July 16, 2025

Walker Custom Homes, LLC
Attn: Donnie Edwards

Re: 2531 NE Woodland Oaks Circle (Lot 22, Woodland Oaks)

Vista Structural Engineering, LLC, was asked to address three structural items called out during the city rough-in inspection for the house being built at 2531 NE Woodland Oaks Circle. The items are below, with our responses following each item.

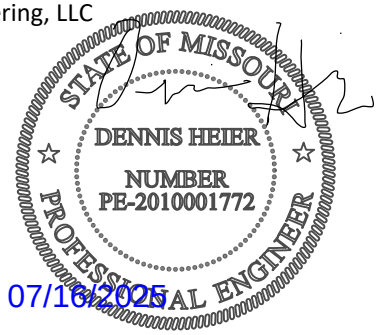
1. **I-beam ledger through bolts not fully installed. Have engineer address ledger support attachment to I-beam, not per detail 4/S3.1** *Through bolts (1/2"-diameter) are required at 2'-0" o.c. We were informed that additional through bolts have been installed with 2x12 web filler material where not previously installed. Pictures attached on following pages.*
2. **Engineer to address support of the roof beam point load not centered to I-beam. Also, plan calls for ¼" steel web stiffener under the point load.** *Based on the attached calculations, the flange is able to adequately support the point load from the roof. The ¼" web stiffener was specified on the plans as an additional measure of redundancy, beyond what is required by code. Per the attached calculations, the web stiffener, although recommended, is not required.*
3. **Move the I-beam column to correct location at stair. Note: if you're concerned , you can have the engineer recheck support of the (5) 2x6 stud point load at this point. Plan does not indicate any support for the I-beam to the grade beam, just blocking of the point load to the I-beam.** *There is no support required in the basement under the (5) 2x6 stud point load on the main floor. The steel beam was designed to transfer this point load to the two adjacent columns – approximately 4' away at the left side of the stairs, and approximately 13' away, adjacent to the storage area. A calculation has been attached to show the structural analysis of the basement beam, including support of this point load by the W8x21 steel beam. Additionally, a partial plan view showing the load path of the point load has been attached as well. It should be noted that there will need to be solid blocking between the top of the steel beam and the bottom of the floor sheathing under the (5) 2x6 studs on the main floor.*

Our firm appreciates the opportunity to serve you. If you have any questions or if you need anything further, please feel free to contact us.

Sincerely,

Vista Structural Engineering, LLC

Dennis Heier, P.E.



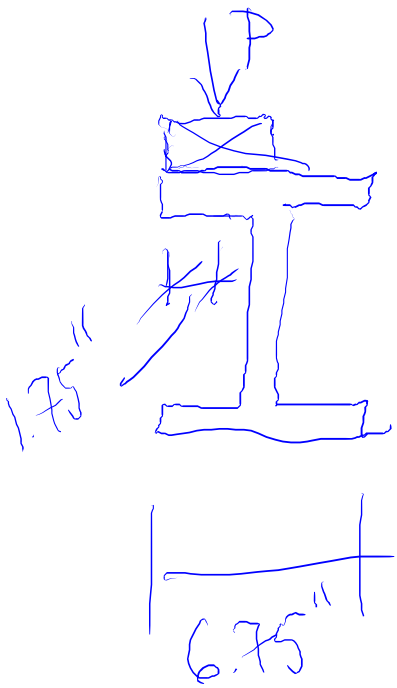
Picture showing installation of through bolts (item #1)

Picture showing installation of through bolts (item #1)

Picture showing installation of through bolts (item #1)

Picture showing installation of through bolts (item #1)

POINT LOAD ON W14x30 FLANGE:



ANALYZE AS CANTILEVER:

$$\ell = \frac{6.75"}{2} = 3.375"$$

1.625" / 2

$P_D = P_L = P_S = 3.2k$

$P_{TOTAL} = 8.0k$

3.375"

$F_y = 50ksi$

$E = 29{,}000ksi$

$I = \frac{bd^3}{12} = 0.057 in^4$

FLANGE SECTION

$b = 12"$ $d = 0.385"$ $V = 8.0k$

$M = P\ell = 13.0k \cdot in$

$$\Delta_{MAX} = \frac{P\ell^3}{3EI} = \frac{(8.0k)(10.625")^3}{(3)(29{,}000ksi)(0.057 in^4)} = 0.0026"$$

OK

CHECK BENDING @ FLANGE-TO-WEB POINT:

$S = \frac{bd^2}{6}$ USE FLANGE DEPTH + ½ OF FILLET DEPTH FOR d

$S = \frac{(12")(0.585")^2}{6} = 0.684\ in^3$

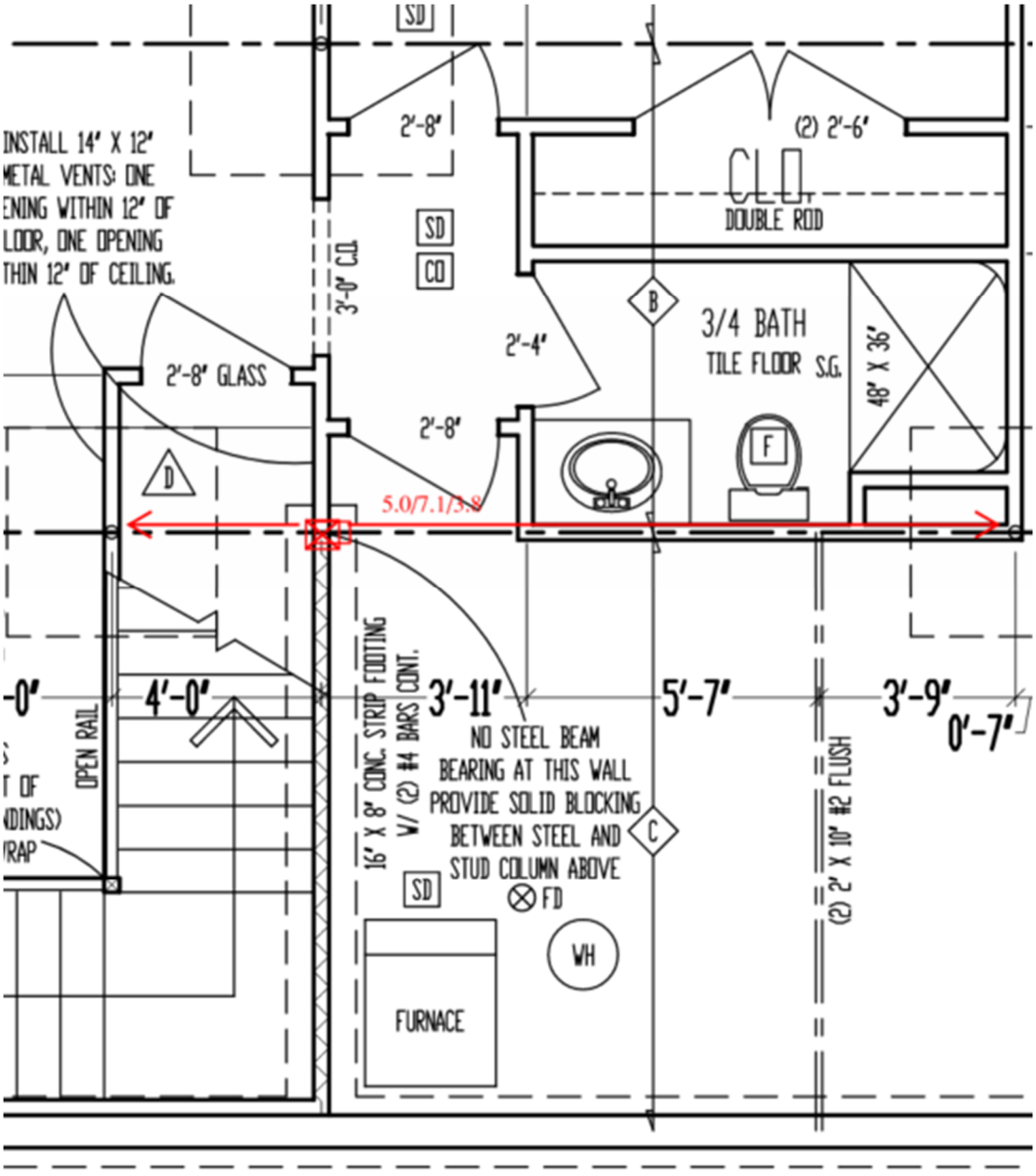
$\sigma = \frac{M}{S} = \frac{13.0\ k\text{-}in}{0.684\ in^3} = 19.0\ ksi$

$\sigma_{ALLOW} = \frac{50\ ksi}{1.67} = 29\ ksi > \sigma$ OK

CHECK SHEAR STRESS:

$\tau_{MAX} = \frac{3V}{2A} = \frac{3(8.0k)}{2(0.385" \times 12")} = 2.60\ ksi$

$\tau_{ALLOW} = \frac{0.6F_y}{\Omega} = 0.4F_y = 20\ ksi > \tau_{MAX}$ OK



Load path of point load (item #3)

Vista Structural Engineering, LLC
11575 SW Pacific Hwy #2262
Tigard, OR 97223
(971) 233-6099
dennis@vistastructural.com

Project Title:
Engineer:
Project ID:
Project Descr:

Printed: 16 JUL 2025, 10:06AM

Steel Beam

File: WLO022 Spec.ec6

Lic. # : KW-06010523 — Vista Structural Engineering, LLC

DESCRIPTION: FDN - beam behind stairs in basement (2531 NE WOODLAND OAK CIRCLE)

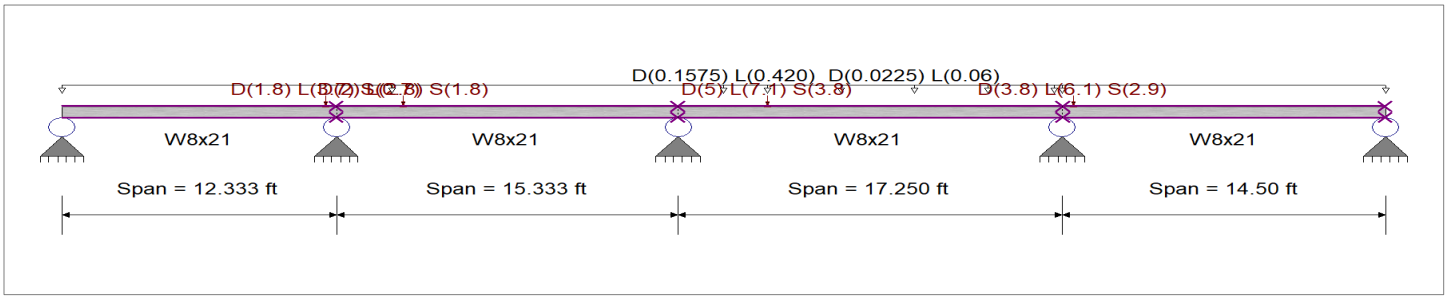
CODE REFERENCES

Calculations per AISC 360-10, IBC 2012, CBC 2013, ASCE 7-10
Load Combination Set : IBC 2018

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 50.0 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

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

Beam self weight NOT internally calculated and added
Loads on all spans...
Uniform Load on ALL spans : D = 0.0150, L = 0.040 ksf, Tributary Width = 10.50 ft

Load(s) for Span Number 1
Point Load : D = 1.80, L = 3.70, S = 0.70 k @ 11.833 ft

Load(s) for Span Number 2
Point Load : D = 2.0, L = 2.80, S = 1.80 k @ 3.0 ft

Load for Span Number 3
Uniform Load : D = 0.0150, L = 0.040 ksf, Extent = 4.0 -->> 17.250 ft, Tributary Width = 1.50 ft

Point Load : D = 5.0, L = 7.10, S = 3.80 k @ 4.0 ft

Load(s) for Span Number 4
Point Load : D = 3.80, L = 6.10, S = 2.90 k @ 0.50 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.619 : 1	Maximum Shear Stress Ratio =	0.376 : 1
Section used for this span	W8x21	Section used for this span	W8x21
Ma : Applied	31.510 k-ft	Va : Applied	15.547 k
Mn / Omega : Allowable	50.898 k-ft	Vn/Omega : Allowable	41.40 k
Load Combination	+D+L	Load Combination	+D+L
Location of maximum on span	15.333ft	Location of maximum on span	17.250 ft
Span # where maximum occurs	Span # 2	Span # where maximum occurs	Span # 3

Maximum Deflection

Max Downward Transient Deflection	0.266 in	Ratio =	777 >=360
Max Upward Transient Deflection	-0.045 in	Ratio =	4,077 >=360
Max Downward Total Deflection	0.419 in	Ratio =	494 >=180
Max Upward Total Deflection	-0.086 in	Ratio =	2134 >=180

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 12.33 ft	1	0.071	0.072	1.79	-3.61	3.61	85.00	50.90	1.00	1.00	2.99	62.10	41.40
Dsgn. L = 15.33 ft	2	0.218	0.132	2.65	-11.12	11.12	85.00	50.90	1.00	1.00	5.47	62.10	41.40
Dsgn. L = 17.25 ft	3	0.218	0.132	9.50	-11.12	11.12	85.00	50.90	1.00	1.00	5.47	62.10	41.40

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Steel Beam

File: WLO022 Spec.ec6

Lic. # : KW-06010523

Vista Structural Engineering, LLC

DESCRIPTION: FDN - beam behind stairs in basement (2531 NE WOODLAND OAK CIRCLE)

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
Dsgn. L = 14.50 ft	4	0.166	0.130	1.52	-8.42	8.42	85.00	50.90	1.00	1.00	5.39	62.10	41.40
+D+L													
Dsgn. L = 12.33 ft	1	0.246	0.238	6.64	-12.51	12.51	85.00	50.90	1.00	1.00	9.85	62.10	41.40
Dsgn. L = 15.33 ft	2	0.619	0.362	6.27	-31.51	31.51	85.00	50.90	1.00	1.00	15.01	62.10	41.40
Dsgn. L = 17.25 ft	3	0.619	0.376	24.17	-31.51	31.51	85.00	50.90	1.00	1.00	15.55	62.10	41.40
Dsgn. L = 14.50 ft	4	0.513	0.376	6.44	-26.12	26.12	85.00	50.90	1.00	1.00	15.55	62.10	41.40
+D+S													
Dsgn. L = 12.33 ft	1	0.085	0.090	1.65	-4.34	4.34	85.00	50.90	1.00	1.00	3.72	62.10	41.40
Dsgn. L = 15.33 ft	2	0.331	0.206	5.24	-16.84	16.84	85.00	50.90	1.00	1.00	8.55	62.10	41.40
Dsgn. L = 17.25 ft	3	0.331	0.206	16.07	-16.84	16.84	85.00	50.90	1.00	1.00	8.55	62.10	41.40
Dsgn. L = 14.50 ft	4	0.224	0.203	1.09	-11.40	11.40	85.00	50.90	1.00	1.00	8.40	62.10	41.40
+D+0.750L													
Dsgn. L = 12.33 ft	1	0.202	0.197	5.43	-10.29	10.29	85.00	50.90	1.00	1.00	8.14	62.10	41.40
Dsgn. L = 15.33 ft	2	0.519	0.305	5.32	-26.41	26.41	85.00	50.90	1.00	1.00	12.62	62.10	41.40
Dsgn. L = 17.25 ft	3	0.519	0.314	20.45	-26.41	26.41	85.00	50.90	1.00	1.00	13.01	62.10	41.40
Dsgn. L = 14.50 ft	4	0.426	0.314	5.21	-21.70	21.70	85.00	50.90	1.00	1.00	13.01	62.10	41.40
+D+0.750L+0.750S													
Dsgn. L = 12.33 ft	1	0.213	0.210	5.32	-10.84	10.84	85.00	50.90	1.00	1.00	8.69	62.10	41.40
Dsgn. L = 15.33 ft	2	0.603	0.361	7.16	-30.71	30.71	85.00	50.90	1.00	1.00	14.93	62.10	41.40
Dsgn. L = 17.25 ft	3	0.603	0.369	25.24	-30.71	30.71	85.00	50.90	1.00	1.00	15.26	62.10	41.40
Dsgn. L = 14.50 ft	4	0.470	0.369	4.84	-23.93	23.93	85.00	50.90	1.00	1.00	15.26	62.10	41.40
+0.60D													
Dsgn. L = 12.33 ft	1	0.043	0.043	1.08	-2.17	2.17	85.00	50.90	1.00	1.00	1.79	62.10	41.40
Dsgn. L = 15.33 ft	2	0.131	0.079	1.59	-6.67	6.67	85.00	50.90	1.00	1.00	3.28	62.10	41.40
Dsgn. L = 17.25 ft	3	0.131	0.079	5.70	-6.67	6.67	85.00	50.90	1.00	1.00	3.28	62.10	41.40
Dsgn. L = 14.50 ft	4	0.099	0.078	0.91	-5.05	5.05	85.00	50.90	1.00	1.00	3.24	62.10	41.40

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0666	5.427		0.0000	0.000
+D+L	2	0.0116	3.680	+D+0.750L+0.750S	-0.0862	11.960
+D+L	3	0.4194	7.590		0.0000	11.960
+D+L	4	0.0536	9.570	+D+0.750L+0.750S	-0.0244	2.223

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3	Support 4	Support 5
Overall MAXimum	2.770	16.902	21.613	23.695	2.727
Overall MINimum	-0.031	1.853	3.756	3.728	-0.106
D Only	0.752	5.318	7.558	7.937	0.692
+D+L	2.770	16.902	21.613	23.695	2.727
+D+S	0.721	7.171	11.314	11.665	0.586
+D+0.750L	2.265	14.006	18.099	19.755	2.218
+D+0.750L+0.750S	2.242	15.396	20.916	22.551	2.139
+0.60D	0.451	3.191	4.535	4.762	0.415
L Only	2.018	11.584	14.055	15.757	2.035
S Only	-0.031	1.853	3.756	3.728	-0.106

Steel Section Properties : W8x21

Depth	=	8.280	in	I xx	=	75.30	in^4	J	=	0.282 in^4
Web Thick	=	0.250	in	S xx		18.20	in^3	Cw	=	152.00 in^6
Flange Width	=	5.270	in	R xx	=	3.490	in			
Flange Thick	=	0.400	in	Zx	=	20.400	in^3			
Area	=	6.160	in^2	I yy	=	9.770	in^4			
Weight	=	21.000	plf	S yy	=	3.710	in^3	Wno	=	10.400 in^2
Kdesign	=	0.700	in	R yy	=	1.260	in	Sw	=	5.470 in^4
K1	=	0.563	in	Zy	=	5.690	in^3	Qf	=	3.960 in^3
rts	=	1.460	in					Qw	=	10.100 in^3
Ycg	=	4.140	in							