROJ. NO.: 14663 — ENGINEER: mfs
CLIENT: Blackwell

building code; IBC 2015 — units; pounds, feet unless noted otherwise

Snow Load — ASCE Chap. 7

Exposure Factor:	C_e =	=	1.0	
Thermal Factor:	C_t =	=	1.0	
Importance Factor:	I =	=	1.0	
Roof Slope Factor:	C_s =	=	1.0	
Ground Snow Load:	p_g =	=	274	psf
Flat Roof Snow Load:	p_f =	0.7 * Ce * Ct * I * pg =	192	psf
Sloped Roof Snow Load:	p_s =	C_s * p_f =	192	psf

Drift — note- No snow drift on roof

l_u=	18	ft				
h_d=.43*(l_u)^0.33*(p_g+10)^0.25 -1.5 =	3.1	ft	leeward			
h_d=	2.2	ft	windward	$w=4h_d$=	8.8	ft
h_c = 15.6-h_d=	13.4	ft				
γ=0.13pg+14 <30 =	30	pcf				
h_b=	6.4	ft				
drift load = p_d = $h_d\gamma$ =	66	psf				

p_d = 0 at a distance of 'w' from wall

Unbalanced Snow Load

ASCE 7.6.1

W= 13.5 ft (W<20ft, therefore unbalanced load= Ip_g & slope == 26.4 deg.)

Use p_f = 0 psf per engineering judgement

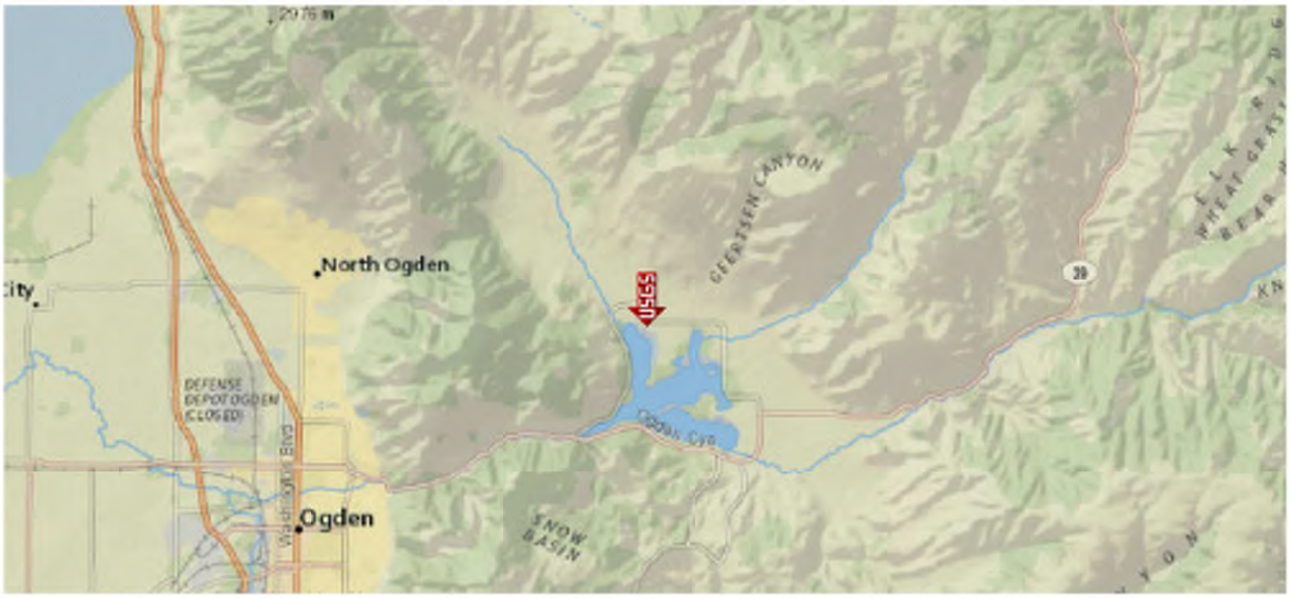
Frost Depth

40 inches

Design Maps Summary Report

User–Specified Input

Report Title	Summit Horizon, Eden, UT Fri March 25, 2016 18:16:11 UTC
Building Code Reference Document	2012 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	41.3007°N, 111.8127°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

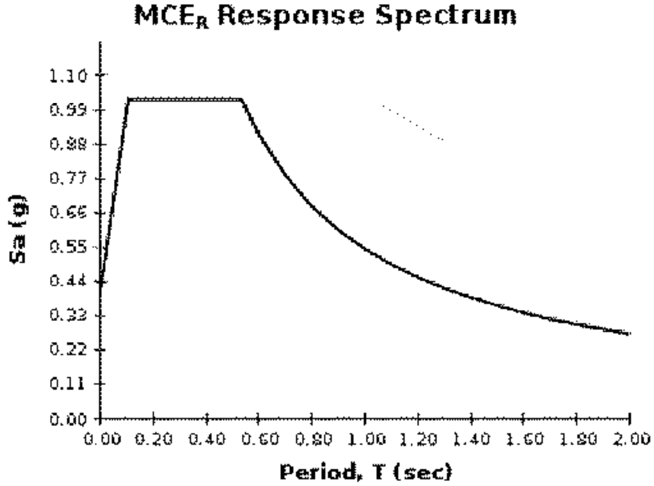


USGS–Provided Output

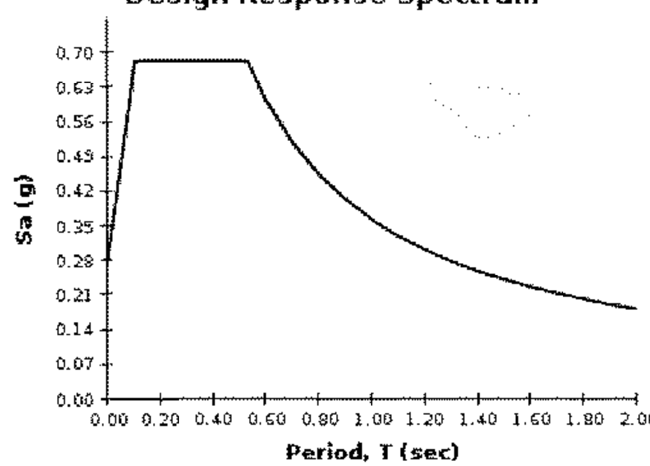
S_S =	0.898 g	S_{MS} =	1.025 g	S_{DS} =	0.683 g
S_1 =	0.304 g	S_{M1} =	0.545 g	S_{D1} =	0.363 g

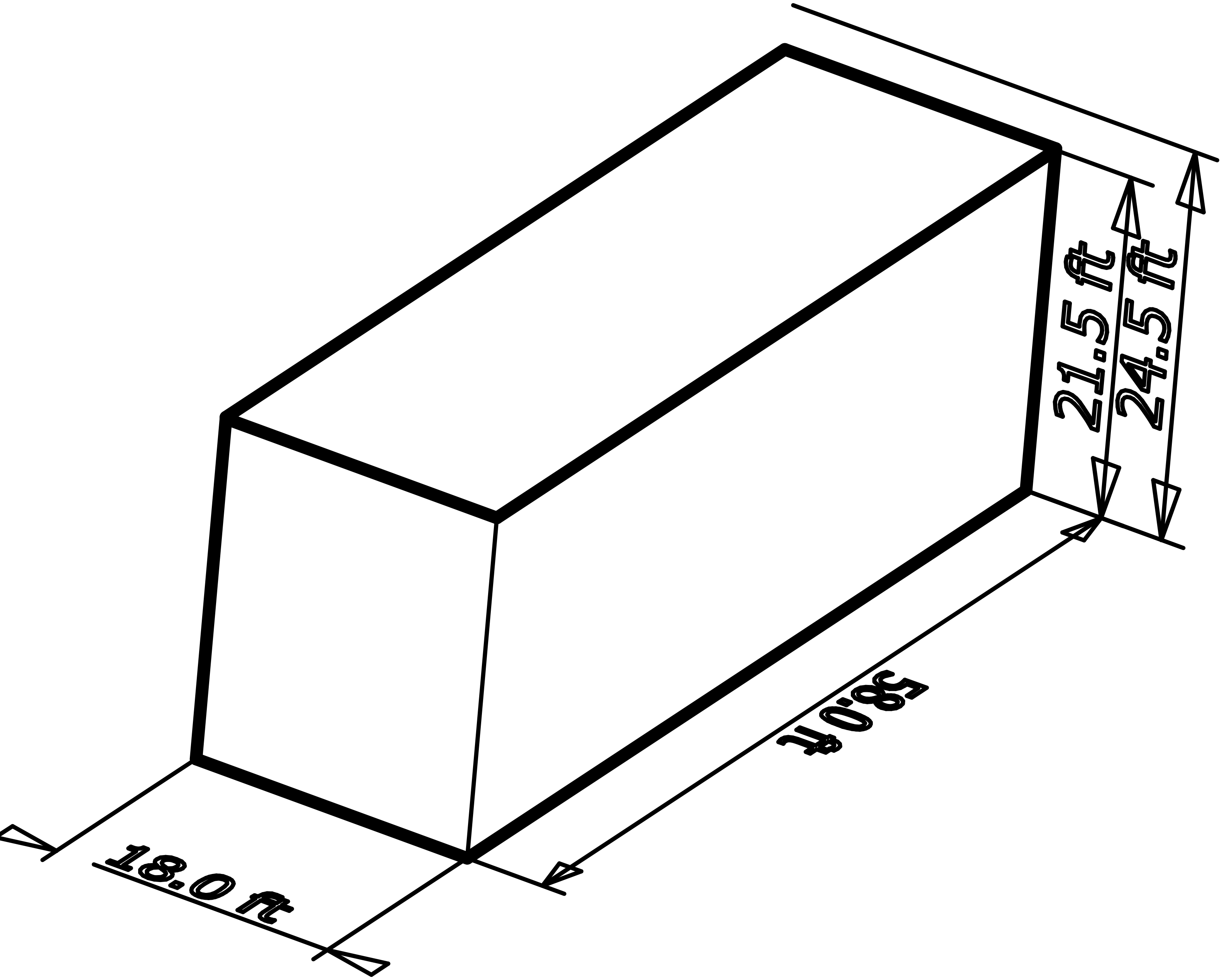
For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.

MCE_R Response Spectrum



Design Response Spectrum




21.5 ft
24.5 ft
58.0 ft
18.0 ft

MecaWind Pro v2.2.7.6 per ASCE 7-10

Developed by MECA Enterprises, Inc. Copyright www.mecaenterprises.com

```
Date         : 6/1/2017                     Project No.    : JobNo
Company Name : True                         Designed By    : Engineer
Address      : Address                      Description    : Description
City         : City                         Customer Name  : Customer
State        : State                        Proj Location  : Location
File Location: C:\Users\mikesullaway\AppData\Roaming\MecaWind\Default.wnd
```

Directional Procedure Simplified Diaphragm Building (Ch 27 Part 2)

```
Basic Wind Speed(V)      =  115.00 mph
Structural Category      =      II        Exposure Category      =      C
Natural Frequency        =    N/A         Flexible Structure     =     No
Importance Factor        =    1.00        Kd Directional Factor  =   0.85
Alpha                    =    9.50        Zg                     = 900.00 ft
At                       =    0.11        Bt                     =   1.00
Am                       =    0.15        Bm                     =   0.65
Cc                       =    0.20        l                      = 500.00 ft
Epsilon                  =    0.20        Zmin                   =  15.00 ft
Pitch of Roof            =  0 : 12        Slope of Roof(Theta)   =    .00 Deg
h: Mean Roof Ht          =   21.50 ft     Type of Roof           = FLAT
RHt: Ridge Ht            =   21.50 ft     Eht: Eave Height       =  21.50 ft
OH: Roof Overhang at Eave=     .00 ft     Overhead Type          = Overhang
Bldg Length Along Ridge  =   58.00 ft     Bldg Width Across Ridge=  18.00 ft
```

Gust Factor Calculations

```
Gust Factor Category I Rigid Structures - Simplified Method
Gust1:  For Rigid Structures (Nat. Freq.>1 Hz) use 0.85       =  0.85

Gust Factor Category II Rigid Structures - Complete Analysis
Zm:     0.6*Ht                                                =  15.00 ft
lzm:    Cc*(33/Zm)^0.167                                      =   0.23
Lzm:    l*(Zm/33)^Epsilon                                     = 427.06 ft
Q:      (1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5                    =   0.94
Gust2: 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm))              =   0.89

Gust Factor Summary
Not a Flexible Structure use the Lessor of Gust1 or Gust2     =   0.85
```

Table 26.11-1 Internal Pressure Coefficients for Buildings, GCpi

```
GCPi   : Internal Pressure Coefficient                        = +/-0.18
```

Topographic Adjustment

```
0.33*z                                                        =    1.00
Kzt (0.33*z): Topographic factor at elevation 0.33*z          =    1.00
Vtopo: Adjust V per Para 27.5.2: V * [Kzt(0.33*z)]^0.5        =  115.00 mph
```

MWFRS Diaphragm Building Wind Pressures per Ch 27 Pt 2

All pressures shown are based upon STRENGTH Design, with a Load Factor of 1

MWFRS Pressures for Wind Normal to 58 ft wall (Normal to Ridge)

```
WALL PRESSURES PER TABLE 27.6-1
L/B: Bldg Dim in Wind Dir / Bldg Dim Normal to Wind Dir       =    0.31
h:   Height to top of Windward Wall                           =   21.50 ft
ph:  Net Pressure at top of wall (windward + leeward)         =   28.99 psf
p0:  Net Pressure at bottom of wall (windward + leeward)      =   28.47 psf

ps:  Side wall pressure acting away from wall = .54 * ph      =  -15.65 psf
pl:  Leeward wall pressure acting away from wall = .38 * ph   =  -11.02 psf
pwh: Windward wall press @ top acting toward wall = ph-pl     =   17.97 psf
pw0: Windward wall press @ bot acting toward wall = p0-pl     =   17.45 psf

ROOF PRESSURES PER TABLE 27.6-2
h:      Mean Roof Height                                      =   21.500 ft
Lambda: Exposure Adjustment Factor                            =   1.000
Slope:  Roof Slope                                            =   .00 Deg

Any slope less than 9.46 Deg is treated as a 'Flat' roof per Table 27.6-2
```

Zone	Load Case1 psf	Load Case2 psf

1	.00	.00
2	.00	.00
3	-27.88	.00
4	-24.83	.00
5	-20.37	.00

Note: A value of '0' indicates that the zone/load case is not applicable.

ROOF OVERHANG LOADS (FIGURE 27.6-3):

LOAD CASE 1:
Povh1: Overhang pressure for zone 1 = .00 psf
Povh3: Overhang pressure for zone 3 = -20.91 psf

LOAD CASE 2:
Povh1: Overhang pressure for zone 1 = .00 psf
Povh3: Overhang pressure for zone 3 = .00 psf

Normal to Ridge - Base Reactions - Walls+Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h/2)	-27.88	624	.00	.00	17.38	63.0	.0	.0
Roof (h/2 to h)	-24.83	421	.00	.00	10.44	-56.1	.0	.0
Windward Wall	17.97	580	.00	10.42	.00	172.0	.0	.0
Windward Wall	17.73	580	.00	10.28	.00	66.8	.0	.0
Windward Wall	17.49	87	.00	1.52	.00	1.1	.0	.0
Leeward Wall	-11.02	1247	.00	13.74	.00	147.7	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0
Total	.00	4312	.00	35.97	27.82	394.5	.0	.0

Normal to Ridge - Base Reactions - Walls Only +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	17.97	580	.00	10.42	.00	172.0	.0	.0
Windward Wall	17.73	580	.00	10.28	.00	66.8	.0	.0
Windward Wall	17.49	87	.00	1.52	.00	1.1	.0	.0
Leeward Wall	-11.02	1247	.00	13.74	.00	147.7	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0
Total	.00	3268	.00	35.97	.00	387.7	.0	.0

Normal to Ridge - Base Reactions - Walls+Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	17.97	580	.00	10.42	.00	172.0	.0	.0
Windward Wall	17.73	580	.00	10.28	.00	66.8	.0	.0
Windward Wall	17.49	87	.00	1.52	.00	1.1	.0	.0
Leeward Wall	-11.02	1247	.00	13.74	.00	147.7	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0
Total	.00	3268	.00	35.97	.00	387.7	.0	.0

Normal to Ridge - Base Reactions - Walls Only -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	17.97	580	.00	10.42	.00	172.0	.0	.0
Windward Wall	17.73	580	.00	10.28	.00	66.8	.0	.0
Windward Wall	17.49	87	.00	1.52	.00	1.1	.0	.0
Leeward Wall	-11.02	1247	.00	13.74	.00	147.7	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0
Total	.00	3268	.00	35.97	.00	387.7	.0	.0

Normal to Ridge - Base Reactions - Walls+Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Normal to Ridge

Note (1) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (2) MIN = Minimum pressures on Walls = 16 psf and Roof = 8 psf
Note (3) Area* = Area of the surface projected onto a vertical plane normal to wind.

MWFRS Pressures for Wind Normal to 18 ft wall (Along Ridge)

WALL PRESSURES PER TABLE 27.6-1

L/B:	Bldg Dim in Wind Dir / Bldg Dim Normal to Wind Dir	=	3.22
h:	Height to top of Windward Wall	=	21.50 ft
ph:	Net Pressure at top of wall (windward + leeward)	=	25.05 psf
p0:	Net Pressure at bottom of wall (windward + leeward)	=	24.42 psf
ps:	Side wall pressure acting away from wall = .64 * ph	=	-16.03 psf
pl:	Leeward wall pressure acting away from wall = .27 * ph	=	-6.76 psf
pwh:	Windward wall press @ top acting toward wall = ph-pl	=	18.28 psf
pw0:	Windward wall press @ bot acting toward wall = p0-pl	=	17.66 psf

ROOF PRESSURES PER TABLE 27.6-2

h:	Mean Roof Height	=	21.500 ft
Lambda:	Exposure Adjustment Factor	=	1.000
Slope:	Roof Slope	=	.00 Deg

Any slope less than 9.46 Deg is treated as a 'Flat' roof per Table 27.6-2

Zone	Load Case1 psf	Load Case2 psf
1	.00	.00
2	.00	.00
3	-27.88	.00
4	-24.83	.00
5	-20.37	.00

Note: A value of '0' indicates that the zone/load case is not applicable.

ROOF OVERHANG LOADS (FIGURE 27.6-3):

LOAD CASE 1:

Povh1:	Overhang pressure for zone 1	=	.00 psf
Povh3:	Overhang pressure for zone 3	=	-20.91 psf

LOAD CASE 2:

Povh1:	Overhang pressure for zone 1	=	.00 psf
Povh3:	Overhang pressure for zone 3	=	.00 psf

Along Ridge - Base Reactions - Walls+Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h/2)	-27.88	194	.00	.00	5.39	.0	-127.4	.0
Roof (h/2 to h)	-24.83	194	.00	.00	4.80	.0	-61.9	.0
Roof (h to 2h)	-20.37	387	.00	.00	7.88	.0	25.6	.0
Roof (>2h)	-20.37	270	.00	.00	5.50	.0	118.2	.0
Windward Wall	18.28	180	3.29	.00	.00	.0	-54.3	.0
Windward Wall	17.99	180	3.24	.00	.00	.0	-21.1	.0
Windward Wall	17.70	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-6.76	387	2.62	.00	.00	.0	-28.1	.0
Side Wall	-16.03	1247	.00	19.99	.00	214.9	.0	.0
Side Wall	-16.03	1247	.00	-19.99	.00	-214.9	.0	.0
Total	.00	4312	9.62	.00	23.58	.0	-149.3	.0

Along Ridge - Base Reactions - Walls Only +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	18.28	180	3.29	.00	.00	.0	-54.3	.0
Windward Wall	17.99	180	3.24	.00	.00	.0	-21.1	.0
Windward Wall	17.70	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-6.76	387	2.62	.00	.00	.0	-28.1	.0
Side Wall	-16.03	1247	.00	19.99	.00	214.9	.0	.0
Side Wall	-16.03	1247	.00	-19.99	.00	-214.9	.0	.0
Total	.00	3268	9.62	.00	.00	.0	-103.8	.0

Along Ridge - Base Reactions - Walls+Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	18.28	180	3.29	.00	.00	.0	-54.3	.0
Windward Wall	17.99	180	3.24	.00	.00	.0	-21.1	.0
Windward Wall	17.70	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-6.76	387	2.62	.00	.00	.0	-28.1	.0
Side Wall	-16.03	1247	.00	19.99	.00	214.9	.0	.0
Side Wall	-16.03	1247	.00	-19.99	.00	-214.9	.0	.0
Total	.00	3268	9.62	.00	.00	.0	-103.8	.0

Along Ridge - Base Reactions - Walls Only -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	18.28	180	3.29	.00	.00	.0	-54.3	.0
Windward Wall	17.99	180	3.24	.00	.00	.0	-21.1	.0
Windward Wall	17.70	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-6.76	387	2.62	.00	.00	.0	-28.1	.0
Side Wall	-16.03	1247	.00	19.99	.00	214.9	.0	.0
Side Wall	-16.03	1247	.00	-19.99	.00	-214.9	.0	.0
Total	.00	3268	9.62	.00	.00	.0	-103.8	.0

Along Ridge - Base Reactions - Walls+Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Along Ridge

Note (1) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (2) MIN = Minimum pressures on Walls = 16 psf and Roof = 8 psf
Note (3) Area* = Area of the surface projected onto a vertical plane normal to wind.

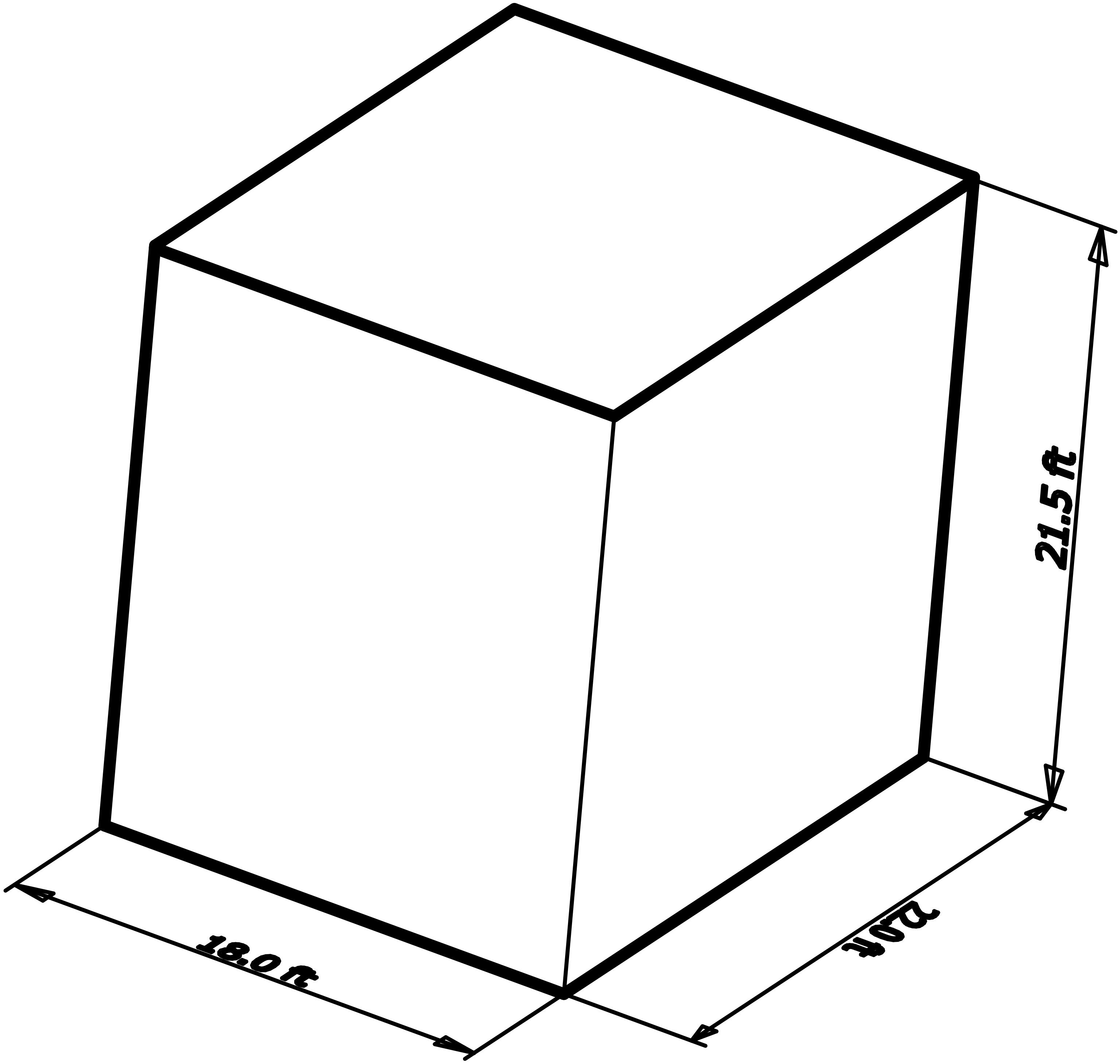
Total Base Reaction Summary

Description	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Normal to Ridge Walls+Roof +GCpi	.0	36.0	27.8	394.5	.0	.0
Normal to Ridge Walls Only +GCpi	.0	36.0	.0	387.7	.0	.0
Normal to Ridge Walls+Roof -GCpi	.0	36.0	.0	387.7	.0	.0
Normal to Ridge Walls Only -GCpi	.0	36.0	.0	387.7	.0	.0
Normal to Ridge Walls+Roof MIN	.0	.0	.0	.0	.0	.0
Along Ridge Walls+Roof +GCpi	9.6	.0	23.6	.0	-149.3	.0
Along Ridge Walls Only +GCpi	9.6	.0	.0	.0	-103.8	.0
Along Ridge Walls+Roof -GCpi	9.6	.0	.0	.0	-103.8	.0
Along Ridge Walls Only -GCpi	9.6	.0	.0	.0	-103.8	.0
Along Ridge Walls+Roof MIN	.0	.0	.0	.0	.0	.0

Notes Applying to MWFRS Reactions:

Note (1) Per Fig 27.4-1, Note 9, Use greater of Shear calculated with or without roof.
Note (2) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (3) MIN = Minimum pressures on Walls = 16 psf and Roof = 8 psf
Note (4) MIN area is the area of the surface onto a vertical plane normal to wind.
Note (5) Total Roof Area (incl OH Top) = 1044.00 sq. ft

Note (6) LC = Load Case (Some pressures can be zero, ref ASCE 7-10 Ch 27 Pt 2)


21.5 ft
18.0 ft
2.0ft

MecaWind Pro v2.2.7.6 per ASCE 7-10


```
Date         : 6/1/2017                      Project No.   : JobNo
Company Name : True                          Designed By   : Engineer
Address      : Address                       Description   : Description
City         : City                          Customer Name : Customer
State        : State                         Proj Location : Location
File Location: C:\Users\mikesullaway\SharePoint\Sullaway Engineering\Sullaway - Documents\Projects
\14600\14663\Load Report\meca 18x22.wnd
```

Directional Procedure Simplified Diaphragm Building (Ch 27 Part 2)

```
Basic Wind Speed(V)        =  115.00 mph
Structural Category        =      II        Exposure Category       =       C
Natural Frequency          =    N/A         Flexible Structure      =      No
Importance Factor          =    1.00        Kd Directional Factor   =    0.85
Alpha                      =    9.50        Zg                      =  900.00 ft
At                         =    0.11        Bt                      =    1.00
Am                         =    0.15        Bm                      =    0.65
Cc                         =    0.20        l                       =  500.00 ft
Epsilon                    =    0.20        Zmin                    =   15.00 ft
Pitch of Roof              =  0 : 12        Slope of Roof(Theta)    =     .00 Deg
h: Mean Roof Ht            =   21.50 ft     Type of Roof            = FLAT
RHt: Ridge Ht              =   21.50 ft     Eht: Eave Height        =   21.50 ft
OH: Roof Overhang at Eave=       .00 ft     Overhead Type           = OH w/ soffit
Bldg Length Along Ridge    =   22.00 ft     Bldg Width Across Ridge=   18.00 ft
```

Gust Factor Calculations

```
Gust Factor Category I Rigid Structures - Simplified Method
Gust1:  For Rigid Structures (Nat. Freq.>1 Hz) use 0.85         =  0.85

Gust Factor Category II Rigid Structures - Complete Analysis
Zm:     0.6*Ht                                                  =  15.00 ft
lzm:    Cc*(33/Zm)^0.167                                        =   0.23
Lzm:    l*(Zm/33)^Epsilon                                       = 427.06 ft
Q:      (1/(1+0.63*((B+Ht)/Lzm)^0.63))^0.5                      =   0.94
Gust2: 0.925*((1+1.7*lzm*3.4*Q)/(1+1.7*3.4*lzm))                =   0.89

Gust Factor Summary
Not a Flexible Structure use the Lessor of Gust1 or Gust2       =   0.85
```

Table 26.11-1 Internal Pressure Coefficients for Buildings, GCpi

```
GCPi    : Internal Pressure Coefficient                         = +/-0.18
```

Topographic Adjustment

```
0.33*z                                                          =     1.00
Kzt (0.33*z): Topographic factor at elevation 0.33*z            =     1.00
Vtopo: Adjust V per Para 27.5.2: V * [Kzt(0.33*z)]^0.5          =   115.00 mph
```

MWFRS Diaphragm Building Wind Pressures per Ch 27 Pt 2

All pressures shown are based upon STRENGTH Design, with a Load Factor of 1

MWFRS Pressures for Wind Normal to 22 ft wall (Normal to Ridge)

```
WALL PRESSURES PER TABLE 27.6-1
L/B: Bldg Dim in Wind Dir / Bldg Dim Normal to Wind Dir        =     0.82
h:   Height to top of Windward Wall                            =    21.50 ft
ph:  Net Pressure at top of wall (windward + leeward)          =    28.99 psf
p0:  Net Pressure at bottom of wall (windward + leeward)       =    28.47 psf

ps:  Side wall pressure acting away from wall = .54 * ph       =   -15.65 psf
pl:  Leeward wall pressure acting away from wall = .38 * ph    =   -11.02 psf
pwh: Windward wall press @ top acting toward wall = ph-pl      =    17.97 psf
pw0: Windward wall press @ bot acting toward wall = p0-pl      =    17.45 psf

ROOF PRESSURES PER TABLE 27.6-2
h:      Mean Roof Height                                       =    21.500 ft
Lambda: Exposure Adjustment Factor                             =     1.000
Slope:  Roof Slope                                             =     .00 Deg

Any slope less than 9.46 Deg is treated as a 'Flat' roof per Table 27.6-2
```

Zone	Load Case1 psf	Load Case2 psf

1	.00	.00
2	.00	.00
3	-27.88	.00
4	-24.83	.00
5	-20.37	.00

Note: A value of '0' indicates that the zone/load case is not applicable.

ROOF OVERHANG LOADS (FIGURE 27.6-3):

LOAD CASE 1:
Povh1: Overhang pressure for zone 1 = .00 psf
Povh3: Overhang pressure for zone 3 = -20.91 psf

LOAD CASE 2:
Povh1: Overhang pressure for zone 1 = .00 psf
Povh3: Overhang pressure for zone 3 = .00 psf

Normal to Ridge - Base Reactions - Walls+Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h/2)	-27.88	237	.00	.00	6.59	23.9	.0	.0
Roof (h/2 to h)	-24.83	160	.00	.00	3.96	-21.3	.0	.0
Windward Wall	17.97	220	.00	3.95	.00	65.2	.0	.0
Windward Wall	17.73	220	.00	3.90	.00	25.4	.0	.0
Windward Wall	17.49	33	.00	0.58	.00	0.4	.0	.0
Leeward Wall	-11.02	473	.00	5.21	.00	56.0	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0
Total	.00	2116	.00	13.64	10.55	149.7	.0	.0

Normal to Ridge - Base Reactions - Walls Only +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	17.97	220	.00	3.95	.00	65.2	.0	.0
Windward Wall	17.73	220	.00	3.90	.00	25.4	.0	.0
Windward Wall	17.49	33	.00	0.58	.00	0.4	.0	.0
Leeward Wall	-11.02	473	.00	5.21	.00	56.0	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0
Total	.00	1720	.00	13.64	.00	147.0	.0	.0

Normal to Ridge - Base Reactions - Walls+Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	17.97	220	.00	3.95	.00	65.2	.0	.0
Windward Wall	17.73	220	.00	3.90	.00	25.4	.0	.0
Windward Wall	17.49	33	.00	0.58	.00	0.4	.0	.0
Leeward Wall	-11.02	473	.00	5.21	.00	56.0	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0
Total	.00	1720	.00	13.64	.00	147.0	.0	.0

Normal to Ridge - Base Reactions - Walls Only -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	17.97	220	.00	3.95	.00	65.2	.0	.0
Windward Wall	17.73	220	.00	3.90	.00	25.4	.0	.0
Windward Wall	17.49	33	.00	0.58	.00	0.4	.0	.0
Leeward Wall	-11.02	473	.00	5.21	.00	56.0	.0	.0
Side Wall	-15.65	387	-6.06	.00	.00	.0	65.1	.0
Side Wall	-15.65	387	6.06	.00	.00	.0	-65.1	.0

Total	.00	1720	.00	13.64	.00	147.0	.0	.0

Normal to Ridge - Base Reactions - Walls+Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Normal to Ridge
Note (1) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (2) MIN = Minimum pressures on Walls = 16 psf and Roof = 8 psf
Note (3) Area* = Area of the surface projected onto a vertical plane normal to wind.

MWFRS Pressures for Wind Normal to 18 ft wall (Along Ridge)

WALL PRESSURES PER TABLE 27.6-1

L/B:	Bldg Dim in Wind Dir / Bldg Dim Normal to Wind Dir	=	1.22
h:	Height to top of Windward Wall	=	21.50 ft
ph:	Net Pressure at top of wall (windward + leeward)	=	28.11 psf
p0:	Net Pressure at bottom of wall (windward + leeward)	=	27.57 psf
ps:	Side wall pressure acting away from wall = .56 * ph	=	-15.81 psf
pl:	Leeward wall pressure acting away from wall = .36 * ph	=	-10.00 psf
pwh:	Windward wall press @ top acting toward wall = ph-pl	=	18.12 psf
pw0:	Windward wall press @ bot acting toward wall = p0-pl	=	17.57 psf

ROOF PRESSURES PER TABLE 27.6-2

h:	Mean Roof Height	=	21.500 ft
Lambda:	Exposure Adjustment Factor	=	1.000
Slope:	Roof Slope	=	.00 Deg

Any slope less than 9.46 Deg is treated as a 'Flat' roof per Table 27.6-2

Zone	Load Case1 psf	Load Case2 psf
1	.00	.00
2	.00	.00
3	-27.88	.00
4	-24.83	.00
5	-20.37	.00

Note: A value of '0' indicates that the zone/load case is not applicable.

ROOF OVERHANG LOADS (FIGURE 27.6-3):

LOAD CASE 1:

Povh1: Overhang pressure for zone 1	=	.00 psf
Povh3: Overhang pressure for zone 3	=	-20.91 psf

LOAD CASE 2:

Povh1: Overhang pressure for zone 1	=	.00 psf
Povh3: Overhang pressure for zone 3	=	.00 psf

Along Ridge - Base Reactions - Walls+Roof +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Roof (0 to h/2)	-27.88	194	.00	.00	5.39	.0	-30.3	.0
Roof (h/2 to h)	-24.83	194	.00	.00	4.80	.0	24.6	.0
Roof (h to 2h)	-20.37	9	.00	.00	0.18	.0	2.0	.0
Windward Wall	18.12	180	3.26	.00	.00	.0	-53.8	.0
Windward Wall	17.86	180	3.22	.00	.00	.0	-20.9	.0
Windward Wall	17.61	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-10.00	387	3.87	.00	.00	.0	-41.6	.0
Side Wall	-15.81	473	.00	7.48	.00	80.4	.0	.0
Side Wall	-15.81	473	.00	-7.48	.00	-80.4	.0	.0
Total	.00	2116	10.82	.00	10.38	.0	-120.4	.0

Along Ridge - Base Reactions - Walls Only +GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	18.12	180	3.26	.00	.00	.0	-53.8	.0
Windward Wall	17.86	180	3.22	.00	.00	.0	-20.9	.0
Windward Wall	17.61	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-10.00	387	3.87	.00	.00	.0	-41.6	.0
Side Wall	-15.81	473	.00	7.48	.00	80.4	.0	.0
Side Wall	-15.81	473	.00	-7.48	.00	-80.4	.0	.0
Total	.00	1720	10.82	.00	.00	.0	-116.7	.0

Along Ridge - Base Reactions - Walls+Roof -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	18.12	180	3.26	.00	.00	.0	-53.8	.0
Windward Wall	17.86	180	3.22	.00	.00	.0	-20.9	.0
Windward Wall	17.61	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-10.00	387	3.87	.00	.00	.0	-41.6	.0
Side Wall	-15.81	473	.00	7.48	.00	80.4	.0	.0
Side Wall	-15.81	473	.00	-7.48	.00	-80.4	.0	.0
Total	.00	1720	10.82	.00	.00	.0	-116.7	.0

Along Ridge - Base Reactions - Walls Only -GCpi

Description	Press psf	Area ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Windward Wall	18.12	180	3.26	.00	.00	.0	-53.8	.0
Windward Wall	17.86	180	3.22	.00	.00	.0	-20.9	.0
Windward Wall	17.61	27	0.48	.00	.00	.0	-0.4	.0
Leeward Wall	-10.00	387	3.87	.00	.00	.0	-41.6	.0
Side Wall	-15.81	473	.00	7.48	.00	80.4	.0	.0
Side Wall	-15.81	473	.00	-7.48	.00	-80.4	.0	.0
Total	.00	1720	10.82	.00	.00	.0	-116.7	.0

Along Ridge - Base Reactions - Walls+Roof MIN

Description	Press psf	Area* ft^2	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Total	.00	0	.00	.00	.00	.0	.0	.0

Notes - Along Ridge

Note (1) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (2) MIN = Minimum pressures on Walls = 16 psf and Roof = 8 psf
Note (3) Area* = Area of the surface projected onto a vertical plane normal to wind.

Total Base Reaction Summary

Description	Fx Kip	Fy Kip	Fz Kip	Mx K-ft	My K-ft	Mz K-ft
Normal to Ridge Walls+Roof +GCpi	.0	13.6	10.6	149.7	.0	.0
Normal to Ridge Walls Only +GCpi	.0	13.6	.0	147.0	.0	.0
Normal to Ridge Walls+Roof -GCpi	.0	13.6	.0	147.0	.0	.0
Normal to Ridge Walls Only -GCpi	.0	13.6	.0	147.0	.0	.0
Normal to Ridge Walls+Roof MIN	.0	.0	.0	.0	.0	.0
Along Ridge Walls+Roof +GCpi	10.8	.0	10.4	.0	-120.4	.0
Along Ridge Walls Only +GCpi	10.8	.0	.0	.0	-116.7	.0
Along Ridge Walls+Roof -GCpi	10.8	.0	.0	.0	-116.7	.0
Along Ridge Walls Only -GCpi	10.8	.0	.0	.0	-116.7	.0
Along Ridge Walls+Roof MIN	.0	.0	.0	.0	.0	.0

Notes Applying to MWFRS Reactions:

Note (1) Per Fig 27.4-1, Note 9, Use greater of Shear calculated with or without roof.
Note (2) X= Along Building ridge, Y = Normal to Building Ridge, Z = Vertical
Note (3) MIN = Minimum pressures on Walls = 16 psf and Roof = 8 psf
Note (4) MIN area is the area of the surface onto a vertical plane normal to wind.
Note (5) Total Roof Area (incl OH Top) = 396.00 sq. ft

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Note (6)  LC = Load Case (Some pressures can be zero, ref ASCE 7-10 Ch 27 Pt 2)
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