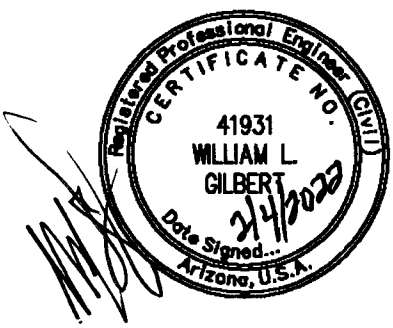
GILBERT STRUCTURAL LLC

2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

Phone (480) 398-8144
Fax (480) 398-8166

PROJECT: Kasnoff Residence
15546 East Telegraph Drive
Fountain Hills, Arizona 85268

CLIENT: Brian Scott Design
4127 East Mesquite Street
Gilbert, Arizona 85296



STRUCTURAL CALCULATIONS INDEX:

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 1

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

DESIGN CRITERIA

CODE: IRC 2018 w/ AMENDMENTS

WIND SPEED: V_{ULT}=115 MPH EXPOSURE: C

V_{ASD}=90 MPH (Applicable Per Exceptions in Sect. 1609.1.1)

ROOF FRAMING	FLAT ROOF (PSF)
FOAM-ROOF	5.0
½" PLYWOOD	1.5
TRUSSES	3.0
M & E	1.0
INSULATION	1.0
½" GYP. BOARD	2.5
MISCELLANEOUS	1.0
TOTAL DEAD LOAD (DL)	**15.0**
ROOF LIVE LOAD (LL)	**20.0**
FLOOR DEAD LOAD (DL)	**15.0**
FLOOR LIVE LOAD (LL)	**40.0**

MATERIALS:

CONCRETE: 2500 PSI

MASONRY: f'_m = 1900 psi

REINFORCING STEEL: ASTM A 615 GRADE 60

GLULAM BEAMS: EWS 24F-V4 FOR SIMPLE SPANS
EWS 24F-V8 FOR CONTINUOUS SPANS AND CANTILEVERS
STANDARD CAMBER: R=2000'

LUMBER: DOUGLAS FIR #2 (DFL) OR BETTER

STUDS: HEM-FIR STUD GRADE FOR HEIGHTS LESS THAN 8'
HEM-FIR #2 FOR HEIGHTS GREATER THAN 8'

ALL TRUSS CALCULATIONS AND SHOP DRAWINGS ARE TO BE SUPPLIED AND SEALED BY AN ARIZONA REGISTERED ENGINEER AND ARE TO BE REVIEWED BY GILBERT STRUCTURAL LLC.

SEE PROJECT SPECIFIC SOIL REPORT FOR FOUNDATION DESIGN CRITERIA. IF NO SITE SPECIFIC SOIL REPORT IS AVAILABLE, FOUNDATION DESIGN IS BASED UPON THE MINIMUM REQUIREMENTS SPECIFIED IN THE ABOVE MENTIONED GOVERNING BUILDING CODE. SOILS ARE ASSUMED TO BE NON-EXPANSIVE AND NON-COLLAPSIBLE. FINISH GRADE SHALL SLOPE AWAY FROM FOUNDATION WALLS.

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN **SHEET NO.:** 2

PROJECT: KASNOFF RESIDENCE **DATE :** 1/2022

TABLE OF ALLOWABLE UNIFORM LOADS (PLF)

	SECTION (D.F.#2 - TYPICAL)				**SECTION** (GLB 24F-V4 - TYPICAL)					
	(2) 2x6	(2) 2x8	(2) 2x10	(2) 2x12	3.125x9	3.125x10.5	3.125x12	3.125x15	5.125x12	5.125x15
SPAN										
2'-0"	1935 (V)	3478 (V)	6862 (M)	9228 (M)	12,276 (V)	*****	*****	*****	*****	*****
3'-0"	1000 (V)	1540 (V)	2400 (V)	3789 (V)	4124 (V)	5784 (V)	8283 (V)	*****	*****	*****
4'-0"	676 (V)	989 (V)	1426 (V)	2008 (V)	2478 (V)	3199 (V)	4125 (V)	6856 (V)	6765 (V)	*****
5'-0"	458 (M)	724 (V)	1015 (V)	1370 (V)	1767 (V)	2214 (V)	2749 (V)	4124 (V)	4509 (V)	6764 (V)
6'-0"	318 (M)	511 (M)	762 (V)	1025 (M)	1371 (V)	1699 (V)	2058 (V)	2943 (V)	3375 (V)	4826 (V)
7'-0"	234 (M)	375 (M)	560 (M)	753 (V)	1127 (V)	1371 (V)	1646 (V)	2287 (V)	2699 (V)	3751 (V)
8'-0"	*****	287 (M)	428 (M)	576 (M)	952 (V)	1156 (V)	1374 (V)	1873 (V)	2254 (V)	3072 (V)
9'-0"	*****	227 (M)	338 (M)	455 (M)	826 (V)	997 (V)	1181 (V)	1582 (V)	1937 (V)	2595 (V)
10'-0"	*****	*****	274 (M)	369 (M)	729 (V)	876 (V)	1031 (V)	1378 (V)	1691 (V)	2261 (V)
11'-0"	*****	*****	226 (M)	305 (M)	570 (V)	781 (V)	914 (V)	1214 (V)	1499 (V)	1991 (V)
12'-0"	*****	*****	*****	256 (M)	439 (D)	697 (V)	826 (V)	1085 (V)	1355 (V)	1779 (V)
13'-0"	*****	*****	*****	218 (M)	345 (D)	548 (V)	748 (V)	981 (V)	1164 (V)	1610 (V)
14'-0"	*****	*****	*****	188 (M)	276 (D)	439 (D)	655 (V)	898 (V)	1003 (M)	1473 (V)
15'-0"	*****	*****	*****	164 (M)	225 (D)	357 (D)	533 (V)	826 (V)	868 (M)	1326 (M)
16'-0"	*****	*****	*****	144 (M)	185 (D)	294 (D)	439 (V)	763 (V)	720 (M)	1158 (M)
17'-0"	*****	*****	*****	*****	154 (D)	245 (D)	366 (D)	711 (V)	600 (D)	1020 (M)
18'-0"	*****	*****	*****	*****	*****	206 (D)	308 (D)	602 (D)	506 (D)	904 (M)
19'-0"	*****	*****	*****	*****	*****	175 (D)	262 (D)	512 (D)	430 (D)	807 (M)
20'-0"	*****	*****	*****	*****	*****	150 (D)	225 (D)	439 (D)	369 (D)	721 (D)
21'-0"	*****	*****	*****	*****	*****	*****	194 (D)	379 (D)	318 (D)	622 (D)
22'-0"	*****	*****	*****	*****	*****	*****	*****	330 (D)	277 (D)	541 (D)
23'-0"	*****	*****	*****	*****	*****	*****	*****	288 (D)	242 (D)	473 (D)
24'-0"	*****	*****	*****	*****	*****	*****	*****	254 (D)	213 (D)	417 (D)
25'-0"	*****	*****	*****	*****	*****	*****	*****	225 (D)	188 (D)	368 (D)
26'-0"	*****	*****	*****	*****	*****	*****	*****	*****	*****	328 (D)
27'-0"	*****	*****	*****	*****	*****	*****	*****	*****	*****	292 (D)
28'-0"	*****	*****	*****	*****	*****	*****	*****	*****	*****	262 (D)
29'-0"	*****	*****	*****	*****	*****	*****	*****	*****	*****	236 (D)
30'-0"	*****	*****	*****	*****	*****	*****	*****	*****	*****	213 (D)

*1. REFER TO TABLE FOR MEMBERS WITH UNIFORM LOADS ONLY. FOR ALL OTHERS REFER TO SEPARATE GRAVITY CALC'S.

2. LETTER NEXT TO FIGURE SHOWS THE GOVERNING PARAMETER FOR DESIGN (M=MOMENT, V=SHEAR, D=DEFLECTION)

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 3

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

Height (ft.)	Allowable Loads for 2x4 Post (lbs.)					Solid Post (lbs.)	
	Number of Members (Hem-Fir #2)					(DFL #1)	
	1	2	3	4	5	4X4 Post	(1) 4x6
8'	2458	4917	7330	9713	12,051	7371	20,888
9'	1993	3987	5955	7903	9827	6006	18,572
10'	1642	3284	4911	6525	8124	4964	16,299
11'	1373	2746	4109	5464	6809	4159	14,225
12'	1163	2327	3484	4635	5779	3529	12,415

Height (ft.)	Allowable Loads for 2x6 Post (lbs.)					Solid Post (lbs.)	
	Number of Members (Hem-Fir #2)					(DFL #1)	
	1	2	3	4	5	(1) 4x6	(1) 6x6
8'	7316	14,633	20,882	27,843	34,803	20,888	31,023
9'	6401	12,802	18,494	24,659	30,824	18,572	27,927
10'	5546	11,092	16,179	21,572	26,965	16,299	24,770
11'	4795	9591	14,088	18,784	23,480	14,225	21,794
12'	4158	8316	12,274	16,366	20,458	12,415	19,132
13'	3623	7247	10,733	14,311	17,889	10,869	16,820
14'	3177	6354	9433	12,578	15,722	9561	14,840
15'	2802	5605	8337	11,116	13,896	8455	13,153
16'	2487	4975	7410	9881	12,351	7519	11,716

Maximum Spans For Joists (FT) *								
SPACING	Flat Roof (15 psf DL, 20 psf LL) SECTION (D.F.#2 OR BETTER)				Interior Floor (15 psf DL, 40 psf LL) SECTION (D.F.#2 OR BETTER)			
	2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
12"	12'-6"	16'-6"	20'-6"	23'-6"	10'-0"	13'-6"	16'-6"	19'-0"
16"	11'-6"	14'-6"	18'-0"	20'-6"	9'-6"	12'-0"	14'-6"	16'-6"
24"	9'-6"	12'-0"	14'-6"	17'-0"	7'-6"	9'-6"	12'-0"	13'-6"
SPACING	4/12 Roof (20 psf DL, 20 psf LL) SECTION (D.F.#2 OR BETTER)				Balcony (15 psf DL, 60 psf LL) SECTION (D.F.#2 OR BETTER)			
	2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
12"	11'-6"	15'-6"	19'-0"	22'-0"	9'-0"	11'-6"	14'-0"	16'-6"
16"	10'-6"	13'-6"	16'-6"	19'-0"	8'-0"	10'-0"	12'-6"	14'-6"
24"	8'-6"	11'-0"	13'-6"	15'-6"	6'-6"	8'-0"	10'-0"	11'-6"

	Size (in.)	Allowable Footing Capacity (psf)					
		1000	1250	1500	2000	2500	3,000
(A)	24x24	4000#	5000#	6000#	8000#	10,000#	12,000#
(B)	30x30	6250#	7800#	9375#	12,500#	15,625#	18,750#
(C)	36x36	9000#	11,250#	13,500#	18,000#	22,500#	27,000#
(D)	42x42	12,250#	15,300#	18,375#	24,500#	30,625#	36,750#
(E)	48x48	16,000#	20,000#	24,000#	32,000#	40,000#	48,000#

* TABLE APPLIES TO MEMBERS W/ UNIFORM LOADS ONLY. FOR ALL OTHERS REFER TO SEPARATE GRAVITY CALC'S.

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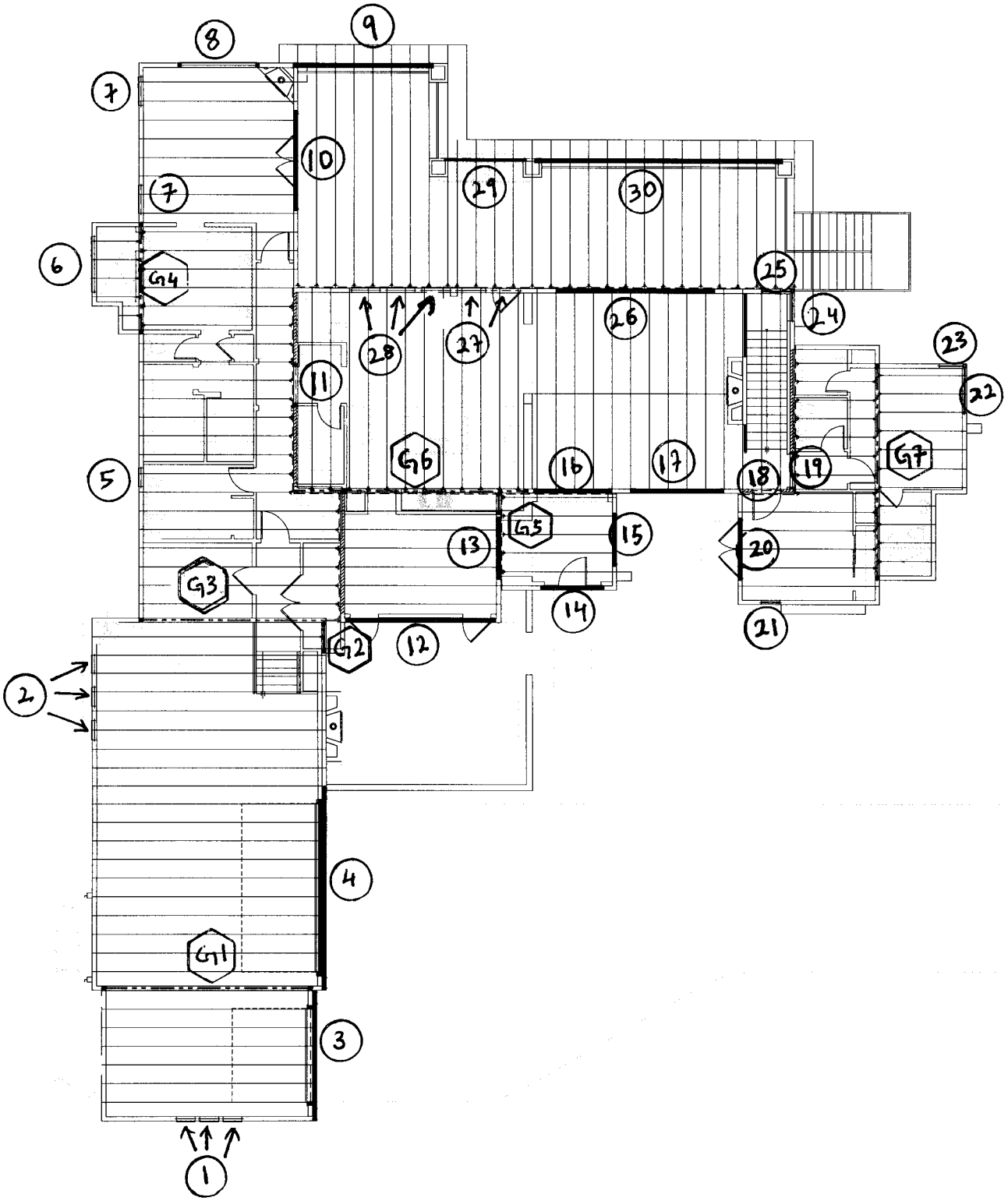
CLIENT: BRIAN SCOTT DESIGN

SHEET NO. 4

PROJECT: KASNOFF RESIDENCE

DATE: 1 / 2022



MAIN HOUSE
ROOF FRAMING PLAN

SCALE: 1/16" = 1'-0"

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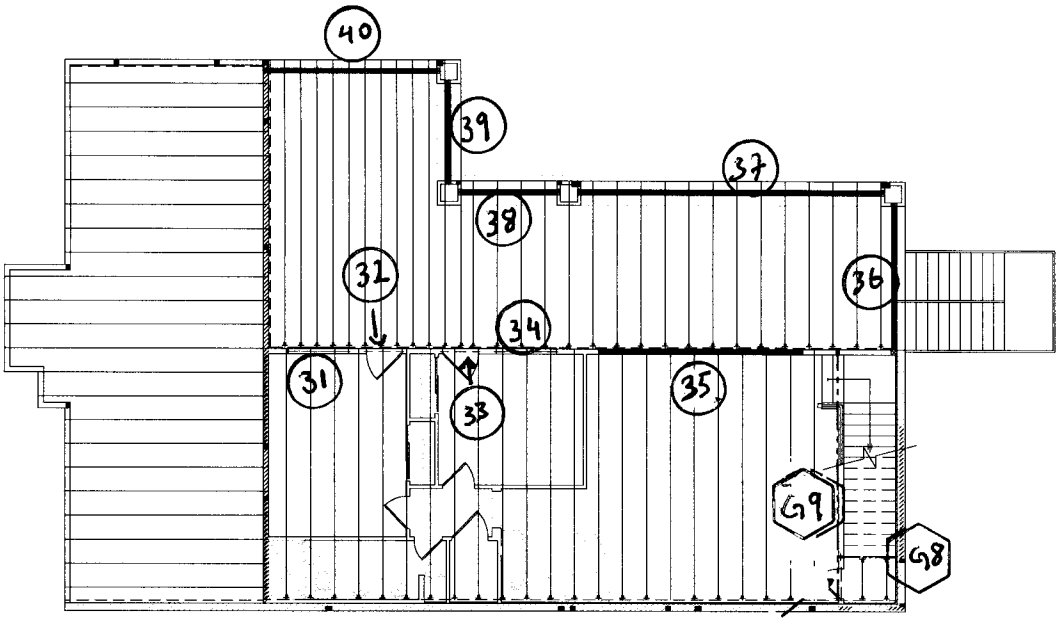
CLIENT: BRIAN SCOTT DESIGN

SHEET NO. 5

PROJECT: KASNOFF RESIDENCE

DATE: 1 / 2022



BASEMENT
ROOF FRAMING PLAN

SCALE: 1/16" = 1'-0"

GILBERT STRUCTURAL
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CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 6

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

(G1) $L = 22'-0"$

$w = \left(\frac{2}{2} + \frac{2}{2}\right) \times 35 = 70$ plf

$R_x = 770$ #

USE: PRE. ENG. G.T

(G2) $L = 3'-0"$

$w = \left(2 + \frac{2.5}{2}\right) \times 35 = 508$ plf

$R_x = 762$ #

USE: PRE. ENG. G.T

(G3) $L = 21'-6"$

$w = \left(\frac{2}{2} + \frac{2}{2}\right) \times 35 = 70$ plf

$P_{10} = 218$ # } from (G2), at 20'-0"

$P_{1L} = 290$ # }

$R_A = 904$ #

$R_B = 1341$ #

USE: PRE. ENG. G.T

(G4) $L = 11'-0"$

$w = \left(\frac{5}{2} + \frac{17}{2}\right) \times 35 = 385$ plf

$R_x = 2118$ #

USE: PRE. ENG. G.T

(G5) $L = 2'-0"$

$w = \left(\frac{12}{2} + \frac{16}{2}\right) \times 35 = 490$ plf

$R_x = 490$ #

USE: PRE. ENG. G.T

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CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 7

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

(G6) $L = 24'-6"$ supports at 0', 5'-5", 24'-6"

$w = \left(\frac{2}{2} + \frac{22}{2}\right) \times 35 = 420$ plf

$P_{1D} = 210\#$ } from (G5), at 22'-0"
$P_{1L} = 280\#$ }

$R_A = -1766\#$

$R_B = 9219\#$

$R_C = 3746\#$

USE: PRE-ENG. G.T

(G7) $L = 22'-4\frac{1}{2}"$ (supports @ 0', 9'3", 22'4½")

$w_1 = \left[\frac{15}{2} + \frac{6}{2}\right] \times 35 = 368$ plf (0' —— 9'-3")

$w_2 = \left[\frac{10}{2} + \frac{10}{2}\right] \times 35 = 350$ plf (9'-3" —— 22'-4½")

$R_A = 1358\#$

$R_B = 5265\#$

$R_C = 1955\#$

USE: PRE-ENG. G.T

(G8) $L = 4'-6"$

$w = \frac{4}{2} \times 55 + (115 \times 17.52)$

$R_x = 4782\#$

USE: PRE-ENG. G.T

(G9) $L = 20'-6"$

$w_1 = \left(\frac{2}{2} + \frac{2}{2}\right) \times 55 = 110$ plf ($0'$ ——— $3'-6"$)

$w_2 = \frac{3}{2} \times 55 + (14 \times 15) = 265$ plf ($3'-6"$ ——— $20'-6"$)

$P_{1D} = 659\#$

$P_{1L} = 4123\#$ } from (G8), at $3'-6"$

$R_A = 6424\#$

$R_B = 3568\#$

USE: PRE-ENG. G.T

(1) $L = 2'-0"$

$w = \left(\frac{2}{2} + \frac{2}{2}\right) \times 35 = 70$ plf

$R_x = 70\#$

USE: (2) 2X6

(2) $L = 2'-0"$

$w = \left(\frac{2}{2} + \frac{24}{2}\right) \times 35 = 455$ plf

$R_x = 455\#$

USE: (2) 2 X 6

(3) $L = 11'-0"$

$w = \left(\frac{2}{2} + \frac{22}{2}\right) \times 35 = 420$ plf

$R_x = 2310\#$

USE: 3.125 X 12 GLB

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CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 9

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

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(4) $L = 19'-0''$

$w = \left(\frac{3}{2} + \frac{24}{2}\right) \times 35 = 455$ plf

$R_x = 4515$ #

USE: 5.125 X 15 GLB

(5) $L = 2'-0''$

$w = \left(\frac{2}{2} + \frac{16}{2}\right) \times 35 = 315$ plf

$R_x = 315$ #

USE: (2) 2X6

(6) $L = 6'-0''$

$w = \left[\frac{2}{2} + \frac{5}{2}\right] \times 35 = 123$ plf

$R_x = 369$ #

USE: (2) 2X6

(7) $L = 3'-0''$

$w = \left(\frac{2}{2} + \frac{16}{2}\right) \times 35 = 315$ plf

$R_x = 473$ #

USE: (2) 2X6

(8) $L = 8'-0''$

$w = \left(\frac{2}{2} + \frac{2}{2}\right) \times 35 = 70$ plf

$R_x = 280$ #

USE: (2) 2X8

(9) $L = 14'-0''$

$w = \left(2 + \frac{24}{2}\right) \times 35 = 490$ plf

$R_x = 3430$ #

USE: 3.125 X 12 GLB

GILBERT STRUCTURAL
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CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 10

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

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(10) $L = 10'-0''$

$w = \left(\frac{2}{2} + \frac{17}{2}\right) \times 35 = 333$ plf

$R_x = 1665$ #

USE: (2) 2x12

(11) $L = 4'-0''$

$w = \left(\frac{2}{2} + \frac{17}{2}\right) \times 35 = 333$ plf

$R_x = 666$ #

USE: (2) 2x6

(12) $L = 15'-0''$

$w = \frac{2}{2} \times 35 + 6 \times 15 = 125$ plf

$R_x = 938$ #

USE: 3.125x10.5 GLB (min)

(13) $L = 6'-0''$

$w = \left(\frac{12}{2} + \frac{17}{2}\right) \times 35 = 508$ plf

$R_x = 1524$ #

USE: (2) 2x10

(14) $L = 6'-0''$

$w = \left(\frac{2}{2} \times 35\right) + (6 \times 15) = 125$ plf

$R_x = 375$ #

USE: (2) 2x6

(15) $L = 5'-0''$

$w = (6 \times 15) + \left(\frac{12}{2} \times 35\right) = 300$ plf

$R_x =$ (2) 2x6

GILBERT STRUCTURAL
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CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 11

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

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(16) $L = 7'-6"$

$w = \left(\frac{2}{2} + \frac{22}{2}\right) \times 35 = 420$ plf

$R_x = 1575$ #

USE: (2) 2x12

(17) $L = 9'-0"$

$w = (3.5 \times 15) + \frac{22}{2} \times 35 = 438$ plf

$R_x = 1971$ #

USE: 3.125 x 9 GLB.

(18) $L = 3'-0"$

$w = \left[\frac{22}{2} + \frac{2}{2}\right] \times 35 = 420$ plf

$R_x = 630$ #

USE: (2) 2x6

(19) $L = 3'-6"$

$w = \left[\frac{2}{2} + \frac{10}{2}\right] \times 35 = 210$ plf

$R_x = 368$ #

USE: (2) 2x6

(20) $L = 6'-0"$

$w = \left[\frac{14}{2} \times 35\right] + (3.5 \times 15) = 298$ plf

$R_x = 894$ #

USE: (2) 2x8

(21) $L = 2'-0"$

$w = (2 + \frac{2}{2}) \times 35 = 105$ plf

$R_x = 105$ #

USE: (2) 2x6

(22) $L = 5'-0''$

$w = (4 \times 15) + \frac{10}{2} \times 35 = 235$ plf

$R_x = 588$ #

USE: (2) 2 x 6

(23) $L = 2'-6''$

$w = \left(\frac{2}{2} \times 35\right) = 35$ plf

$R_x = 44$ #

USE: (2) 2 x 6

(24) $L = 3'-0''$

$w = \left(\frac{3}{2} \times 35\right) + (3 \times 15) = 80$ plf

$R_x = 120$ #

USE: (2) 2 x 6

(25) $L = 3'-0$

$w = \left[\frac{22}{2} + \frac{14}{2}\right] \times 35 = 630$ plf

$R_x = 945$ #

USE: (2) 2 x 6

(26) $L = 16'-0''$

$w = \left[\frac{22}{2} + \frac{14}{2}\right] \times 35 = 630$ plf

$R_x = 5040$ #

USE: 3·125 X 15 GLB. OR 5½ + 13½ GLB

(27) $L = 3'-0''$

$w = \left[\frac{22}{2} + \frac{14}{2}\right] \times 35 = 630$ plf

$R_x = 945$ #

USE: (2) 2 x 6

(28) $L = 3'-0"$

$w = \left[\frac{22}{2} + \frac{24}{2}\right] \times 35 = 805$ plf

$R_x = 1208$ #

USE: (2) 2x6

(29) $L = 8'-0"$

$w = \left[\frac{14}{2} + 2\right] \times 35 = 1315$ plf

$R_x = 1260$ #

USE: (2) 2x10

(30) $L = 25'-0"$

$w = \left(2 + \frac{14}{2}\right) \times 35 = 315$ plf

$R_x = 4190$ #

USE: 5.125 x 16½ GLB

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(31) $L = 5'-0"$ Lower Roof

$w' = \left[\frac{22}{2} + \frac{24}{2}\right] \times 55 = 1265$ plf

$P_{1D} = 518$ #
$P_{1L} = 690$ # } from beam (28), at 4'-4"

$w_2 = (11 \times 15) = 165$ plf (wall)

$w_3 = \left(\frac{22}{2} + \frac{24}{2}\right) \times 35 = 805$ plf

$R_A = 6042$ #

$R_B = 6970$ #

USE: 3.125 x 9 GLB

(32) $L = 8'-0"$

$w_1 = \left(\frac{22}{2} + \frac{24}{2}\right) \times 55 = 1265$ plf (entire beam)

$w_2 = 11 \times 15 = 165$ plf (wall)

$P_{1D} = 518\#$
$P_{1L} = 690\#$ } from beam (28), at 1'-7"

$w_3 = \left(\frac{22}{2} + \frac{24}{2}\right) \times 35 = 805$ plf - from level above.

$R_A = 4178\#$

$R_B = 4170\#$

USE: (2) 2 x 10

(33) $L = 3'-0"$

$w_1 = \left[\frac{22}{2} + \frac{14}{2}\right] \times 55 = 990$ plf

$w_2 = 11 \times 15 = 165$ plf

$P_{1D} = 518\#$
$P_{1L} = 690\#$ } at 2'-0', from (28)

$P_{2D} = 405\#$
$P_{2L} = 540\#$ } at 2'-7", from (27)

$w_3 = \frac{1}{2}\left(\frac{22}{2} + \frac{14}{2}\right)(35) = 315$ plf

$R_A = 2889\#$

$R_B = 3916\#$

USE: (2) 2 x 10

(34) $L = 5'-0"$

$w_1 = \left[\frac{22}{2} + \frac{14}{2}\right] \times 55 = 990$ plf

$P_{1D} = 405\#$, $P_{1L} = 540\#$ } at 1'-3"

$P_{2L} = 405\#$, $P_{2L} = 540\#$ } at 2'-0"

$P_{3D} = 405\#$, $P_{3L} = 540\#$ } at 4'-6"

} from beam (27)

$w_2 = 11 \times 15 = 165$ plf (wall)

$w_3 = \left(\frac{22}{2} + \frac{14}{2}\right) \times \frac{1}{2} \times 35 = 315$ plf - from level above.

$R_A = 5282\#$

$R_B = 5253\#$

USE: 3.125 x 9 GLB

(35) $L = 16'-0"$

$w_1 = \left(\frac{22}{2} + \frac{14}{2}\right) \times 55 = 990$ plf

$w_2 = 14 \times 15 = 210$ plf

$R_A = 9900\#$

$R_B = 9900\#$

USE: 5.125 x 16½ GLB

(36) $L = 12'-0"$

$w_1 = 115 \times 14.36 = 1706$ plf ($0'$ ____ $8'-6"$)

$+ \frac{2}{2} \times 55$

$w_2 = \frac{2}{2} \times 55 = 55$ plf ($8'-6"$ ____ $12'-0"$)

$R_A = 9637\#$

$R_B = 5247\#$

USE: 5.125 X 13.5 GLB

(37) $L = 25'-0"$

$w = (2 + \frac{14}{2}) \times 55 = 495$ plf

$R_A = 6493\#$

$R_B = 6493\#$

USE: 5.125 X 18 GLB

(38) $L = 8'-0"$

$w = (2 + \frac{14}{2}) \times 55 = 495$ plf

$R_x = 2034\#$

USE: (2) 2 X 12

(39) $L = 8'-0"$

$w = (\frac{2}{2} + 2) \times 55 = 165$ plf

$R_x = 660\#$

USE: (2) 2 X 8

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN SHEET NO.: 17

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

---

(40) $L = 14'-0''$

$w = \left(2 + \frac{24}{2}\right) \times 55 = 770$ plf

$P_x = 5543$ #

USE: 5.125 X 12 GLB

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 20, 2022 12:22	BRIAN SCOTT DESIGN KASNOFF RESIDENCE GIRDER 3 KASNOFF

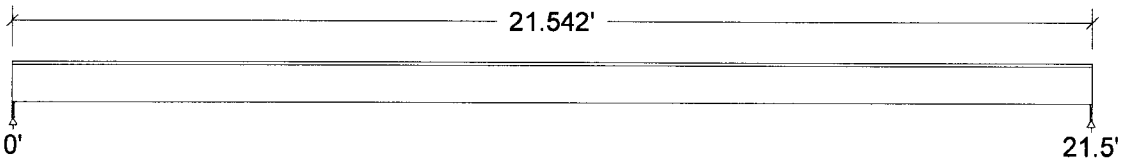
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				30.0		plf
Load2	Live	Full UDL				40.0		plf
Load3	Dead	Point		20.02		218		lbs
Load4	Live	Point		20.02		290		lbs
Self-weight	Dead	Full UDL				10.6		plf

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



Unfactored:			
Dead	452		640
Live	451		701
Factored:			
Total	904		1341
Bearing:			
Capacity			
Beam	1666		1666
Support	1719		1719
Des ratio			
Beam	0.54		0.80
Support	0.53		0.78
Load comb	#2		#2
Length	0.50*		0.50*
Min req'd	0.50*		0.50*
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

*Minimum bearing length setting used: 1/2" for end supports

~~Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/8"x9"~~ R_x ONLY

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 21.56'; Clear span: 21.438'; Volume = 6.9 cu.ft.; 6 laminations, 5-1/8" maximum width,

Lateral support: top = continuous, bottom = at supports;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 42	Fv' = 265	psi	fv/Fv' = 0.16
Bending(+)	fb = 875	Fb' = 2400	psi	fb/Fb' = 0.36
Live Defl'n	0.38 = L/676	0.72 = L/360	in	0.53
Total Defl'n	0.95 = L/272	1.08 = L/240	in	0.88

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear      : LC #2  = D + L
Bending(+): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing    : Support 1 - LC #2 = D + L
             Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 1339, V design = 1277 lbs; M(+) = 5046 lbs-ft
  EIy = 560.41 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 24, 2022 10:07	BRIAN SCOTT DESIGN KASNOFF RESIDENCE GIRDER 6 KASNOFF

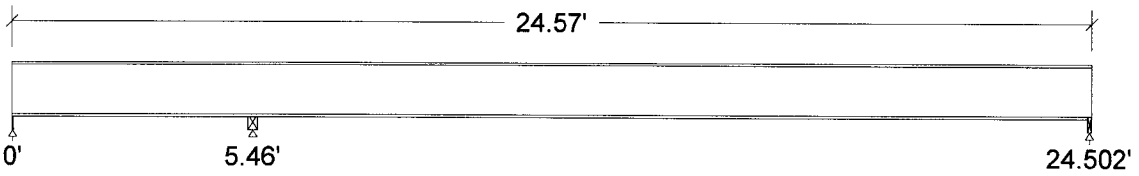
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL	No			180.0		plf
Load2	Live	Full UDL	No			240.0		plf
Load3	Dead	Point	No	22.02		210		lbs
Load4	Live	Point	No	22.02		280		lbs
Self-weight	Dead	Full UDL	No			15.9		plf

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



Unfactored:					
Dead	-792		4140		1675
Live	-974		5079		2071
Factored:					
Uplift	-1766				
Total			9219		3746
Bearing:					
Capacity					
Beam	1666		10184		3746
Support	1719		9219		3865
Des ratio					
Beam	0.00		0.91		1.00
Support	0.00		1.00		0.97
Load comb	#1		#2		#2
Length	0.50*		2.68		1.12
Min req'd	0.50*		2.68**		1.12
Cb	1.00		1.14		1.00
Cb min	1.00		1.14		1.00
Cb support	1.07		1.07		1.07
Fcp sup	625		625		625

*Minimum bearing length setting used: 1/2" for end supports

**Minimum bearing length governed by the required width of the supporting member.

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/8"x13-1/2"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 24.56'; Clear span: 5.313', 18.875'; Volume = 11.8 cu.ft.; 9 laminations, 5-1/8" maximum width,

Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 98	Fv' = 265	psi	fv/Fv' = 0.37
Bending(+)	fb = 1020	Fb' = 2400	psi	fb/Fb' = 0.43
Bending(-)	fb = 1248	Fb' = 1450	psi	fb/Fb' = 0.86
Live Defl'n	0.21 = < L/999	0.63 = L/360	in	0.33
Total Defl'n	0.46 = L/494	0.95 = L/240	in	0.49

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fb'-	1450	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear     : LC #2  = D + L
Bending(+): LC #2  = D + L
Bending(-): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing   : Support 1 - LC #1 = D only
            Support 2 - LC #2 = D + L
            Support 3 - LC #2 = D + L
Uplift    : Support 1 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 5065, V design = 4527 lbs; M(+) = 13237 lbs-ft; M(-) = 16186 lbs-ft
  EIy = 1891.38 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. Grades with equal bending capacity in the top and bottom edges of the beam cross-section are recommended for continuous beams.
5. GLULAM: bxd = actual breadth x actual depth.
6. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
7. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 20, 2022 14:17	BRIAN SCOTT DESIGN KASNOFF RESIDENCE GIRDER 7 KASNOFF

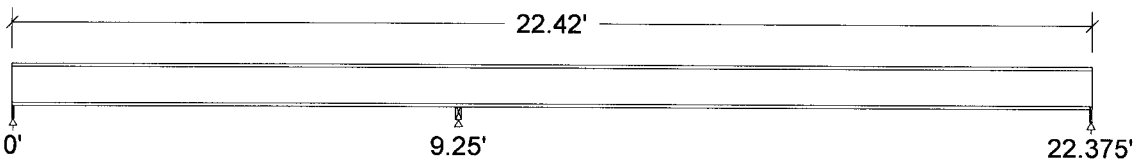
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Partial UDL	No	0.00	9.25	158.0	158.0	plf
Load2	Live	Partial UDL	Yes	0.00	9.25	210.0	210.0	plf
Load3	Dead	Partial UDL	No	9.25	22.38	150.0	150.0	plf
Load4	Live	Partial UDL	Yes	9.25	22.38	200.0	200.0	plf
Self-weight	Dead	Full UDL	No			10.6		plf

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



Unfactored:					
Dead	483		2345		840
Live	875		2920		1116
Factored:					
Total	1358		5265		1955
Bearing:					
Capacity					
Beam	1666		6352		1955
Support	1719		5265		2018
Des ratio					
Beam	0.82		0.83		1.00
Support	0.79		1.00		0.97
Load comb	#3		#2		#4
Length	0.50*		1.53		0.59
Min req'd	0.50*		1.53**		0.59
Cb	1.00		1.24		1.00
Cb min	1.00		1.24		1.00
Cb support	1.07		1.07		1.07
Fcp sup	625		625		625

*Minimum bearing length setting used: 1/2" for end supports

**Minimum bearing length governed by the required width of the supporting member.

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/8"x9"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 22.44'; Clear span: 9.188', 13.063'; Volume = 7.2 cu.ft.; 6 laminations, 5-1/8" maximum width,

Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 83	Fv' = 265	psi	fv/Fv' = 0.31
Bending(+)	fb = 926	Fb' = 2400	psi	fb/Fb' = 0.39
Bending(-)	fb = 1080	Fb' = 1450	psi	fb/Fb' = 0.75
Live Defl'n	0.16 = < L/999	0.44 = L/360	in	0.36
Total Defl'n	0.31 = L/513	0.66 = L/240	in	0.47

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	4
Fb'-	1450	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	1.00	1.00	-	-	-	-	1.00	-	-	4
Eminy'	0.85 million	1.00	1.00	-	-	-	-	1.00	-	-	4

CRITICAL LOAD COMBINATIONS:

```
 Shear      : LC #2  = D + L
 Bending(+): LC #4  = D + L (pattern: _L)
 Bending(-): LC #2  = D + L
 Deflection: LC #4  = D + L (pattern: _L)  (live)
             LC #4  = D + L (pattern: _L)  (total)
 Bearing    : Support 1 - LC #3 = D + L (pattern: L_)
              Support 2 - LC #2 = D + L
              Support 3 - LC #4 = D + L (pattern: _L)
 D=dead L=live
 All LC's are listed in the Analysis output
 Load Patterns: s=S/2,  X=L+S or L+Lr,  _=no pattern load in this span
 Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
 V max = 2841, V design = 2549 lbs; M(+) = 5341 lbs-ft; M(-) = 6229 lbs-ft
   EIy = 560.41 lb-in^2
 "Live" deflection is due to all non-dead loads (live, wind, snow...)
 Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. Grades with equal bending capacity in the top and bottom edges of the beam cross-section are recommended for continuous beams.
5. GLULAM: bxd = actual breadth x actual depth.
6. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
7. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY
Gilbert Structural LLC
2036 N. Gilbert Rd. Suite 2-428
Messa, Arizona 85203
Jan. 20, 2022 15:02

PROJECT
BRIAN SCOTT
DESIGN
KASNOFF
RESIDENCE
GIRDER 9
KASNOFF

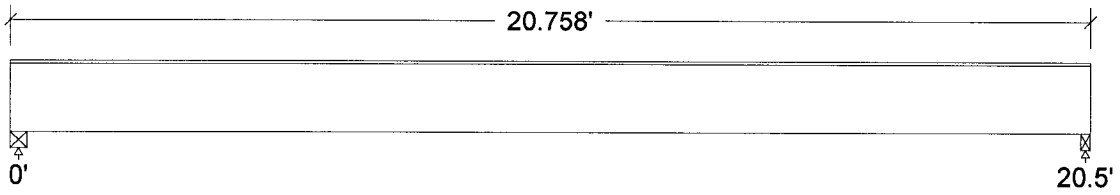
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Partial UDL		0.00	3.50	30.0	30.0	plf
Load2	Live	Partial UDL		0.00	3.50	80.0	80.0	plf
Load3	Dead	Partial UDL		3.50	20.50	225.0	225.0	plf
Load4	Live	Partial UDL		3.50	20.50	40.0	40.0	plf
Load5	Dead	Point		3.50		659		lbs
Load6	Live	Point		3.50		4123		lbs
Self-weight	Dead	Full UDL				15.6		plf

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



Unfactored:			
Dead	2426		2483
Live	3998		1085
Factored:			
Total	6424		3568
Bearing:			
Capacity			
Beam	6424		3568
Support	13679		7597
Des ratio			
Beam	1.00		1.00
Support	0.47		0.47
Load comb	#2		#2
Length	3.98		2.21
Min req'd	3.98		2.21
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

Glulam-Unbalan., West Species, 16F-1.3E WS, 5-1/8"x16"
Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 20.75'; Clear span: 20.25'; Volume = 11.8 cu.ft.; 11 laminations, 5-1/8" maximum width,
Lateral support: top = continuous, bottom = at supports;
This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 114	Fv' = 195	psi	fv/Fv' = 0.58
Bending(+)	fb = 1275	Fb' = 1558	psi	fb/Fb' = 0.82
Live Defl'n	0.34 = L/717	0.68 = L/360	in	0.50
Total Defl'n	1.00 = L/245	1.02 = L/240	in	0.98

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	195	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	1600	1.00	1.00	1.00	1.000	0.974	-	-	1.00	1.00	-	2
Fcp'	315	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.3 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2
Eminy'	0.58 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear     : LC #2  = D + L
Bending(+): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing   : Support 1 - LC #2 = D + L
            Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 6406, V design = 6211 lbs; M(+) = 23239 lbs-ft
  EIy = 2274.10 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 20, 2022 17:09	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 30

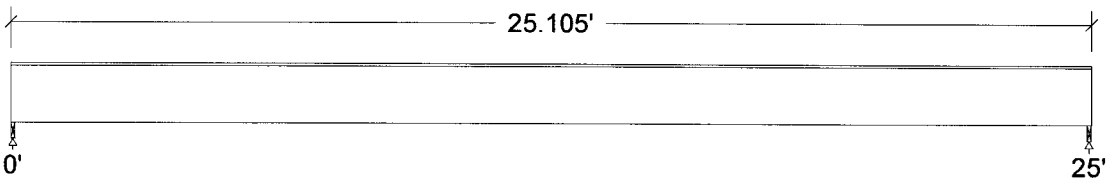
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				135.0		plf
Load2	Live	Full UDL				180.0		plf
Self-weight	Dead	Full UDL				18.9		plf

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



Unfactored:			
Dead	1931		1931
Live	2259		2259
Factored:			
Total	4190		4190
Bearing:			
Capacity			
Beam	4190		4190
Support	4324		4324
Des ratio			
Beam	1.00		1.00
Support	0.97		0.97
Load comb	#2		#2
Length	1.26		1.26
Min req'd	1.26		1.26
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/8"x16"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 25.13'; Clear span: 24.875'; Volume = 14.3 cu.ft.; 11 laminations, 5-1/8" maximum width,

Lateral support: top = continuous, bottom = at supports;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 68	Fv' = 265	psi	fv/Fv' = 0.26
Bending(+)	fb = 1431	Fb' = 2292	psi	fb/Fb' = 0.62
Live Defl'n	0.50 = L/597	0.83 = L/360	in	0.60
Total Defl'n	1.15 = L/261	1.25 = L/240	in	0.92

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	0.955	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear     : LC #2  = D + L
Bending(+): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing   : Support 1 - LC #2 = D + L
            Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 4173, V design = 3711 lbs; M(+) = 26084 lbs-ft
  EIy = 3148.75 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 21, 2022 08:41	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 31

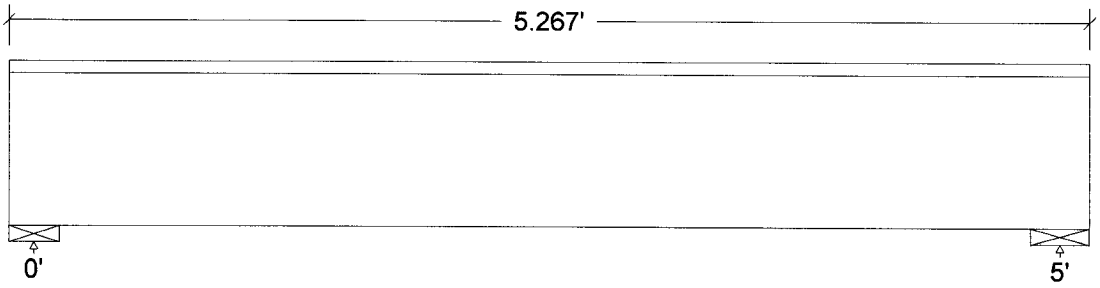
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				345.0		plf
Load2	Live	Full UDL				920.0		plf
Load3	Dead	Full UDL				165.0		plf
Load4	Dead	Point		4.46		518		lbs
Load5	Live	Point		4.46		690		lbs
Load6	Dead	Full UDL				345.0		plf
Load7	Live	Full UDL				460.0		plf
Self-weight	Dead	Full UDL				6.5		plf

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



Unfactored:			
Dead	2329		2725
Live	3713		4245
Factored:			
Total	6042		6970
Bearing:			
Capacity			
Beam	6042		6970
Support	6507		7506
Des ratio			
Beam	1.00		1.00
Support	0.93		0.93
Load comb	#2		#2
Length	2.97		3.43
Min req'd	2.97		3.43
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.12		1.12
Fcp sup	625		625

Glulam-Unbalan., West Species, 24F-1.8E WS, 3-1/8"x9"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 5.25'; Clear span: 4.75'; Volume = 1.0 cu.ft.; 6 laminations, 3-1/8" maximum width,

Lateral support: top = continuous, bottom = at supports;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv* = 232	Fv' = 265	psi	fv*/Fv' = 0.87
Bending(+)	fb = 2109	Fb' = 2400	psi	fb/Fb' = 0.88
Live Defl'n	0.06 = L/994	0.17 = L/360	in	0.36
Total Defl'n	0.12 = L/510	0.25 = L/240	in	0.47

*The effect of point loads within a distance d of the support has been included as per NDS 3.4.3.1

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D + L
Bending(+): LC #2 = D + L
Deflection: LC #2 = D + L (live)
LC #2 = D + L (total)
Bearing : Support 1 - LC #2 = D + L
Support 2 - LC #2 = D + L

D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1

CALCULATIONS:

V max = 6651, V design* = 4341 lbs; M(+) = 7413 lbs-ft
EIy = 341.71 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 21, 2022 08:46	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 32

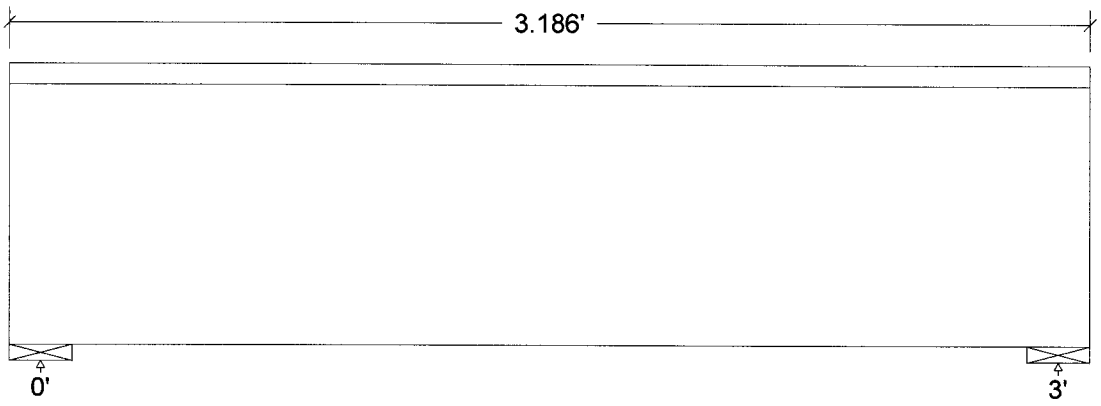
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				345.0		plf
Load2	Live	Full UDL				920.0		plf
Load3	Dead	Full UDL				165.0		plf
Load4	Dead	Point		1.58		518		lbs
Load5	Live	Point		1.58		690		lbs
Load6	Dead	Full UDL				345.0		plf
Load7	Live	Full UDL				460.0		plf
Self-weight	Dead	Full UDL				6.6		plf

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



Unfactored:			
Dead	1632		1629
Live	2545		2541
Factored:			
Total	4178		4170
Bearing:			
Capacity			
Beam	4178		4170
Support	4700		4691
Des ratio			
Beam	1.00		1.00
Support	0.89		0.89
Load comb	#2		#2
Length	2.23		2.22
Min req'd	2.23		2.22
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.13		1.13
Fcp sup	625		625

Lumber n-ply, D.Fir-L, No.2, 2x10, 2-ply (3"x9-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 3.19'; Clear span: 2.813'; Volume = 0.6 cu.ft.

Lateral support: top = continuous, bottom = at supports; Repetitive factor: applied where permitted (refer to online help);

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 110	Fv' = 180	psi	fv/Fv' = 0.61
Bending(+)	fb = 961	Fb' = 990	psi	fb/Fb' = 0.97
Live Defl'n	0.01 = < L/999	0.10 = L/360	in	0.10
Total Defl'n	0.02 = < L/999	0.15 = L/240	in	0.13

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	LC#
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	1.00	2
Fb'+	900	1.00	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-
E'	1.6 million	1.00	1.00	-	-	-	-	-	1.00	1.00	2
Emin'	0.58 million	1.00	1.00	-	-	-	-	-	1.00	1.00	2

CRITICAL LOAD COMBINATIONS:

```
Shear     : LC #2  = D + L
Bending(+): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing   : Support 1 - LC #2 = D + L
            Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 3970, V design = 2034 lbs; M(+) = 3428 lbs-ft
  EIy = 158.29 lb-in^2/ply
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
4. BUILT-UP BEAMS: it is assumed that each ply is a single continuous member (that is, no butt joints are present) and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
5. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 21, 2022 09:15	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 33

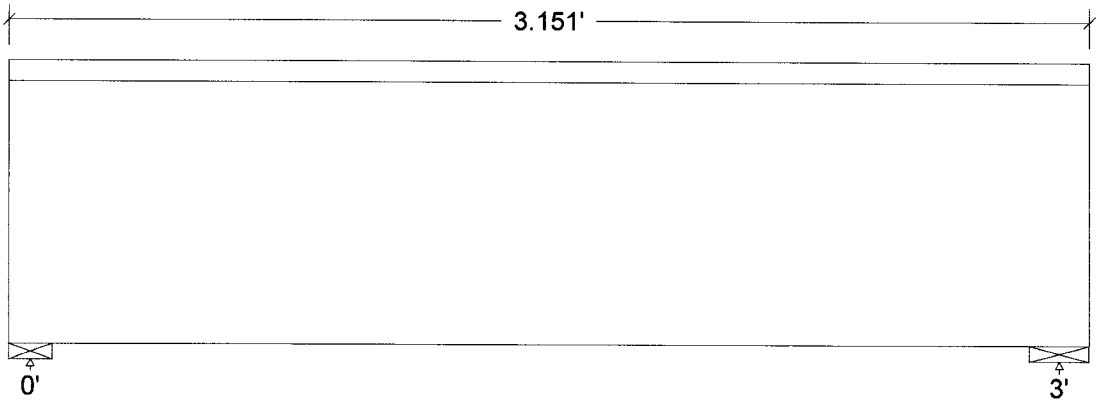
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				270.0		plf
Load2	Live	Full UDL				720.0		plf
Load3	Dead	Full UDL				165.0		plf
Load4	Dead	Point		2.00		518		lbs
Load5	Live	Point		2.00		690		lbs
Load6	Dead	Full UDL				135.0		plf
Load7	Live	Full UDL				180.0		plf
Load8	Dead	Point		2.58		405		lbs
Load9	Live	Point		2.58		540		lbs
Self-weight	Dead	Full UDL				6.6		plf

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



Unfactored:			
Dead	1150		1589
Live	1739		2327
Factored:			
Total	2889		3916
Bearing:			
Capacity			
Beam	2889		3916
Support	3250		4405
Des ratio			
Beam	1.00		1.00
Support	0.89		0.89
Load comb	#2		#2
Length	1.54		2.09
Min req'd	1.54		2.09
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.13		1.13
Fcp sup	625		625

Lumber n-ply, D.Fir-L, No.2, 2x10, 2-ply (3"x9-1/4")

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 3.13'; Clear span: 2.875'; Volume = 0.6 cu.ft.

Lateral support: top = continuous, bottom = at supports; Repetitive factor: applied where permitted (refer to online help);

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv* = 116	Fv' = 180	psi	fv*/Fv' = 0.64
Bending(+)	fb = 742	Fb' = 990	psi	fb/Fb' = 0.75
Live Defl'n	0.01 = < L/999	0.10 = L/360	in	0.08
Total Defl'n	0.02 = < L/999	0.15 = L/240	in	0.11

*The effect of point loads within a distance d of the support has been included as per NDS 3.4.3.1

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CF	Cfu	Cr	Cfrt	Ci	LC#
Fv'	180	1.00	1.00	1.00	-	-	-	-	1.00	1.00	2
Fb'+	900	1.00	1.00	1.00	1.000	1.100	-	1.00	1.00	1.00	2
Fcp'	625	-	1.00	1.00	-	-	-	-	1.00	1.00	-
E'	1.6 million	1.00	1.00	-	-	-	-	1.00	1.00	2	
Emin'	0.58 million	1.00	1.00	-	-	-	-	1.00	1.00	2	

CRITICAL LOAD COMBINATIONS:

Shear : LC #2 = D + L

Bending(+): LC #2 = D + L

Deflection: LC #2 = D + L (live)

LC #2 = D + L (total)

Bearing : Support 1 - LC #2 = D + L

Support 2 - LC #2 = D + L

D=dead L=live

All LC's are listed in the Analysis output

Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1

CALCULATIONS:

V max = 3788, V design* = 2143 lbs; M(+) = 2645 lbs-ft

EIy = 158.29 lb-in^2/ply

"Live" deflection is due to all non-dead loads (live, wind, snow...)

Total deflection = 1.5 dead + "live"

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Sawn lumber bending members shall be laterally supported according to the provisions of NDS Clause 4.4.1.
4. BUILT-UP BEAMS: it is assumed that each ply is a single continuous member (that is, no butt joints are present) and that each ply is equally top-loaded. Where beams are side-loaded, special fastening details may be required.
5. FIRE RATING: Joists, wall studs, and multi-ply members are not rated for fire endurance.

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 21, 2022 09:36	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 34

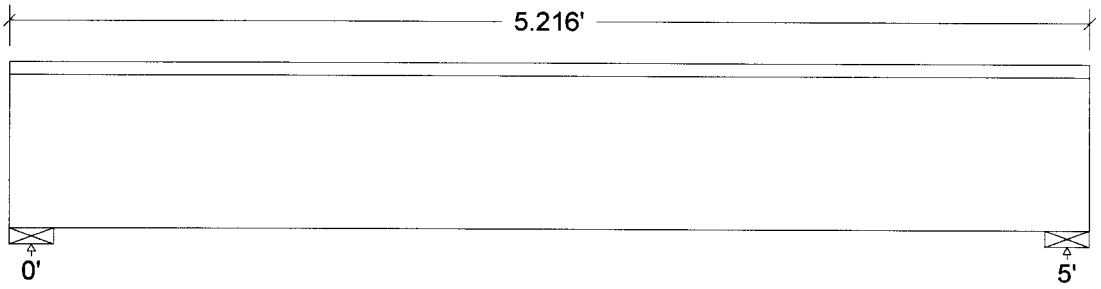
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				270.0		plf
Load2	Live	Full UDL				720.0		plf
Load3	Dead	Full UDL				165.0		plf
Load4	Dead	Point		1.25		405		lbs
Load5	Live	Point		1.25		540		lbs
Load6	Dead	Full UDL				135.0		plf
Load7	Live	Full UDL				180.0		plf
Load8	Dead	Point		2.00		405		lbs
Load9	Live	Point		2.00		540		lbs
Load10	Dead	Point		4.50		405		lbs
Load11	Live	Point		4.50		540		lbs
Self-weight	Dead	Full UDL				6.5		plf

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



Unfactored:			
Dead	2117		2104
Live	3166		3149
Factored:			
Total	5282		5253
Bearing:			
Capacity			
Beam	5282		5253
Support	5688		5657
Des ratio			
Beam	1.00		1.00
Support	0.93		0.93
Load comb	#2		#2
Length	2.60		2.59
Min req'd	2.60		2.59
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.12		1.12
Fcp sup	625		625

Glulam-Unbalan., West Species, 24F-1.8E WS, 3-1/8"x9"
Supports: All - Timber-soft Beam, D.Fir-L No.2
Total length: 5.19'; Clear span: 4.813'; Volume = 1.0 cu.ft.; 6 laminations, 3-1/8" maximum width,
Lateral support: top = continuous, bottom = at supports;
This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 204	Fv' = 265	psi	fv/Fv' = 0.77
Bending(+)	fb = 1822	Fb' = 2400	psi	fb/Fb' = 0.76
Live Defl'n	0.05 = < L/999	0.17 = L/360	in	0.30
Total Defl'n	0.10 = L/590	0.25 = L/240	in	0.41

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million	1.00	1.00	-	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:
Shear : LC #2 = D + L
Bending(+): LC #2 = D + L
Deflection: LC #2 = D + L (live)
LC #2 = D + L (total)
Bearing : Support 1 - LC #2 = D + L
Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
CALCULATIONS:
V max = 5123, V design = 3817 lbs; M(+) = 6406 lbs-ft
EIy = 341.71 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 21, 2022 09:58	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 35

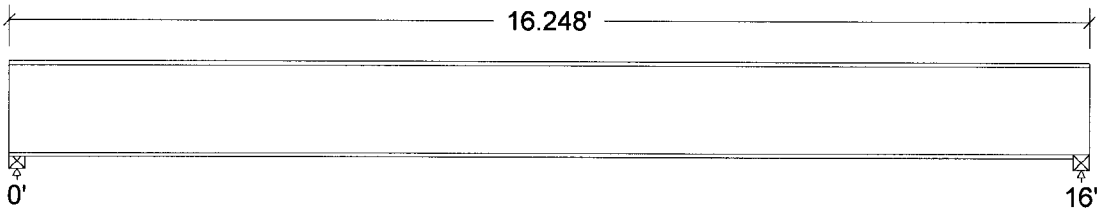
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				480.0		plf
Load2	Live	Full UDL				720.0		plf
Self-weight	Dead	Full UDL				18.9		plf

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



Unfactored:			
Dead	4050		4050
Live	5849		5849
Factored:			
Total	9900		9900
Bearing:			
Capacity			
Beam	9900		9900
Support	10215		10215
Des ratio			
Beam	1.00		1.00
Support	0.97		0.97
Load comb	#2		#2
Length	2.97		2.97
Min req'd	2.97		2.97
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/8"x16"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 16.25'; Clear span: 15.75'; Volume = 9.3 cu.ft.; 11 laminations, 5-1/8" maximum width,

Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 146	Fv' = 265	psi	fv/Fv' = 0.55
Bending(+)	fb = 2140	Fb' = 2396	psi	fb/Fb' = 0.89
Live Defl'n	0.34 = L/569	0.53 = L/360	in	0.63
Total Defl'n	0.69 = L/279	0.80 = L/240	in	0.86

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	0.998	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear      : LC #2  = D + L
Bending(+): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing    : Support 1 - LC #2 = D + L
             Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 9751, V design = 7975 lbs; M(+) = 39004 lbs-ft
  EIy = 3148.75 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 21, 2022 10:29	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 36

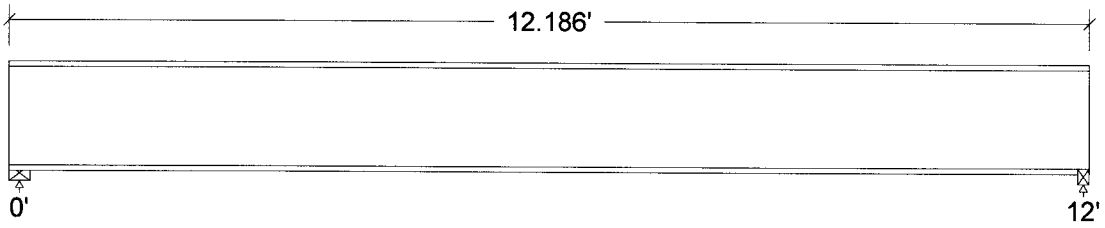
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Partial UDL		0.00	8.50	230.0	230.0	plf
Load2	Live	Partial UDL		0.00	8.50	1476.0	1476.0	plf
Load3	Dead	Partial UDL		8.50	12.00	15.0	15.0	plf
Load4	Live	Partial UDL		8.50	12.00	40.0	40.0	plf
Self-weight	Dead	Full UDL				15.9		plf

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



Unfactored:			
Dead	1386		813
Live	8251		4435
Factored:			
Total	9637		5247
Bearing:			
Capacity			
Beam	9637		5247
Support	9945		5415
Des ratio			
Beam	1.00		1.00
Support	0.97		0.97
Load comb	#2		#2
Length	2.89		1.58
Min req'd	2.89		1.58
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/8"x13-1/2"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 12.19'; Clear span: 11.813'; Volume = 5.9 cu.ft.; 9 laminations, 5-1/8" maximum width,

Lateral support: top = continuous, bottom = continuous

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 160	Fv' = 265	psi	fv/Fv' = 0.60
Bending(+)	fb = 1990	Fb' = 2400	psi	fb/Fb' = 0.83
Live Defl'n	0.29 = L/494	0.40 = L/360	in	0.73
Total Defl'n	0.37 = L/393	0.60 = L/240	in	0.61

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	1.000	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear      : LC #2  = D + L
Bending(+): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing    : Support 1 - LC #2 = D + L
             Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 9429, V design = 7391 lbs; M(+) = 25816 lbs-ft
  EIy = 1891.38 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

WoodWorks® SOFTWARE FOR WOOD DESIGN

COMPANY	PROJECT
Gilbert Structural LLC 2036 N. Gilbert Rd. Suite 2-428 Messa, Arizona 85203 Jan. 21, 2022 10:39	BRIAN SCOTT DESIGN KASNOFF RESIDENCE BEAM 37

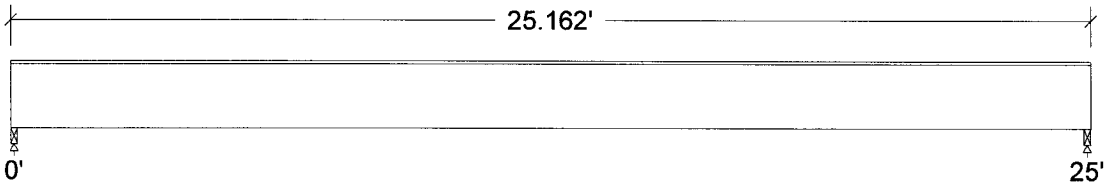
Design Check Calculation Sheet

WoodWorks Sizer 2019 (Update 4)

Loads:

Load	Type	Distribution	Pat-tern	Location [ft] Start	End	Magnitude Start	End	Unit
Load1	Dead	Full UDL				135.0		plf
Load2	Live	Full UDL				360.0		plf
Self-weight	Dead	Full UDL				21.2		plf

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



Unfactored:			
Dead	1964		1964
Live	4529		4529
Factored:			
Total	6493		6493
Bearing:			
Capacity			
Beam	6493		6493
Support	6700		6700
Des ratio			
Beam	1.00		1.00
Support	0.97		0.97
Load comb	#2		#2
Length	1.95		1.95
Min req'd	1.95		1.95
Cb	1.00		1.00
Cb min	1.00		1.00
Cb support	1.07		1.07
Fcp sup	625		625

Glulam-Unbalan., West Species, 24F-1.8E WS, 5-1/8"x18"

Supports: All - Timber-soft Beam, D.Fir-L No.2

Total length: 25.19'; Clear span: 24.813'; Volume = 16.1 cu.ft.; 12 laminations, 5-1/8" maximum width,

Lateral support: top = continuous, bottom = at supports;

This section PASSES the design code check.

Analysis vs. Allowable Stress and Deflection using NDS 2018 :

Criterion	Analysis Value	Design Value	Unit	Analysis/Design
Shear	fv = 92	Fv' = 265	psi	fv/Fv' = 0.35
Bending(+)	fb = 1749	Fb' = 2265	psi	fb/Fb' = 0.77
Live Defl'n	0.71 = L/425	0.83 = L/360	in	0.85
Total Defl'n	1.17 = L/257	1.25 = L/240	in	0.93

Additional Data:

FACTORS:	F/E(psi)	CD	CM	Ct	CL	CV	Cfu	Cr	Cfrt	Notes	Cvr	LC#
Fv'	265	1.00	1.00	1.00	-	-	-	-	1.00	1.00	1.00	2
Fb'+	2400	1.00	1.00	1.00	1.000	0.944	-	-	1.00	1.00	-	2
Fcp'	650	-	1.00	1.00	-	-	-	-	1.00	-	-	-
E'	1.8 million		1.00	1.00	-	-	-	-	1.00	-	-	2
Eminy'	0.85 million		1.00	1.00	-	-	-	-	1.00	-	-	2

CRITICAL LOAD COMBINATIONS:

```
Shear      : LC #2  = D + L
Bending(+): LC #2  = D + L
Deflection: LC #2  = D + L  (live)
            LC #2  = D + L  (total)
Bearing    : Support 1 - LC #2 = D + L
             Support 2 - LC #2 = D + L
D=dead L=live
All LC's are listed in the Analysis output
Load combinations: ASD Basic from ASCE 7-16 2.4 / IBC 2018 1605.3.1
```

CALCULATIONS:

```
V max = 6453, V design = 5637 lbs; M(+) = 40331 lbs-ft
  EIy = 4483.28 lb-in^2
"Live" deflection is due to all non-dead loads (live, wind, snow...)
Total deflection = 1.5 dead + "live"
```

Design Notes:

1. Analysis and design are in accordance with the ICC International Building Code (IBC 2018) and the National Design Specification (NDS 2018), using Allowable Stress Design (ASD). Design values are from the NDS Supplement.
2. Please verify that the default deflection limits are appropriate for your application.
3. Glulam design values are for materials conforming to ANSI 117-2015 and manufactured in accordance with ANSI A190.1-2012
4. GLULAM: bxd = actual breadth x actual depth.
5. Glulam Beams shall be laterally supported according to the provisions of NDS Clause 3.3.3.
6. GLULAM: bearing length based on smaller of Fcp(tension), Fcp(comp'n).

GILBERT STRUCTURAL
2036 N. Gilbert Rd.,
Ste. 2-428
Mesa, Arizona 85203
Phone (480) 398-8144

CLIENT: BRIAN SCOTT DESIGN **SHEET:** L1

PROJECT: KASNOFF RESIDENCE **DATE:** 1/2022

"UPPER FLOOR"

LATERAL ANALYSIS

ALL LATERAL LOADS (WIND, SEISMIC) ARE RESISTED BY A FLEXIBLE PLYWOOD DIAPHRAGM AND TRANSFERRED THRU WOOD SHEAR WALLS AND INTO A CONTINUOUS SPREAD FOOTING.

WIND

WIND SPEED (3 - second gust (V_{3S})) 115 MPH

EXPOSURE CATEGORY C

DETERMINE IF SIMPLIFIED PROVISIONS APPLY

MEAN ROOF HEIGHT (MRH)

EAVE HEIGHT		29	FT
ROOF PITCH	RISE	0	FT
	RUN	12	FT
ROOF WIDTH		25	FT
LEAST HORIZONTAL DIMENSION (L)		25	FT
ROOF ANGLE = ARCTAN(RISE/RUN)		1.2	DEGREES

MRH = 29 FT

MRH < Least horizontal dimension

29 < 25 USE ANALYTICAL METHOD

WIDTH OF "END ZONE" 2a

LEAST HORIZONTAL DIMENSION (L) 25 FT
EAVE HEIGHT (h) 29 FT

"END ZONE" SHALL BE **2 X 0.10L** OR **2 X 0.40h**, WHICHEVER IS LESS

2 X 0.10L = 5 FT
2 X 0.40h = 23.2 FT

BUT NOT LESS THAN 4% OF LEAST HORIZONTAL DIMENSION (L) OR 3FT

L = 1 FT

USE: 6 FT

GILBERT STRUCTURAL
2036 N. Gilbert Rd.,
Ste. 2-428
Mesa, Arizona 85203
Phone (480) 398-8144

CLIENT: BRIAN SCOTT DESIGN **SHEET:** L2

PROJECT: KASNOFF RESIDENCE **DATE:** 1/2022

WIND LOADS IBC 2018

HEIGHT & EXPOSURE ADJUSTMENT FACTOR **1.39**

HORIZONTAL LOADS **29.1** FT (MRH)

ZONE	TRANSVERSE DIRECTION (LB/FT^2)	LONGITUDINAL DIRECTION (LB/FT^2)	**TRANSVERSE ADJUSTED (LB/FT^2)**	**LONGITUDINAL ADJUSTED (LB/FT^2)**
END ZONE OF WALL	12.8	12.8	**17.8**	**17.8**
END ZONE OF ROOF	-6.7	-6.7	**-9.3**	**-9.3**
INTERIOR ZONE OF WALL	8.5	8.5	**11.8**	**11.8**
INTERIOR ZONE OF ROOF	-4.0	-4.0	**-5.6**	**-5.6**

****ALL NEGATIVE VALUES SHALL BE TAKEN AS ZERO**

VERTICAL LOADS

ZONE	TRANSVERSE DIRECTION (LB/FT^2)	LONGITUDINAL DIRECTION (LB/FT^2)	**TRANSVERSE ADJUSTED (LB/FT^2)**	**LONGITUDINAL ADJUSTED (LB/FT^2)**
END ZONE WINDWARD ROOF	-15.4	-15.4	**-21.4**	**-21.4**
END ZONE LEEWARD ROOF	-8.8	-8.8	**0.0**	**-12.2**
INTERIOR ZONE WINDWARD ROOF	-10.7	-10.7	**-14.9**	**-14.9**
INTERIOR ZONE LEEWARD ROOF	-6.8	-6.8	**-9.5**	**-9.5**

GILBERT STRUCTURAL
2036 N. Gilbert Rd.,
Ste. 2-428
Mesa, Arizona 85203
Phone (480) 398-8144

CLIENT: BRIAN SCOTT DESIGN **SHEET:** L3

PROJECT: KASNOFF RESIDENCE **DATE:** 1/2022

"LOWER FLOOR"

LATERAL ANALYSIS

ALL LATERAL LOADS (WIND, SEISMIC) ARE RESISTED BY A FLEXIBLE PLYWOOD DIAPHRAGM AND TRANSFERRED THRU WOOD SHEAR WALLS AND INTO A CONTINUOUS SPREAD FOOTING.

WIND

WIND SPEED (3 - second gust (V_{3S})) 115 MPH

EXPOSURE CATEGORY C

DETERMINE IF SIMPLIFIED PROVISIONS APPLY

MEAN ROOF HEIGHT (MRH)

EAVE HEIGHT		22	FT
ROOF PITCH	RISE	0	FT
	RUN	12	FT
ROOF WIDTH		25	FT
LEAST HORIZONTAL DIMENSION (L)		25	FT
ROOF ANGLE = ARCTAN(RISE/RUN)		1.2	DEGREES

MRH = 22 FT

MRH < Least horizontal dimension

22 < 25 OK

WIDTH OF "END ZONE" 2a

LEAST HORIZONTAL DIMENSION (L) 25 FT
EAVE HEIGHT (h) 22 FT

"END ZONE" SHALL BE **2 X 0.10L** OR **2 X 0.40h**, WHICHEVER IS LESS

2 X 0.10L = 5 FT
2 X 0.40h = 17.464 FT

BUT NOT LESS THAN 4% OF LEAST HORIZONTAL DIMENSION (L) OR 3FT

L = 1 FT

USE: 6 FT

GILBERT STRUCTURAL
2036 N. Gilbert Rd.,
Ste. 2-428
Mesa, Arizona 85203
Phone (480) 398-8144

CLIENT: BRIAN SCOTT DESIGN **SHEET:** L4

PROJECT: KASNOFF RESIDENCE **DATE:** 1/2022

WIND LOADS IBC 2018

HEIGHT & EXPOSURE ADJUSTMENT FACTOR **1.31**

HORIZONTAL LOADS **22.0** FT (MRH)

ZONE	TRANSVERSE DIRECTION (LB/FT^2)	LONGITUDINAL DIRECTION (LB/FT^2)	**TRANSVERSE ADJUSTED (LB/FT^2)**	**LONGITUDINAL ADJUSTED (LB/FT^2)**
END ZONE OF WALL	12.8	12.8	**16.8**	**16.8**
END ZONE OF ROOF	-6.7	-6.7	**-8.8**	**-8.8**
INTERIOR ZONE OF WALL	8.5	8.5	**11.2**	**11.2**
INTERIOR ZONE OF ROOF	-4.0	-4.0	**-5.3**	**-5.3**

****ALL NEGATIVE VALUES SHALL BE TAKEN AS ZERO**

VERTICAL LOADS

ZONE	TRANSVERSE DIRECTION (LB/FT^2)	LONGITUDINAL DIRECTION (LB/FT^2)	**TRANSVERSE ADJUSTED (LB/FT^2)**	**LONGITUDINAL ADJUSTED (LB/FT^2)**
END ZONE WINDWARD ROOF	-15.4	-15.4	**-20.2**	**-20.2**
END ZONE LEEWARD ROOF	-8.8	-8.8	**0.0**	**-11.6**
INTERIOR ZONE WINDWARD ROOF	-10.7	-10.7	**-14.1**	**-14.1**
INTERIOR ZONE LEEWARD ROOF	-6.8	-6.8	**-8.9**	**-8.9**

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN **SHEET NO.:** L5

PROJECT: KASNOFF RESIDENCE **DATE :** 1/2022

MARK	SHEATHING SCHEDULE (FOR WIND LOADS PER CURRENT NDS)		SILL PLATE NAIL SPACING -- SHEARWALL AT UPPER FLOORS
	DESCRIPTION	CAPACITY (plf)	
G1	1/2" G.W.B. w/ 5d COOLER NAILS AT 7" O.C. EDGES AND FIELD (UNBLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 48" O.C. (INTERIOR): HILTI PINS AT 9" O.C.	100	16d Nails at 6"
G2	1/2" G.W.B. w/ 5d COOLER NAILS AT 7" O.C. EDGES AND FIELD (BLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 48" O.C. (INTERIOR): HILTI PINS AT 9" O.C.	125	16d Nails at 6"
G3	1/2" G.W.B. w/ 5d COOLER NAILS AT 4" O.C. EDGES AND FIELD (BLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 48" O.C. (INTERIOR): HILTI PINS AT 6" O.C.	150	16d Nails at 6"
G4	5/8" G.W.B. w/ 6d COOLER NAILS AT 7" O.C. EDGES AND FIELD (UNBLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 48" O.C. (INTERIOR): HILTI PINS AT 9" O.C.	115	16d Nails at 6"
G5	5/8" G.W.B. w/ 6d COOLER NAILS AT 7" O.C. EDGES AND FIELD (BLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 48" O.C. (INTERIOR): HILTI PINS AT 6" O.C.	145	16d Nails at 6"
P1	7/16" PLYWOOD/OSB SHTG w/ 8d NAILS AT 6" O.C. EDGES / 12" O.C. FIELD (BLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 32" O.C. (INTERIOR): 1/2"ø SIMP. STRONG-BOLT 2 A.B. AT 32" O.C. (EMBED 2-3/4" MIN. ICC ESR-3037)	308	16d Nails at 4"
P2	7/16" PLYWOOD/OSB w/ 8d NAILS AT 4" O.C. EDGES / 12" O.C. FIELD (BLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 24" O.C. (INTERIOR): 1/2"ø SIMP. STRONG-BOLT 2 A.B. AT 24" O.C. (EMBED 2-3/4" MIN. ICC ESR-3037)	450	16d Nails at 3"
P3	7/16" PLYWOOD/OSB w/ 8d NAILS AT 3" O.C. EDGES / 12" O.C. FIELD (BLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 16" O.C. (INTERIOR): 1/2"ø SIMP. STRONG-BOLT 2 A.B. AT 16" O.C. (EMBED 2-3/4" MIN. ICC ESR-3037)	579	6d Nails at 2-1/2"
P4	7/16" PLYWOOD/OSB w/ 8d NAILS AT 2" O.C. EDGES / 12" O.C. FIELD (BLOCKED) (EXTERIOR): 1/2" X 10" ANCHOR BOLTS AT 12" O.C. (INTERIOR): 1/2"ø SIMP. STRONG-BOLT 2A.B. AT 12" O.C. (EMBED 2-3/4" MIN. ICC ESR-3037)	754	1/4"x5" SDS Screws at 6"

MARK	HOLDOWN SCHEDULE			
	TYPE	DESCRIPTION	1/2" FROM CORNER	8" FROM CORNER
B	STHD10	USE STHD10 [w/ (28) 16d SINKER NAILS]	3820	3820
C	HTT-5	USE HTT-5 [w/ (26) 10d SINKER NAILS] 5/8"ø STRONG-BOLT 2 w/ 5-1/8" EMBED (ESR-3037)	****	3965
D	STHD14	USE STHD14 [w/ (38) 16d SINKER NAILS]	5150	5150
E	HDQ8-SDS3	USE HDQ8 w/ SDS 1/4 X 3 WOOD SCREW w/ 7/8"ø HEAVY HEX MIN. 8" EMBEDMENT (MIN. 4x4 SOLID DF#2 POST)	****	7630
I	MSTC52	MSTC52 STRAP [w/ (62) 16d SINKER NAILS]	4745	4745
F	HHDQ11-SDS2.5	USE HHDQ11 W/ SDS 1/4 X 2.5 WOOD SCREW w/ 1"ø EPOXY THREADED ROD (MIN. 15" EMBED) w/ SIMPSON SET XP EPOXY (MIN. 4x6 or 6x6 SOLID DF#2 POST)	****	10300

Gilbert Structural LLC
2036 North Gilbert Road, Suite 2-428
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Office 480-398-8144
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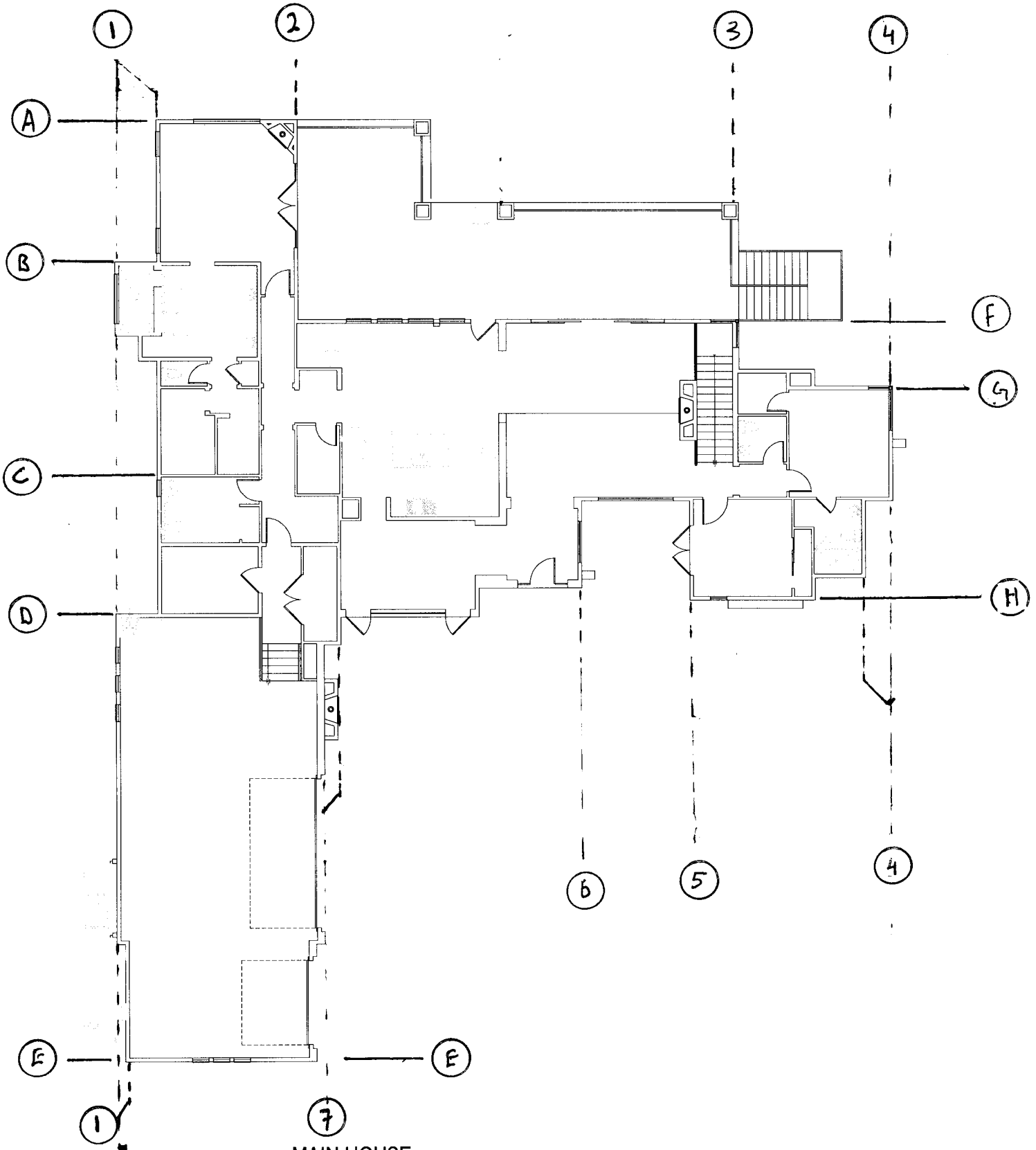
CLIENT: BRIAN SCOTT DESIGN

SHEET NO. L6

PROJECT: KASNOFF RESIDENCE

DATE: 1 / 2022



MAIN HOUSE
SHEARWALL PLAN

SCALE: 1/16" = 1'-0"

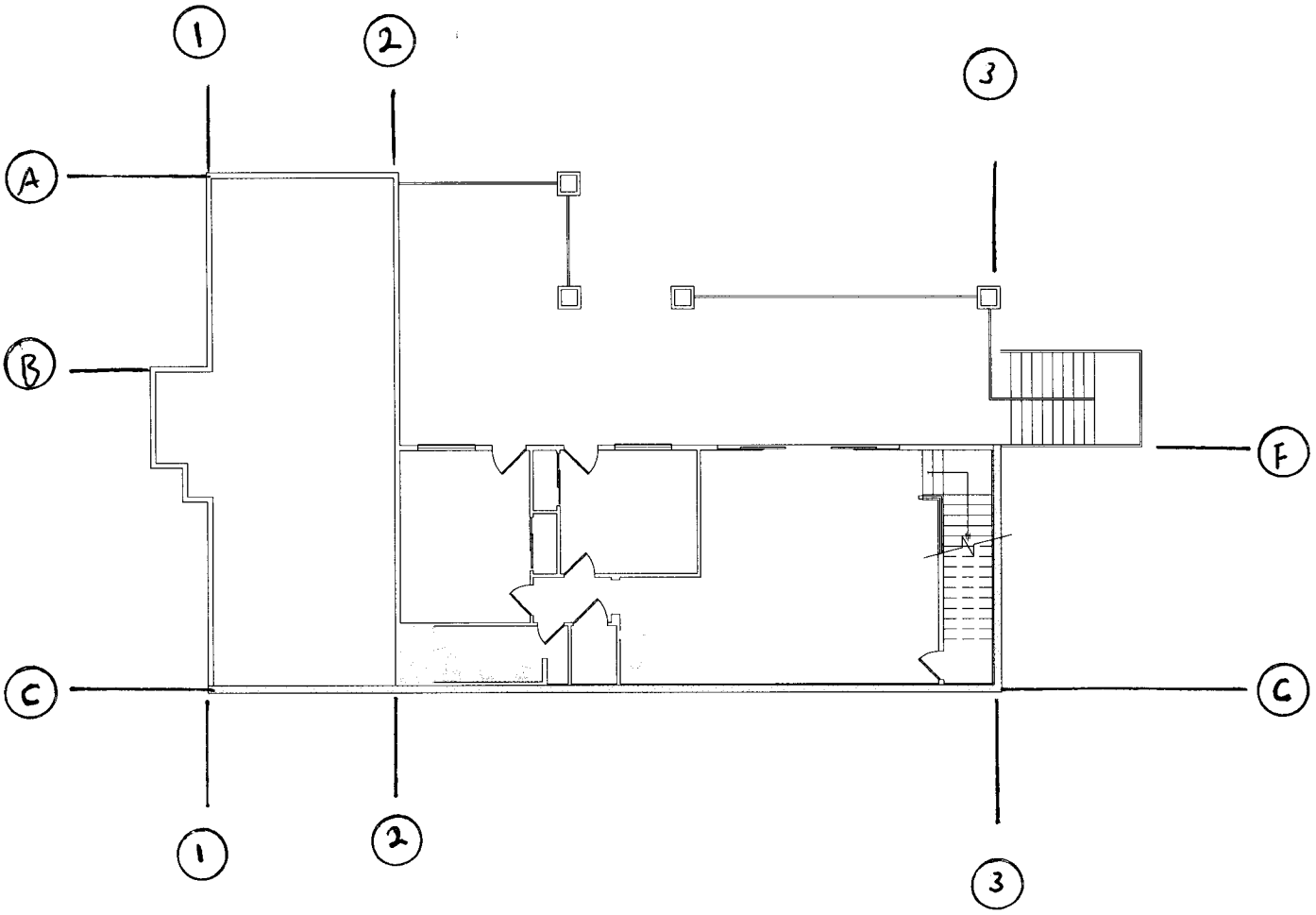
Gilbert Structural LLC
2036 North Gilbert Road, Suite 2-428
Mesa, Arizona 85203
Office 480-398-8144
Fax 480-398-8166

CLIENT: BRIAN SCOTT DESIGN

SHEET NO. L7

PROJECT: KASNOFF RESIDENCE

DATE: 1 / 2022



BASEMENT
SHEARWALL PLAN

SCALE: 1/16" = 1'-0"

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN SHEET NO.: L8

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

LATERAL ANALYSIS (UPPER LEVEL)

① $F = \left[\left(\frac{10}{2}+4\right)(6)(17.8)\right] + \left[\left(\frac{10}{2}+4\right)\left(\frac{28}{2}-6\right)(11.8)\right] = 1811\ \#$

$$V = \frac{1811}{40-2-2-2} = 53\ plf$$

USE: P1, WITH STANDARD STORY STRAP / No Holdowns Req'd

② $F = \left[\left(\frac{10}{2}+4\right)(6)(17.8)\right] + \left[\left(\frac{10}{2}+4\right)\left(\frac{74}{2}-6\right)(11.8)\right] = 4253\ \#$

$$V = \frac{4253}{22-10+8+8} = 152\ plf$$

USE: P1 WITH STANDARD STORY STRAPS

③ $F = \left[\left(\frac{10}{2}+7\right)(6)(17.8)\right] + \left[\left(\frac{10}{2}+7\right)\left(\frac{72}{2}-6\right)(11.8)\right] = 5530\ \#$

$$V = \frac{5530}{14} = 395\ plf$$

USE: P2, HTT-5 HOLDOWNS

④ $F = \left[\left(\frac{10}{2}+4\right)(6)(17.8)\right] + \left[\left(\frac{10}{2}+4\right)\left(\frac{24}{2}-6\right)(11.8)\right] = 1598\ \#$

$$V = \frac{1598}{14-5} = 178\ plf$$

USE: P1 WITH STANDARD STORY STRAPS / No Holdowns Req'd

⑤ $F = \left[\left(\frac{10}{2}+7\right)(6)(17.8)\right] + \left[\left(\frac{10}{2}+7\right)\left(\frac{38}{2}-6\right)(11.8)\right] = 3122\ \#$

$$V = \frac{3122}{11.5-6+7} = 250\ plf$$

USE: P1 No Holdowns Req'd.

⑥ $F = \left[\left(\frac{10}{2}+4\right)(6)(17.8)\right] + \left[\left(\frac{10}{2}+4\right)\left(\frac{42}{2}-6\right)(11.8)\right] = 2554\#$

$$V = \frac{2554}{10-5} = 511 \text{ plf}$$

USE: [P3] w/ STHDN HOLDOWNS

⑦ $F = \left[\left(\frac{10}{2}+6\right)\left(\frac{56}{2}\right)(11.8)\right] = 3684\#$

$$V = \frac{3684}{16} = 227 \text{ plf}$$

USE: [P1] NO HOLDOWNS REQ.

Ⓐ $F = \left[\left(\frac{10}{2}+7\right)(6)(17.8)\right] + \left[\left(\frac{10}{2}+7\right)\left(\frac{17}{2}-6\right)(11.8)\right] = 1636\#$

$$V = \frac{1636}{16.5-8} = 193 \text{ plf}$$

USE: [P1] + STANDARD STORY STRAPS

Ⓑ $F = \left[\left(\frac{10}{2}+6\right)\left(\frac{43}{2}\right)(11.8)\right] = 2791\#$

$$V = \frac{2791}{5} = 558.2 \text{ plf}$$

USE: [P3] and MSTC78 STRAPS

Ⓒ $F = \left[\left(\frac{10}{2}+6\right)\left(\frac{42}{2}\right)(11.8)\right] = 2726\#$

$$V = \frac{2726}{12} = 227 \text{ plf}$$

USE: [P1] and HTT-5 HOLDOWNS

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN SHEET NO.: L10

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

(D) $F = \left(\frac{10}{2}+4\right)\left(\frac{72}{2}\right)(11.8) = 3823\ \#$

$$V = \frac{3823}{17} = 225\ plf$$

USE: [P1] NO HOLDOWNS REQ'D

(E) $F = \left(\frac{10}{2}+4\right)(6)(17.8) + \left(\frac{10}{2}+4\right)\left(\frac{54}{2}-6\right)(11.8) = 3191\ \#$

$$V = \frac{3191}{(22.625 - 2-2-2)} = 192\ plf$$

USE: [P1] NO HOLDOWNS REQ'D

(F) $F = \left(\frac{10}{2}+4\right)\left(\frac{8}{2}\right)(17.8) = 641\ \#$

$$V = \frac{641}{5} = 128\ plf$$

USE: [P1] · WITH STANDARD STORY STRAPS

(G) $F = \left(\frac{10}{2}+11\right)\left(\frac{34}{2}\right)(11.8) = 3210\ \#$

$$V = \frac{3210}{18 - 2.5} = 207\ plf$$

USE: [P1] WITH STANDARD STORY STRAPS

(H) $F = \left(\frac{10}{2}+6\right)(6)(17.8) + \left(\frac{10}{2}+6\right)\left(\frac{26}{2}-6\right)(11.8) = 2083\ \#$

$$V = \frac{2083}{15-2} = 160\ plf$$

USE: [P1] NO HOLDOWNS REQ'D.

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN SHEET NO.: L 11

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

LOWER FLOOR

① $F = \left[\frac{10}{2} + 1.83 + \frac{10}{2}\right] \times 6 \times 16.8 + (11.83)\left(\frac{18}{2} - 6\right)(11.2) + 1811$

$= 3401\#$

$V = \frac{3401}{46} = 74$ plf

USE: [P1] . NO HOLDOWNS REQ

② $F = (11.83)(6)(16.8) + (11.83)\left(\frac{74}{2} - 6\right)(11.2) + 4253 = 9553\#$

$V = \frac{9553}{24} = 398$ plf

USE: [P2] . NO HOLDOWNS REQ.

③ $F = (11.83)(6)(16.8) + (11.83)\left(\frac{54}{2} - 6\right)(11.2) + 5530 = 9505\#$

$V = \frac{9505}{22} = 432$ plf

USE: 10" CMU, OK

Ⓐ $F = (11.83)(6)(16.8) + (11.83)\left(\frac{46}{2} - 6\right)(11.2) + 1636 = 5081\#$

$V = \frac{5081}{16.583} = 306$ plf

USE: [P1] with STHD10 HOLDOWNS

GILBERT STRUCTURAL
2036 N. Gilbert Rd., Ste. 2-428
Mesa, Arizona 85203

CLIENT : BRIAN SCOTT DESIGN SHEET NO.: L12

PROJECT: KASNOFF RESIDENCE DATE : 1/2022

(B) Transfer from above only.

(C) $F = (11.83)(6)(16.8) + (11.83)\left(\frac{46}{2} - 6\right)(11.2) + 2726 = 6171\ \#$

$$V = \frac{6171}{70} = 88\ plf$$

USE: 10" CMU WALL, OK

(F) $F = (11.83)(6)(16.8) + (11.83)\left(\frac{22}{2} - 6\right)(11.2) + 641 = 2496\ \#$

$$V = \frac{2496}{52 - 16 - 5 - 3 - 3 - 5} = 125\ plf$$

USE: P1 , NO HOLDOWNS REQ.

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R1

Restrained Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

Code Reference:

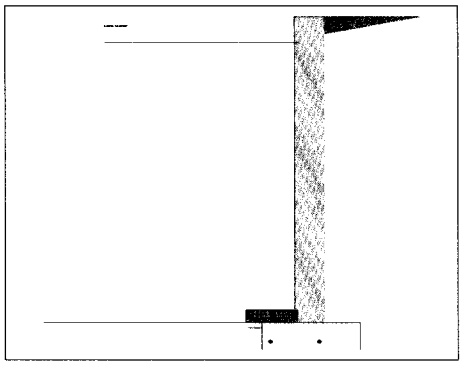
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	11.920 ft
Wall height above soil	=	ft
Total Wall Height	=	11.920 ft
Top Support Height	=	10.920 ft
Slope Behind Wal	=	0
Height of Soil over Toe	=	6 in

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
At-Rest Heel Pressure	=	55.0 psf/ft
	=	0.0 psf/ft
Passive Pressure	=	150.0 psf/ft
Soil Density	=	110 pcf
Footing||Soil Frictior	=	0.4 psf
Soil height to ignore for passive pressure	=	12 in



Surcharge Loads

Surcharge Over Heel = psf
>>>Used To Resist Sliding & Overturning
Surcharge Over Toe = psf
Used for Sliding & Overturning

Axial Load Applied to Stem

Axial Dead Load	=	600.0 lbs
Axial Live Load	=	720.0 lbs
Axial Load Eccentricity	=	in

Earth Pressure Seismic Load

Uniform Lateral Load Applied to Stem

Lateral Load	=	#/ft
...Height to Top	=	ft
...Height to Bottom	=	ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem	=	0.00 psf (Strength Level)

Wind acts left-to-right toward retention side.

Adjacent Footing Load

Adjacent Footing Load	=	lbs
Footing Width	=	ft
Eccentricity	=	in
Wall to Ftg CL Dist	=	ft
Footing Type		Line Load
Base Above/Below Soil at Back of Wall	=	ft
Poisson's Ratio	=	0.3

K_h Soil Density Multiplier = 0.2 g Added seismic per unit area = 0.0 psf

Design Summary

Total Bearing Load	=	4,459.90 lbs
...resultant ecc.	=	0.0 in
Soil Pressure @ Toe	=	1,486.63 psf OK
Soil Pressure @ Heel	=	1,486.63 psf OK
Allowable	=	psf
Soil Pressure Less Than Allowable		
ACI Factored @ Toe	=	1,879.96 psf
ACI Factored @ Heel	=	1,879.96 psf
Footing Shear @ Toe	=	15.338 psi OK
Footing Shear @ Heel	=	0.9618 psi OK
Allowable	=	82.158 psi
Reaction at Top	=	906.37 lbs
Reaction at Bottom	=	3,740.05 lbs

Sliding Calcs
Lateral Sliding Force = 3,740.05 lbs

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	0.000
Live Load	0.000
Earth, H	0.000
Wind, W	0.000
Seismic, E	0.000

Masonry Stem Construction

Thickness = 10.00 in
Wall Weight = 98.0 psf
Stem is FIXED to top of footing

		@ Top Support	Mmax Between Top & Base	@ Base of Wall
		Stem OK	Stem OK	Stem OK
Design Height Above Ftg	=	10.920 ft	6.227 ft	0.00 ft
Rebar Size	=	# 5	# 5	# 5
Rebar Spacing	=	16.00 in	16.00 in	8.00 in
Rebar Placed at	=	Edge	Edge	Edge
Rebar Depth 'd'	=	7.250 in	7.250 in	7.250 in
Design Data				
fb/FB + fa/Fa	=			
Moment....Actual	=	9.167 ft-#	2,579.04 ft-#	5,589.96 ft-#
Moment.....Allowable	=	4,106.72 ft-#	4,106.72 ft-#	6,855.19 ft-#
Shear Force @ this height	=	882.33 lbs		2,997.55 lbs
Shear.....Actual	=	7.639 psi		25.953 psi
Shear.....Allowable	=	79.558 psi		49.288 psi

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R2

Restrained Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 | Gilbert Structural LLC | (c) ENERCALC INC 1983-2022

Footing Strengths & Dimensions

Toe Width	=	1.080 ft
Heel Width	=	1.920
Total Footing Width	=	3.0
Footing Thickness	=	13.0 in
Key Width	=	in
Key Depth	=	in
Key Distance from Toe	=	ft

f'c = 3,000 psi Fy = 60000 psi
Footing Concrete Density = 150 pcf
Min. As % = 0.0018
Cover @ Top = 2 in @ Btm.= 3 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,879.96	1,879.96	psf
Mu' : Upward	=	1,560.18		ft-#
Mu' : Downward	=	216.604		ft-#
Mu: Design	=	1,344	-94	ft-#
Actual 1-Way Shear	=	15.338		psi
Allow 1-Way Shear	=	82.158	82.158	psi

Other Acceptable Sizes & Spacings:

Toe: # 7 @ 18.00 in -or- phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Heel: None Spec'd -or- phiMn = phi * 5 * lambda * sqrt(fc) * Sm
Key: # 0 @ 0.00 in -or- No key defined

Min footing T&S reinf Area 0.84 in2
Min footing T&S reinf Area per foot 0.28 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 8.55 in	#4@ 17.09 in
#5@ 13.25 in	#5@ 26.50 in
#6@ 18.80 in	#6@ 37.61 in

Summary of Forces on Footing : Slab RESISTS sliding, stem is FIXED at footing

Forces acting on footing for soil pressure

>>> Sliding Forces are restrained by the adjacent slab

Load & Moment Summary For Footing : For Soil Pressure Calcs

Moment @ Top of Footing Applied from Stem			=		-5,589.96 ft-#
Surcharge Over Heel	=	0.0 lbs		0.0 ft	0.0 ft-#
Adjacent Footing Load	=	0.0 lbs		0.0 ft	0.0 ft-#
Axial Dead Load on Stem	=	1,320.0 lbs		1.497 ft	1,975.60 ft-#
Soil Over Toe	=	59.40 lbs		0.540 ft	32.076 ft-#
Surcharge Over Toe	=	0.0 lbs		0.0 ft	0.0 ft-#
Stem Weight	=	1,168.16 lbs		1.497 ft	1,748.35 ft-#
Soil Over Heel	=	1,424.84 lbs		2.457 ft	3,500.35 ft-#
Footing Weight	=	487.50 lbs		1.50 ft	731.25 ft-#
Total Vertical Force	=	4,459.90 lbs	Base Moment	=	2,397.66 ft-#

Stem is specified to be fixed to footing, and top restraint is assumed to react out any tendency for moment at the footing/soil interface, so uniform soil pressure is assumed.

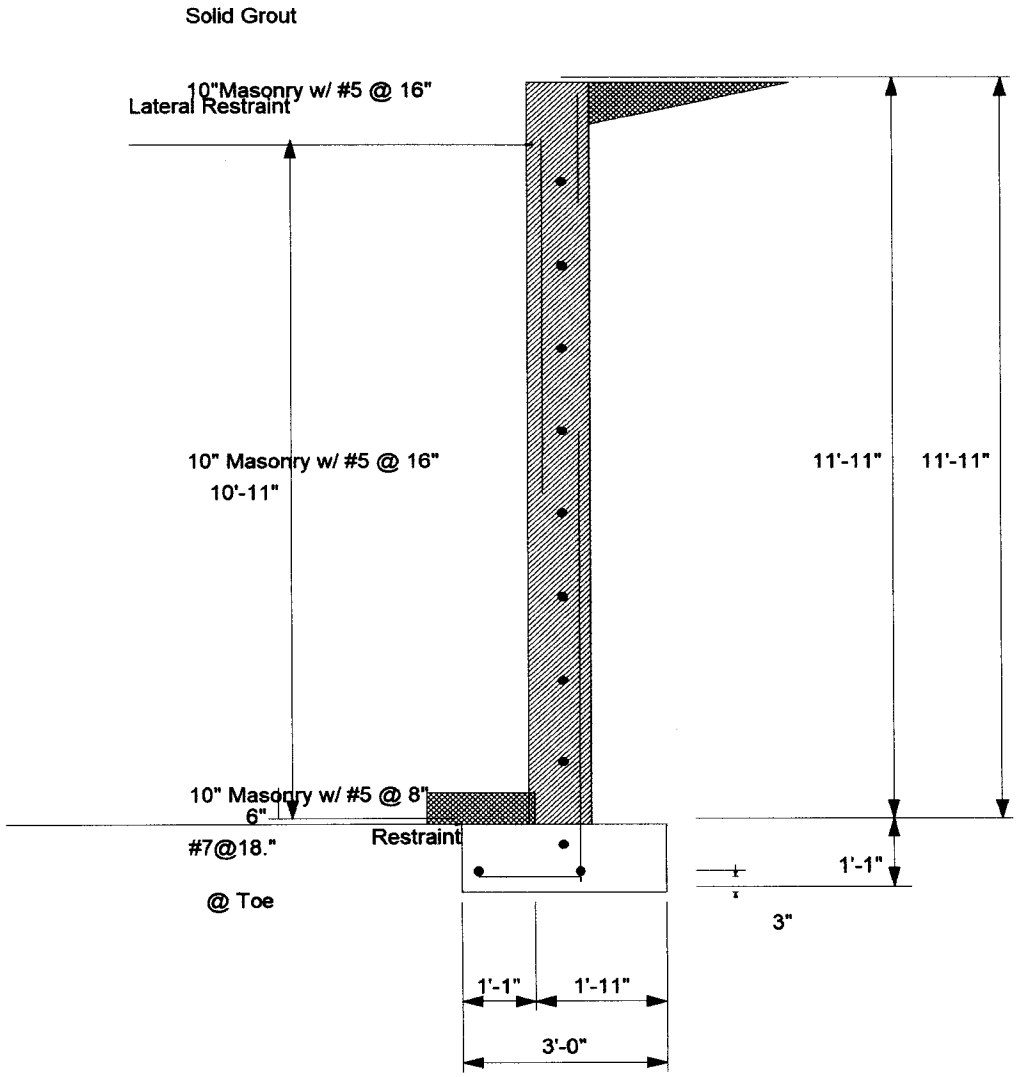
Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Rebar Lap & Embedment Lengths Information

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

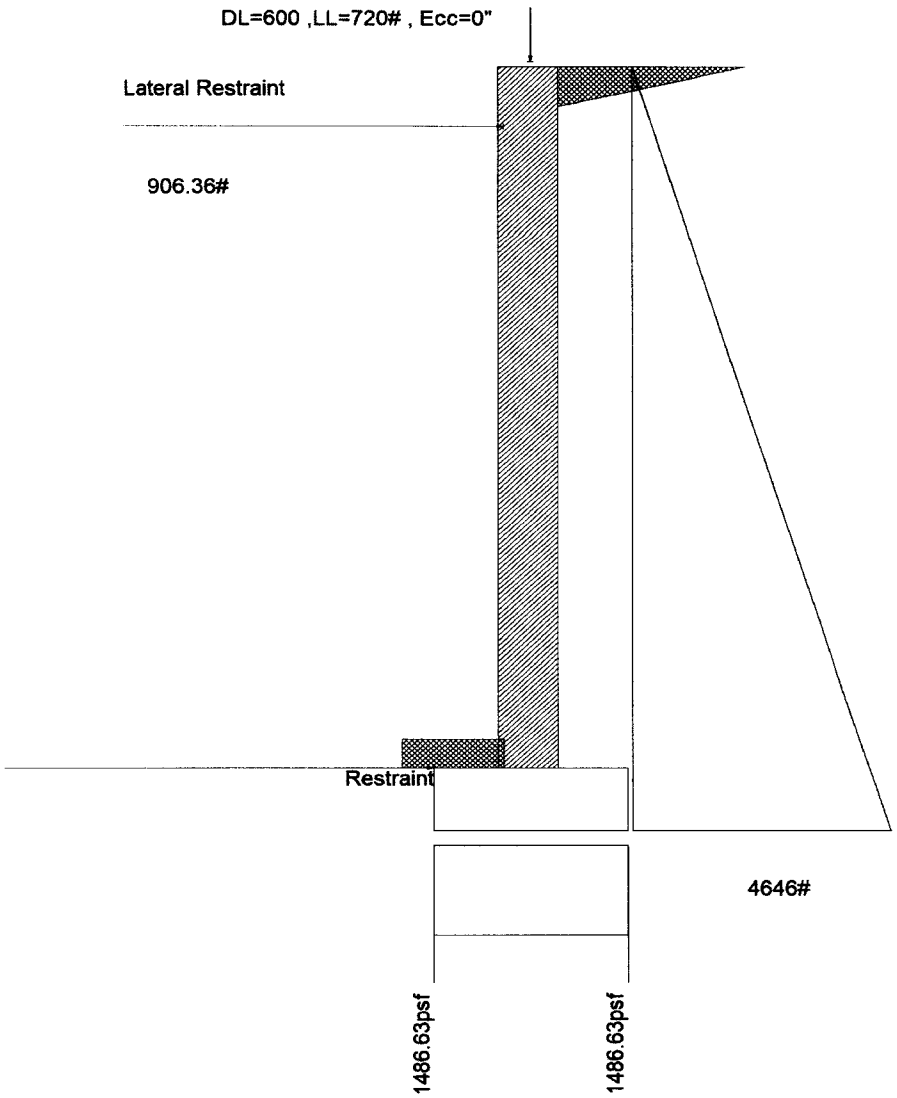
R 4

Restrained Retaining Wall Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6



Restrained Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6



Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 6

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 2 FT CANTILEVERED RETAINING WALL

Code Reference

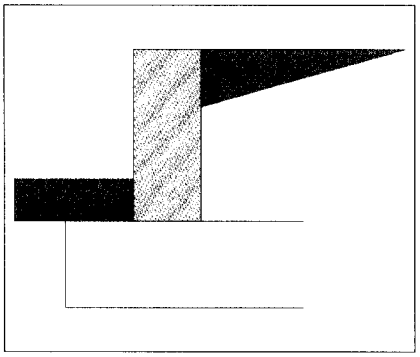
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	2.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 7

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 2 FT CANTILEVERED RETAINING WALL

Design Summary

Wall Stability Ratios

Overturning	=	5.26	OK
Sliding	=	1.55	OK
Global Stability	=	4.90	
Total Bearing Load	=	609 lbs	
...resultant ecc.	=	0.80 in	
Soil Pressure @ Toe	=	305 psf	OK
Soil Pressure @ Heel	=	215 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	427 psf	
ACI Factored @ Heel	=	302 psf	
Footing Shear @ Toe	=	0.8 psi	OK
Footing Shear @ Heel	=	1.0 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	157.5 lbs	
less 0 % Passive Force	-	0.0 lbs	
less 100% Friction Force	= -	243.4 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom				
		Stem OK				
Design Height Above Ftg	ft =	0.00				
Wall Material Above "Ht"	=	Masonry				
Design Method	=	ASD	SD	SD	SD	SD
Thickness	=	8.00				
Rebar Size	=	# 4				
Rebar Spacing	=	48.00				
Rebar Placed at	=	Edge				
Design Data						
fb/FB + fa/Fa	=	**0.070**				
Total Force @ Section						
Service Level	lbs =	70.0				
Strength Level	lbs =	2,800.0				
Moment....Actual						
Service Level	ft-# =	46.7				
Strength Level	ft-# =	9,333.3				
Moment.....Allowable	=	664.7				
Shear.....Actual						
Service Level	psi =	0.8				
Strength Level	psi =	31.1				
Shear.....Allowable	psi =	49.0				
Anet (Masonry)	in2 =	91.50				
Rebar Depth 'd'	in =	5.25				
Masonry Data						
f'm	psi =	1,900				
Fs	psi =	32,000				
Solid Grouting	=	Yes				
Modular Ratio 'n'	=	16.96				
Wall Weight	psf =	0.0				
Short Term Factor	=	1.000				
Equiv. Solid Thick.	in =	7.60				
Masonry Block Type	=					
Masonry Design Method	=	ASD				
Concrete Data						
f'c	psi =					
Fy	psi =					

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 8

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 2 FT CANTILEVERED RETAINING WALL

Footing Data

Toe Width	=	0.67 ft
Heel Width	=	1.67
Total Footing Width	=	2.34
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	427	302 psf
Mu' : Upward	=	93	161 ft-#
Mu' : Downward	=	83	298 ft-#
Mu: Design	=	10	137 ft-#
phiMin	=	2,739	2,739 ft-#
Actual 1-Way Shear	=	0.79	0.97 psi
Allow 1-Way Shear	=	43.82	43.82 psi
Toe Reinforcing	=	None Spec'd	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	
Footing Torsion, Tu	=	0.00 ft-lbs	
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs	

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area 0.61 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	157.5	1.00	157.5	Soil Over HL (ab. water tbl)	220.7	1.84	405.8
HL Act Pres (be water tbl)				Soil Over HL (bel. water tbl)		1.84	405.8
Hydrostatic Force				Watre Table			
Buoyant Force =				Sloped Soil Over Heel =			
Surcharge over Heel =				Surcharge Over Heel =			
Surcharge Over Toe =				Adjacent Footing Load =			
Adjacent Footing Load =				Axial Dead Load on Stem =			
Added Lateral Load =				* Axial Live Load on Stem =			
Load @ Stem Above Soil =				Soil Over Toe =	36.9	0.34	12.3
=				Surcharge Over Toe =			
				Stem Weight(s) =			
				Earth @ Stem Transitions =			
Total =	157.5	**O.T.M.** =	157.5	Footing Weight =	351.0	1.17	410.7
				Key Weight =			
				Vert. Component =			
				Total =	608.6 lbs	**R.M.**=	828.8

Resisting/Overturning Ratio = **5.26**
Vertical Loads used for Soil Pressure = 608.6 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 2 FT CANTILEVERED RETAINING WALL

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.007	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: 2 FT CANTILEVERED RETAINING WALL

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress,fs = 2214.44

Lap Splice length for #4 bar specified in this stem design segment =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.0500 in2/ft
As Required =	0.0037 in2/ft

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

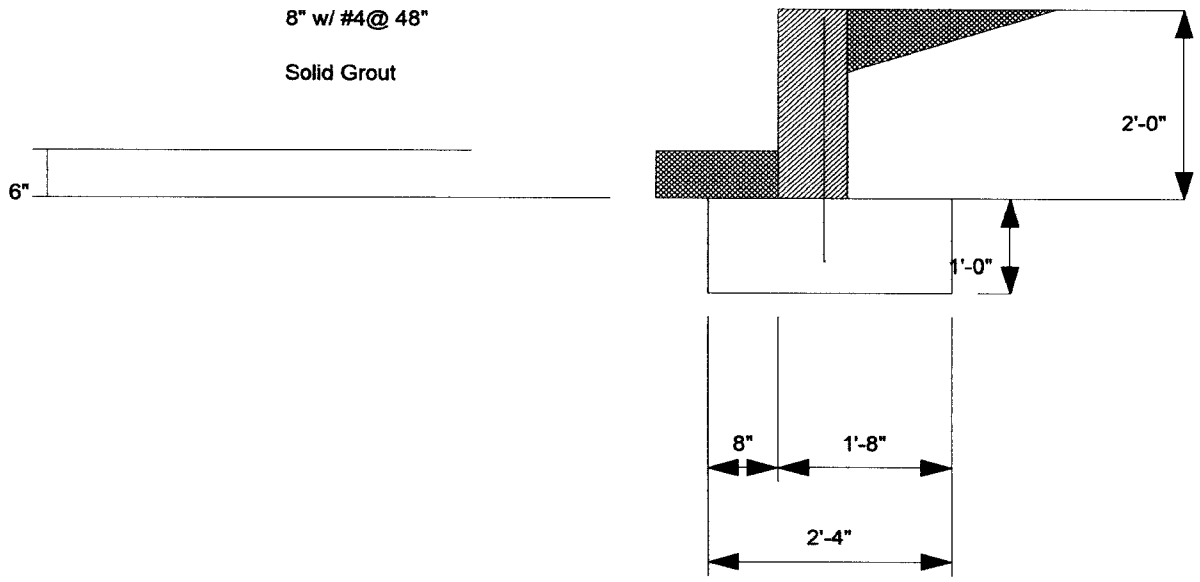
R 11

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

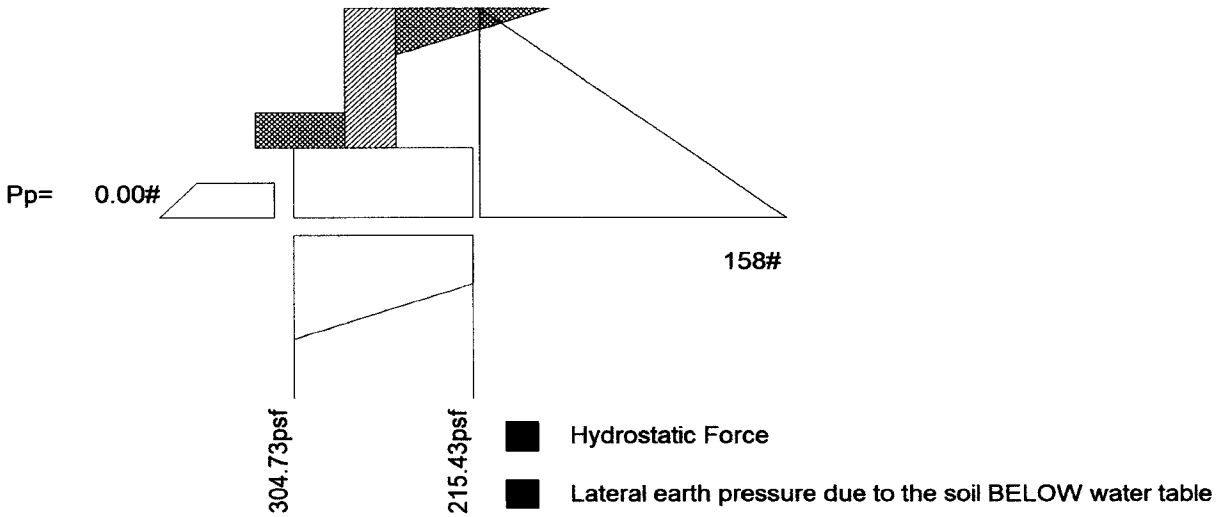
DESCRIPTION: 2 FT CANTILEVERED RETAINING WALL



Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 2 FT CANTILEVERED RETAINING WALL



Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R13

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 4 FT CANTILEVERED RETAINING WALL

Code Reference:

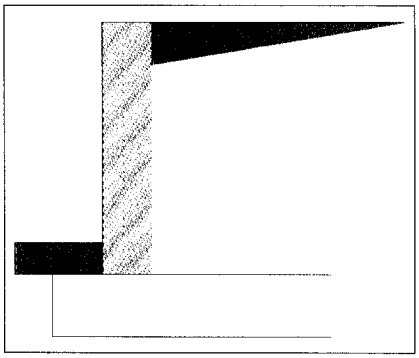
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	4.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 14

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 4 FT CANTILEVERED RETAINING WALL

Design Summary

Wall Stability Ratios

Overturning	=	5.18	OK
Sliding	=	1.52	OK
Global Stability	=	3.18	
Total Bearing Load	=	1,663 lbs	
...resultant ecc.	=	0.54 in	
Soil Pressure @ Toe	=	475 psf	OK
Soil Pressure @ Heel	=	411 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	665 psf	
ACI Factored @ Heel	=	575 psf	
Footing Shear @ Toe	=	2.2 psi	OK
Footing Shear @ Heel	=	2.1 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	437.5 lbs	
less 0 % Passive Force	-	0.0 lbs	
less 100% Friction Force	-	665.3 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom Stem OK				
Design Height Above Ftg	ft =	0.00				
Wall Material Above "Ht"	=	Masonry				
Design Method	=	ASD	SD	SD	SD	SD
Thickness	=	8.00				
Rebar Size	=	# 4				
Rebar Spacing	=	32.00				
Rebar Placed at	=	Edge				
Design Data						
fb/FB + fa/Fa	=	**0.378**				
Total Force @ Section						
Service Level	lbs =	280.0				
Strength Level	lbs =	2,800.0				
Moment....Actual						
Service Level	ft-# =	373.3				
Strength Level	ft-# =	9,333.3				
Moment.....Allowable	=	986.4				
Shear.....Actual						
Service Level	psi =	3.1				
Strength Level	psi =	31.1				
Shear.....Allowable	psi =	49.0				
Anet (Masonry)	in2 =	91.50				
Rebar Depth 'd'	in =	5.25				
Masonry Data						
f'm	psi =	1,900				
Fs	psi =	32,000				
Solid Grouting	=	Yes				
Modular Ratio 'n'	=	16.96				
Wall Weight	psf =	0.0				
Short Term Factor	=	1.000				
Equiv. Solid Thick.	in =	7.60				
Masonry Block Type	=					
Masonry Design Method	=	ASD				
Concrete Data						
f'c	psi =					
Fy	psi =					

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R15

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 4 FT CANTILEVERED RETAINING WALL

Footing Data

Toe Width	=	0.67 ft
Heel Width	=	3.08
Total Footing Width	=	3.75
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	665	575 psf
Mu' : Upward	=	148	1,737 ft-#
Mu' : Downward	=	83	2,353 ft-#
Mu: Design	=	65	616 ft-#
phiMin	=	2,739	2,739 ft-#
Actual 1-Way Shear	=	2.17	2.09 psi
Allow 1-Way Shear	=	43.82	43.82 psi
Toe Reinforcing	=	None Spec'd	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	
Footing Torsion, Tu	=	0.00 ft-lbs	
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs	

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area	0.97	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft
If one layer of horizontal bars:	If two layers of horizontal bars:	
#4@ 9.26 in	#4@ 18.52 in	
#5@ 14.35 in	#5@ 28.70 in	
#6@ 20.37 in	#6@ 40.74 in	

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		437.5	1.67	729.2	Soil Over HL (ab. water tbl)	1,063.3	2.54	2,706.1
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		2.54	2,706.1
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=	36.9	0.34	12.3
	=				Surcharge Over Toe	=		
					Stem Weight(s)	=		
					Earth @ Stem Transitions	=		
Total	=	437.5	**O.T.M.** =	729.2	Footing Weight	=	563.0	1.88	1,056.5
					Key Weight	=		
					Vert. Component	=		
					Total =	1,663.2 lbs	**R.M.**=	3,775.0

Resisting/Overturning Ratio = **5.18**
Vertical Loads used for Soil Pressure = 1,663.2 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Cantilevered Retaining Wall

DESCRIPTION: 4 FT CANTILEVERED RETAINING WALL

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.014	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

DESCRIPTION: 4 FT CANTILEVERED RETAINING WALL

Rebar Lap & Embedment Lengths Information

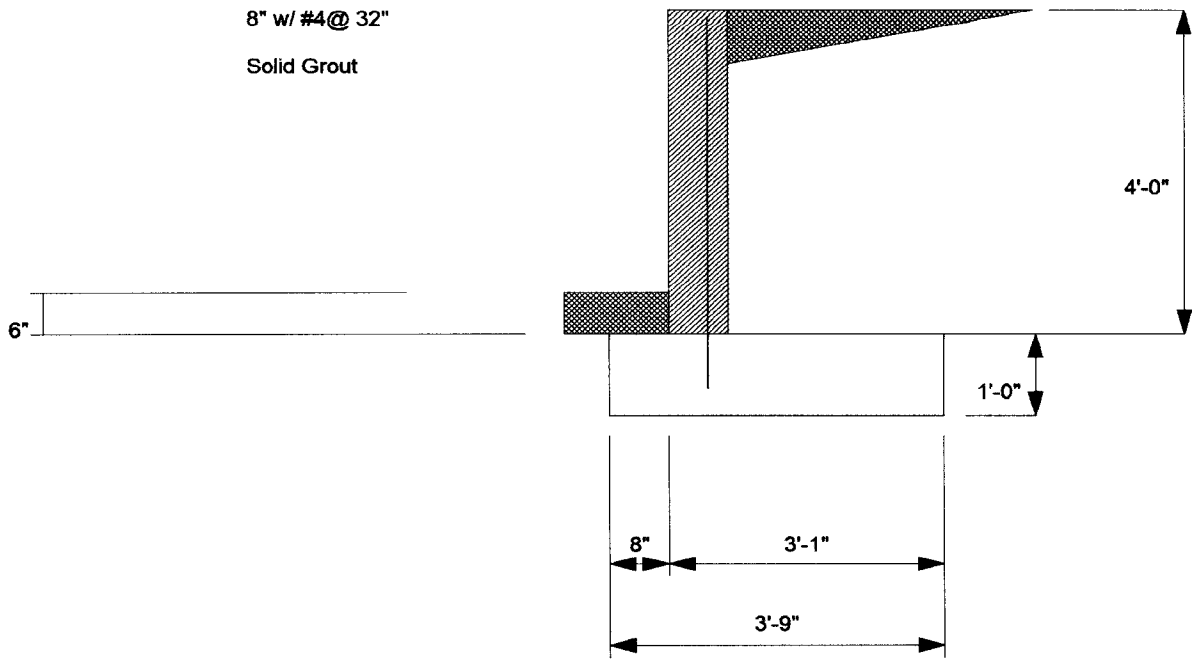
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress,fs = 12100.79

Lap Splice length for #4 bar specified in this stem design segment =	20.00 in
Development length for #4 bar specified in this stem design segment =	12.10 in
Hooked embedment length into footing for #4 bar specified in this stem design segment =	7.67 in
As Provided =	0.0750 in2/ft
As Required =	0.0297 in2/ft

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

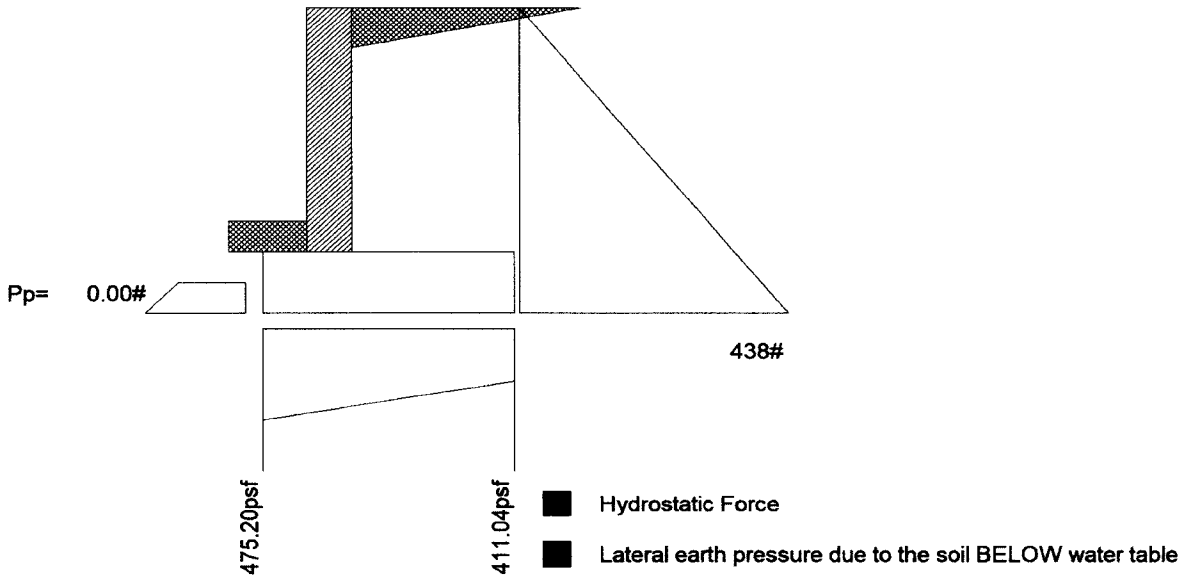
DESCRIPTION: 4 FT CANTILEVERED RETAINING WALL



Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 4 FT CANTILEVERED RETAINING WALL



Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 20

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 6 FT CANTILEVERED RETAINING WALL

Code Reference:

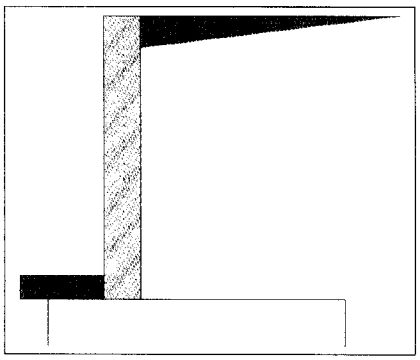
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	6.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 6 FT CANTILEVERED RETAINING WALL

Design Summary

Wall Stability Ratios

Overturning	=	5.31	OK
Sliding	=	1.53	OK
Global Stability	=	2.65	
Total Bearing Load	=	3,275 lbs	
...resultant ecc.	=	0.38 in	
Soil Pressure @ Toe	=	636 psf	OK
Soil Pressure @ Heel	=	592 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	890 psf	
ACI Factored @ Heel	=	829 psf	
Footing Shear @ Toe	=	5.1 psi	OK
Footing Shear @ Heel	=	3.7 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	857.5 lbs	
less 0 % Passive Force	-	0.0 lbs	
less 100% Friction Force	= -	1,310.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom				
		Stem OK				
Design Height Above Ftg	ft =	0.00				
Wall Material Above "Ht"	=	Masonry				
Design Method	=	ASD	SD	SD	SD	SD
Thickness	=	8.00				
Rebar Size	=	# 5				
Rebar Spacing	=	24.00				
Rebar Placed at	=	Edge				
Design Data						
fb/FB + fa/Fa	=	**0.633**				
Total Force @ Section						
Service Level	lbs =	630.0				
Strength Level	lbs =	2,800.0				
Moment....Actual						
Service Level	ft-# =	1,260.0				
Strength Level	ft-# =	9,333.3				
Moment.....Allowable	=	1,989.1				
Shear.....Actual						
Service Level	psi =	6.9				
Strength Level	psi =	31.1				
Shear.....Allowable	psi =	49.0				
Anet (Masonry)	in2 =	91.50				
Rebar Depth 'd'	in =	5.25				
Masonry Data						
f'm	psi =	1,900				
Fs	psi =	32,000				
Solid Grouting	=	Yes				
Modular Ratio 'n'	=	16.96				
Wall Weight	psf =	0.0				
Short Term Factor	=	1.000				
Equiv. Solid Thick.	in =	7.60				
Masonry Block Type	=					
Masonry Design Method	=	ASD				
Concrete Data						
f'c	psi =					
Fy	psi =					

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 22

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 6 FT CANTILEVERED RETAINING WALL

Footing Data

Toe Width	=	1.00 ft
Heel Width	=	4.33
Total Footing Width	=	5.33
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	890	829 psf
Mu' : Upward	=	443	5,668 ft-#
Mu' : Downward	=	164	7,128 ft-#
Mu: Design	=	279	1,460 ft-#
phiMin	=	2,739	2,739 ft-#
Actual 1-Way Shear	=	5.14	3.72 psi
Allow 1-Way Shear	=	43.82	43.82 psi
Toe Reinforcing	=	None Spec'd	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	
Footing Torsion, Tu	=	0.00 ft-lbs	
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs	

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area	1.38	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft
If one layer of horizontal bars:	If two layers of horizontal bars:	
#4@ 9.26 in	#4@ 18.52 in	
#5@ 14.35 in	#5@ 28.70 in	
#6@ 20.37 in	#6@ 40.74 in	

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		857.5	2.33	2,000.8	Soil Over HL (ab. water tbl)	2,420.0	3.50	8,469.9
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		3.50	8,469.9
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=	55.0	0.50	27.5
	=				Surcharge Over Toe	=		
					Stem Weight(s)	=		
					Earth @ Stem Transitions	=		
Total	=	857.5	**O.T.M.** =	2,000.8	Footing Weight	=	800.0	2.67	2,133.3
					Key Weight	=		
					Vert. Component	=		
					Total =	3,275.0 lbs	**R.M.**=	10,630.7

Resisting/Overturning Ratio = **5.31**
Vertical Loads used for Soil Pressure = 3,275.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Cantilevered Retaining Wall

DESCRIPTION: 6 FT CANTILEVERED RETAINING WALL

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.020	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 6 FT CANTILEVERED RETAINING WALL

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress,fs = 16.09

Lap Splice length for #5 bar specified in this stem design segment =	25.00 in
Development length for #5 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.25 in
As Provided =	0.1550 in2/ft
As Required =	0.1010 in2/ft

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

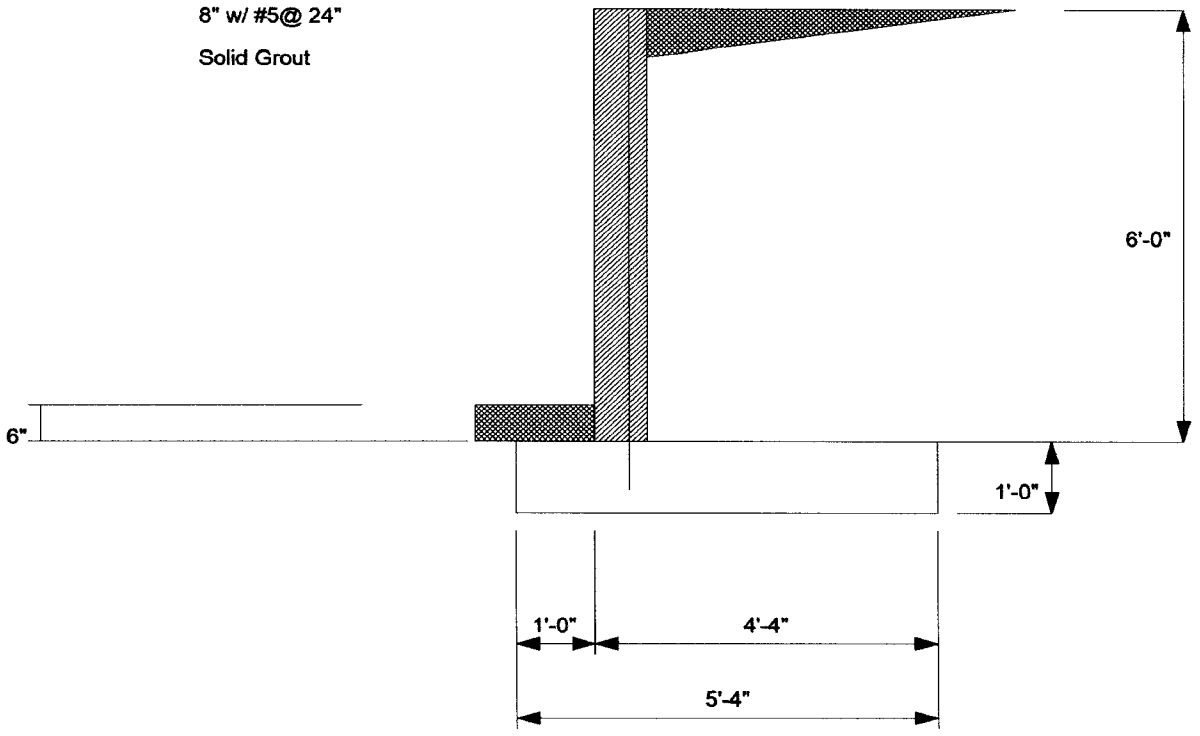
R25

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 6 FT CANTILEVERED RETAINING WALL

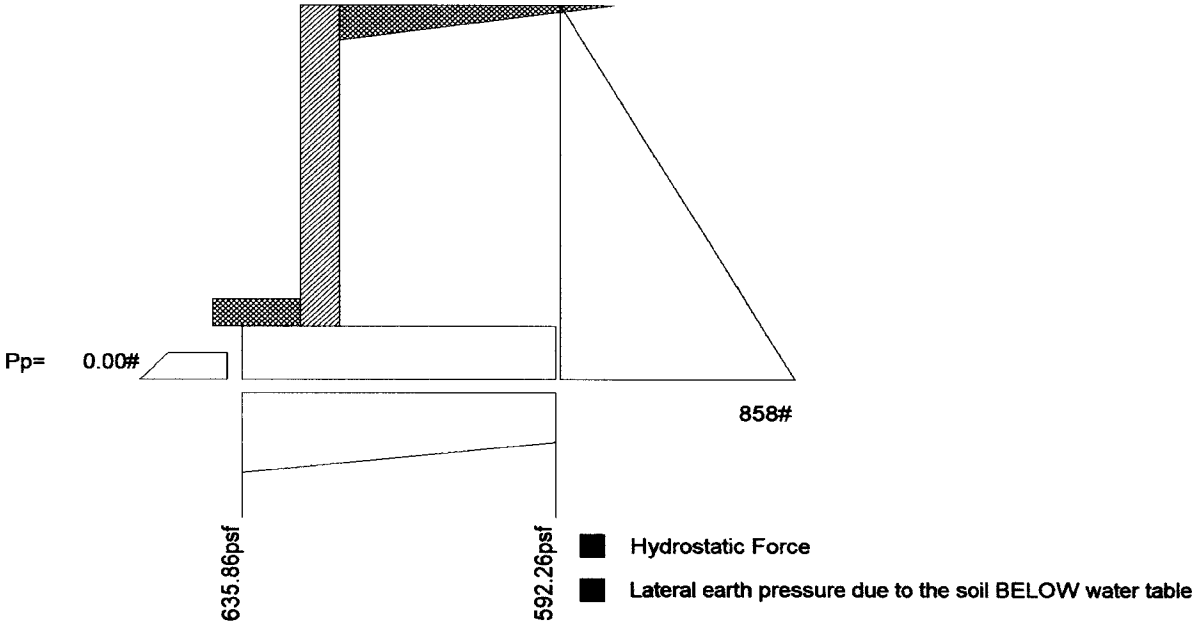


Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 6 FT CANTILEVERED RETAINING WALL



Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 2 7

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 8 FT CANTILEVERED RETAINING WALL

Code Reference:

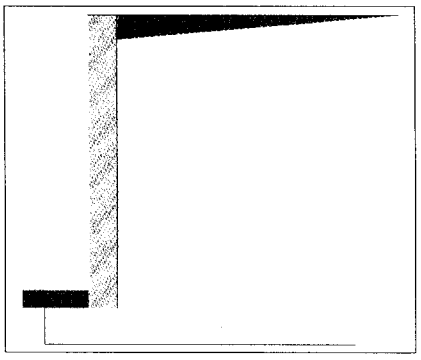
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	8.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 8 FT CANTILEVERED RETAINING WALL

Design Summary

Wall Stability Ratios			
Overturning	=	5.94	OK
Sliding	=	1.68	OK
Global Stability	=	2.52	
Total Bearing Load	=	5,970 lbs	
...resultant ecc.	=	0.78 in	
Soil Pressure @ Toe	=	878 psf	OK
Soil Pressure @ Heel	=	788 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,230 psf	
ACI Factored @ Heel	=	1,103 psf	
Footing Shear @ Toe	=	7.9 psi	OK
Footing Shear @ Heel	=	3.9 psi	OK
Allowable	=	82.2 psi	
Sliding Calcs			
Lateral Sliding Force	=	1,417.5 lbs	
less 0 % Passive Force	-	0.0 lbs	
less 100% Friction Force	-	2,388.1 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors	
Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom				
		Stem OK				
Design Height Above Ftg	ft =	0.00				
Wall Material Above "Ht"	=	Masonry				
Design Method	=	ASD	SD	SD	SD	SD
Thickness	=	8.00				
Rebar Size	=	# 5				
Rebar Spacing	=	8.00				
Rebar Placed at	=	Edge				
Design Data						
fb/FB + fa/Fa	=	**0.746**				
Total Force @ Section						
Service Level	lbs =	1,120.0				
Strength Level	lbs =	2,800.0				
Moment....Actual						
Service Level	ft-# =	2,986.7				
Strength Level	ft-# =	9,333.3				
Moment.....Allowable	=	4,003.1				
Shear.....Actual						
Service Level	psi =	12.2				
Strength Level	psi =	31.1				
Shear.....Allowable	psi =	49.0				
Anet (Masonry)	in2 =	91.50				
Rebar Depth 'd'	in =	5.25				
Masonry Data						
f'm	psi =	1,900				
Fs	psi =	32,000				
Solid Grouting	=	Yes				
Modular Ratio 'n'	=	16.96				
Wall Weight	psf =	0.0				
Short Term Factor	=	1.000				
Equiv. Solid Thick.	in =	7.60				
Masonry Block Type	=					
Masonry Design Method	=	ASD				
Concrete Data						
f'c	psi =					
Fy	psi =					

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 8 FT CANTILEVERED RETAINING WALL

Footing Data

Toe Width	=	1.00 ft
Heel Width	=	6.17
Total Footing Width	=	7.17
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,230	1,103 psf
Mu' : Upward	=	612	17,172 ft-#
Mu' : Downward	=	164	19,830 ft-#
Mu: Design	=	448	2,658 ft-#
phiMin	=	2,739	2,739 ft-#
Actual 1-Way Shear	=	7.94	3.87 psi
Allow 1-Way Shear	=	43.82	43.82 psi
Toe Reinforcing	=	None Spec'd	
Heel Reinforcing	=	None Spec'd	
Key Reinforcing	=	None Spec'd	
Footing Torsion, Tu	=	0.00 ft-lbs	
Footing Allow. Torsion, phi Tu	=	0.00 ft-lbs	

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area	1.86	in2
Min footing T&S reinf Area per foot	0.26	in2 /ft
If one layer of horizontal bars:	If two layers of horizontal bars:	
#4@ 9.26 in	#4@ 18.52 in	
#5@ 14.35 in	#5@ 28.70 in	
#6@ 20.37 in	#6@ 40.74 in	

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	1,417.5	3.00	4,252.5			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =						
Load @ Stem Above Soil =						
=						
				Soil Over HL (ab. water tbl)	4,840.3	4.42	21,378.8
				Soil Over HL (bel. water tbl)		4.42	21,378.8
				Watre Table			
				Sloped Soil Over Heel =			
				Surcharge Over Heel =			
				Adjacent Footing Load =			
				Axial Dead Load on Stem =			
				* Axial Live Load on Stem =			
				Soil Over Toe =	55.0	0.50	27.5
				Surcharge Over Toe =			
				Stem Weight(s) =			
				Earth @ Stem Transitions =			
				Footing Weight =	1,075.1	3.58	3,852.4
				Key Weight =			
				Vert. Component =			
Total =	1,417.5	**O.T.M.** =	4,252.5	**Total** =	5,970.3 lbs	**R.M.**=	25,258.7

Resisting/Overturning Ratio = **5.94**
Vertical Loads used for Soil Pressure = 5,970.3 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Cantilevered Retaining Wall

DESCRIPTION: 8 FT CANTILEVERED RETAINING WALL

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.027	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 8 FT CANTILEVERED RETAINING WALL

Rebar Lap & Embedment Lengths Information

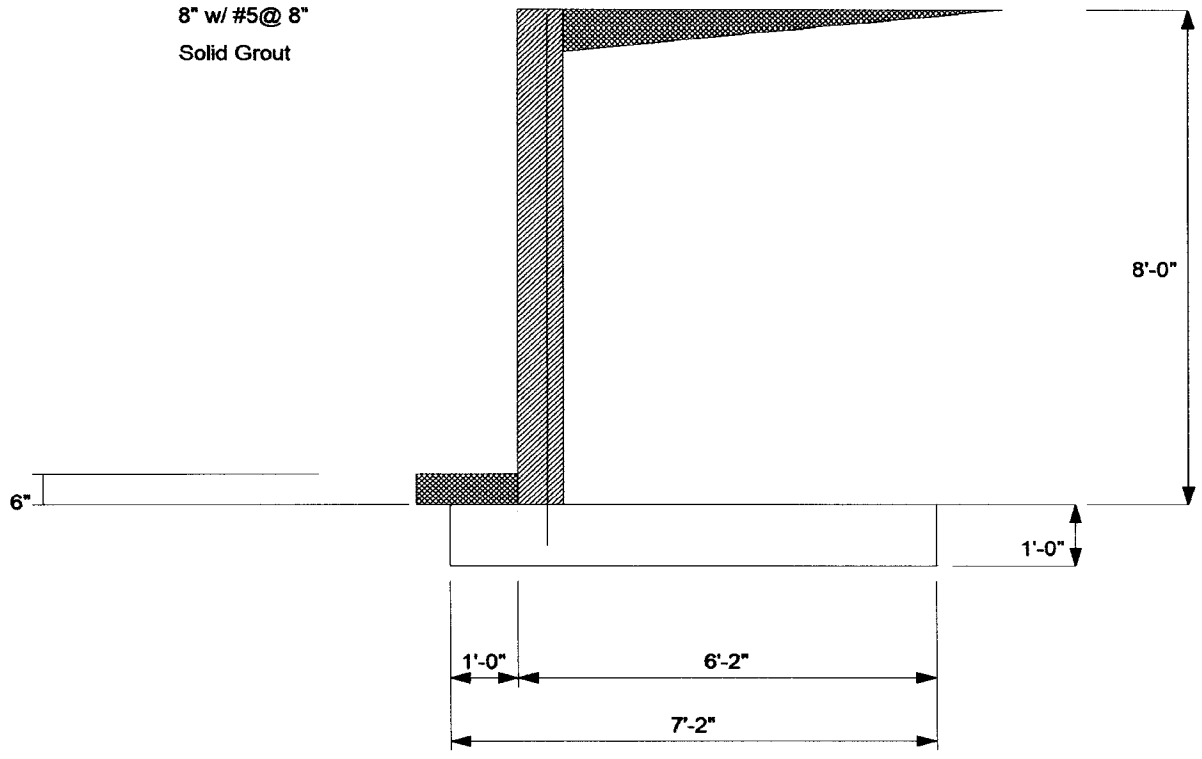
Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress,fs = 11.30

Lap Splice length for #5 bar specified in this stem design segment =	25.00 in
Development length for #5 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.00 in
As Provided =	0.4650 in2/ft
As Required =	0.2429 in2/ft

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

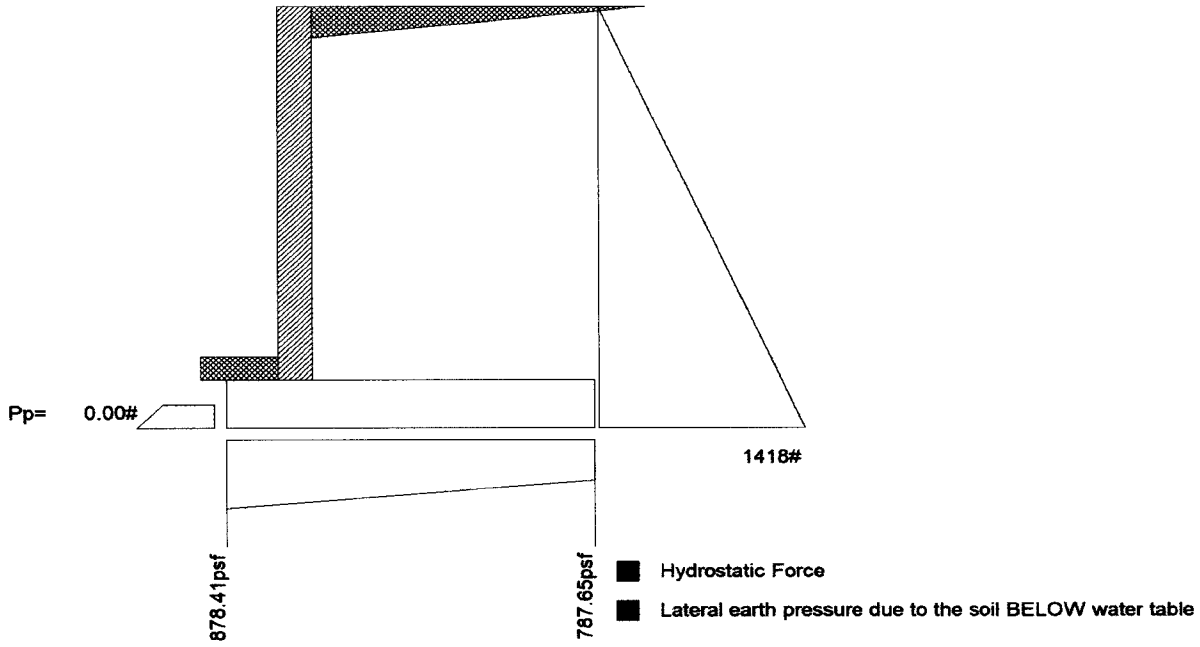
DESCRIPTION: 8 FT CANTILEVERED RETAINING WALL



Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 8 FT CANTILEVERED RETAINING WALL



Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 34

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 10 FT CANTILEVERED RETAINING WALL

Code Reference:

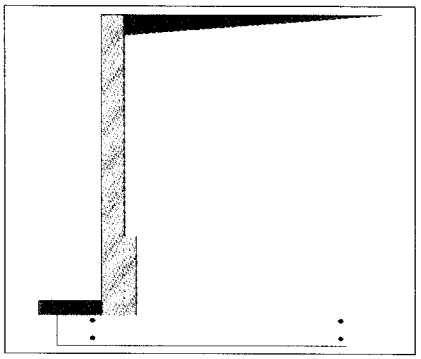
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	10.00 ft
Wall height above soil	=	0.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water height over heel	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	35.0 psf/ft
	=	
Passive Pressure	=	150.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0 psf
Used for Sliding & Overturning		

Lateral Load Applied to Stem

Lateral Load	=	0.0 #/ft
...Height to Top	=	0.00 ft
...Height to Bottom	=	0.00 ft
Load Type	=	Wind (W) (Service Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Axial Load Applied to Stem

Axial Dead Load	=	0.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 35

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 10 FT CANTILEVERED RETAINING WALL

Design Summary

Wall Stability Ratios

Overturning	=	5.09	OK
Sliding	=	1.53	OK
Global Stability	=	2.28	
Total Bearing Load	=	8,075 lbs	
...resultant ecc.	=	1.80 in	
Soil Pressure @ Toe	=	1,098 psf	OK
Soil Pressure @ Heel	=	879 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,537 psf	
ACI Factored @ Heel	=	1,231 psf	
Footing Shear @ Toe	=	13.0 psi	OK
Footing Shear @ Heel	=	8.2 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	2,117.5 lbs	
less 0 % Passive Force	-	0.0 lbs	
less 100% Friction Force	≡ -	3,230.0 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		2nd	Bottom			
		Stem OK	Stem OK			
Design Height Above Ftg	ft =	2.67	0.00			
Wall Material Above "Ht"	=	Masonry	Masonry			
Design Method	=	ASD	ASD	SD	SD	SD
Thickness	=	8.00	12.00			
Rebar Size	=	# 5	# 5			
Rebar Spacing	=	8.00	8.00			
Rebar Placed at	=	Edge	Edge			
Design Data						
fb/FB + fa/Fa	=	**0.573**	**0.595**			
Total Force @ Section						
Service Level	lbs =	940.3	1,750.0			
Strength Level	lbs =	2,800.0				
Moment....Actual						
Service Level	ft-# =	2,297.4	5,833.3			
Strength Level	ft-# =	9,333.3				
Moment.....Allowable	ft-# =	4,003.1	9,790.9			
Shear.....Actual						
Service Level	psi =	10.3	12.5			
Strength Level	psi =	31.1				
Shear.....Allowable	psi =	49.0	49.2			
Anet (Masonry)	in2 =	91.50	139.50			
Rebar Depth 'd'	in =	5.25	9.00			
Masonry Data						
f'm	psi =	1,900	1,900			
Fs	psi =	32,000	32,000			
Solid Grouting	=	Yes	Yes			
Modular Ratio 'n'	=	16.96	16.96			
Wall Weight	psf =	0.0	0.0			
Short Term Factor	=	1.000	1.000			
Equiv. Solid Thick.	in =	7.60	11.60			
Masonry Block Type	=					
Masonry Design Method	=	ASD				
Concrete Data						
f'c	psi =					
Fy	psi =					

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 10 FT CANTILEVERED RETAINING WALL

Footing Data

Toe Width	=	1.25 ft
Heel Width	=	6.92
Total Footing Width	=	8.17
Footing Thickness	=	12.00 in
Key Width	=	0.00 in
Key Depth	=	0.00 in
Key Distance from Toe	=	0.00 ft

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel
Factored Pressure	=	1,537	1,231 psf
Mu' : Upward	=	1,188	22,863 ft-#
Mu' : Downward	=	269	28,505 ft-#
Mu: Design	=	919	5,641 ft-#
phiMin	=	2,739	13,090 ft-#
Actual 1-Way Shear	=	12.97	8.22 psi
Allow 1-Way Shear	=	43.82	82.16 psi

Toe Reinforcing = None Spec'd
Heel Reinforcing = # 5 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, phi Tu = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe:
Heel:
Key:

Min footing T&S reinf Area 2.12 in2
Min footing T&S reinf Area per foot 0.26 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 9.26 in	#4@ 18.52 in
#5@ 14.35 in	#5@ 28.70 in
#6@ 20.37 in	#6@ 40.74 in

Summary of Overturning & Resisting Forces & Moments

Item		.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#		.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)		2,117.5	3.67	7,764.2	Soil Over HL (ab. water tbl)	6,512.0	5.21	33,927.5
HL Act Pres (be water tbl)					Soil Over HL (bel. water tbl)		5.21	33,927.5
Hydrostatic Force					Watre Table			
Buoyant Force	=				Sloped Soil Over Heel	=		
Surcharge over Heel	=				Surcharge Over Heel	=		
Surcharge Over Toe	=				Adjacent Footing Load	=		
Adjacent Footing Load	=				Axial Dead Load on Stem	=		
Added Lateral Load	=				* Axial Live Load on Stem	=		
Load @ Stem Above Soil	=				Soil Over Toe	=	68.8	0.63	43.0
	=				Surcharge Over Toe	=		
					Stem Weight(s)	=		
					Earth @ Stem Transitions	=	268.8	2.08	559.9
					Footing Weight	=	1,225.5	4.09	5,006.2
					Key Weight	=			
					Vert. Component	=			
Total	=	2,117.5	**O.T.M.** =	7,764.2	**Total** =	8,075.0 lbs	**R.M.**=	39,536.6

Resisting/Overturning Ratio = **5.09**
Vertical Loads used for Soil Pressure = 8,075.0 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Cantilevered Retaining Wall

DESCRIPTION: 10 FT CANTILEVERED RETAINING WALL

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.037	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Cantilevered Retaining Wall Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 10 FT CANTILEVERED RETAINING WALL

Rebar Lap & Embedment Lengths Information

Stem Design Segment: 2nd
Stem Design Height: 2.67 ft above top of footing
Calculated Rebar Stress,fs = 11.30

Lap Splice length for #5 bar specified in this stem design segment =	25.00 in
Development length for #5 bar specified in this stem design segment =	12.00 in

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Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress,fs = 16.03

Lap Splice length for #5 bar specified in this stem design segment =	25.00 in
Development length for #5 bar specified in this stem design segment =	12.00 in
Hooked embedment length into footing for #5 bar specified in this stem design segment =	6.00 in
As Provided =	0.4650 in2/ft
As Required =	0.2744 in2/ft

Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

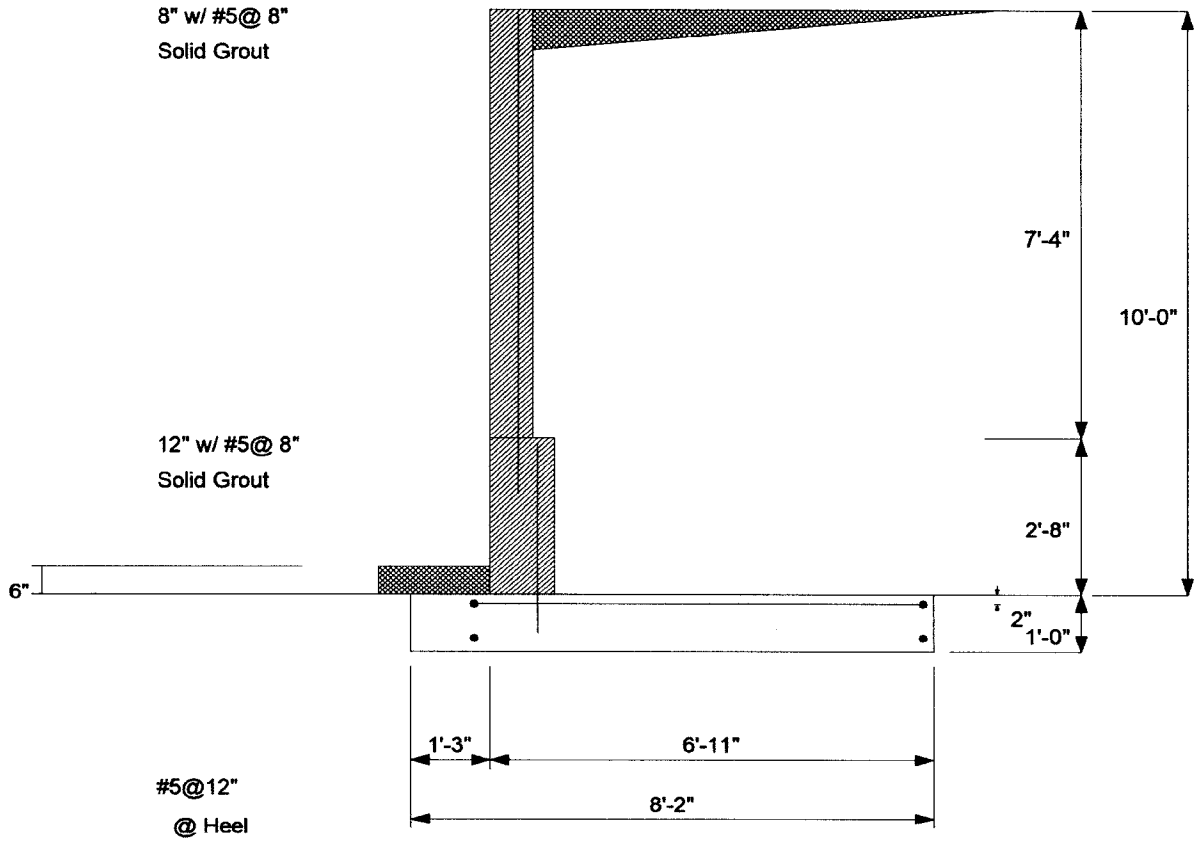
R 39

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

LIC# : KW-06015823, Build:20.22.1.30 Gilbert Structural LLC

DESCRIPTION: 10 FT CANTILEVERED RETAINING WALL



Project Title: KASNOFF RESIDENCE
Engineer:
Project ID:
Project Descr:

R 40

Cantilevered Retaining Wall

Project File: KASNOFF RESIDENCE-BRIAN SCOTT DESIGN.ec6

DESCRIPTION: 10 FT CANTILEVERED RETAINING WALL