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DIVERSIFIED STRUCTURAL DESIGN, INC.

STRUCTURAL CALCULATION

This cover sheet is provided as per Florida Statute 61G15-31 in lieu of signing and sealing each individual sheet. An index sheet is attached which is numbered.

FOR:
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FOUNDATION DESIGN



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

FOUNDATION (C) TO SUPPORT COLUMN 2 AT GREAT ROOM CENTER DOOR

$$\text{Areatrib} := \frac{34.0}{2} \cdot \text{ft} \cdot \frac{24.50}{2} \cdot \text{ft} = 208.25 \text{ ft}^2$$

$$\text{Upliftpressure} := 41.86 \cdot \text{psf}$$

UPLIFT LOAD

$$\text{UpliftLoad} := \text{Upliftpressure} \cdot \text{Areatrib}$$

$$\text{UpliftLoad} = 8717 \text{ lb}$$

VERTICAL LOADS

$$\text{BEAM} := 8 \cdot \text{in} \cdot 16 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot \frac{34.0}{2} \cdot \text{ft}$$

$$\text{BEAM} = 2267 \text{ lb}$$

$$\text{Column} := 8 \cdot \text{in} \cdot 16 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot 10.33 \cdot \text{ft}$$

$$\text{Column} = 1377 \text{ lb}$$

$$\text{SLAB} := 4 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot 5.0 \cdot \text{ft} \cdot 5.0 \cdot \text{ft}$$

$$\text{SLAB} = 1250 \text{ lb}$$

$$\text{SOIL} := 12 \cdot \text{in} \cdot 110 \cdot \text{pcf} \cdot 6.0 \cdot \text{ft} \cdot 6.0 \cdot \text{ft}$$

$$\text{SOIL} = 3960 \text{ lb}$$

$$\text{FOUNDATION} := 6.0 \cdot \text{ft} \cdot 6.0 \cdot \text{ft} \cdot 1.50 \cdot \text{ft} \cdot 150 \cdot \text{pcf}$$

$$\text{FOUNDATION} = 8100 \text{ lb}$$

$$\text{TotalverticalLoads} := (\text{BEAM} + \text{Column} + \text{SLAB} + \text{SOIL} + \text{FOUNDATION}) \cdot 0.6$$

$$\text{TotalverticalLoads} = 10172 \text{ lb}$$

$$\text{Control} := \text{if}(\text{UpliftLoad} > \text{TotalverticalLoads}, \text{"NOT O.K."}, \text{"O.K."})$$

$$\text{Control} = \text{"O.K."}$$

CHECK FOUNDATION FOR GRAVITY

Beam Reactions $\text{ReactionDL} := 14.0 \cdot \text{K}$

$$\text{ReactionLL} := 5.0 \cdot \text{K}$$

THEN USE 6'-0"x 6'-0"x16" CONCRETE FOOTING W/ 7#5 TOP AND BOTTON EACH WAY. F'c=3000 psi

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: FOUNDATION (C) TO SUPPORT COLUMN 2 AT GREAT ROOM CENTER DOOR

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : ACI 318-19

Load Combinations Used : ASCE 7-22 / IBC 2024

Rho (or Omega) = 1.00

General Information

Material Properties

f'_c : Concrete 28 day strength	=	3.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	3.0 ft
Allow press. increase per foot of depth when footing base is below	=	ksf ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf ft
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Dimensions

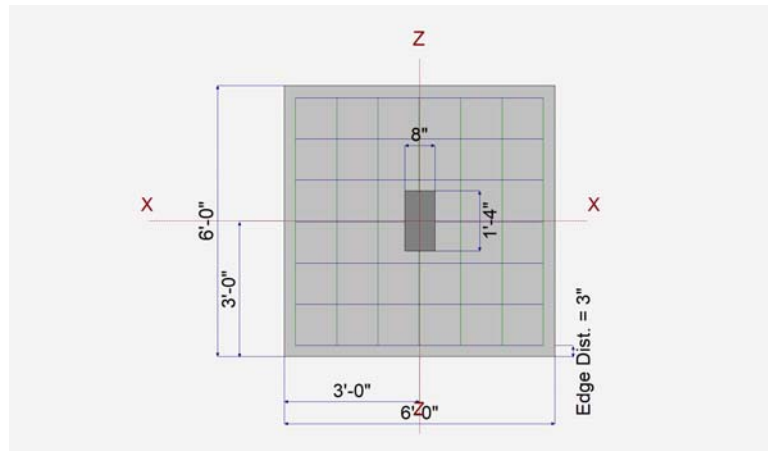
Width parallel to X-X Axis	=	6.0 ft
Length parallel to Z-Z Axis	=	6.0 ft
Footing Thickness	=	16.0 in

Pedestal dimensions...

px : parallel to X-X Axis	=	8.0 in
pz : parallel to Z-Z Axis	=	16.0 in
Height	=	18.0 in

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a



Bottom Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)

Number of Bars	=	7.0
Reinforcing Bar Size	=	# 5

Bars parallel to Z-Z Axis (resisting X Flexure)

Number of Bars	=	7.0
Reinforcing Bar Size	=	# 5

Rebar Centerline to Edge of Concrete...
at Bottom of footing

= 3.0 in



Project Title:
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DESCRIPTION: FOUNDATION (C) TO SUPPORT COLUMN 2 AT GREAT ROOM CENTER DOOR

Applied Loads

		D	Lr	L	S	W	E	H
P : Column Load	=	14.000	0.000	5.000	0.000	0.000	0.000	0.000 k
OB : Overburden	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 ksf
M-xx	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
M-zz	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
V-x	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k
V-z	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.45	Soil Bearing	0.8999 ksf	2.0 ksf	+D+L
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	999.0	Sliding - X-X	0.0 k	12.886 k	D Only
PASS	999.0	Sliding - Z-Z	0.0 k	12.886 k	D Only
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.2040	Z Flexure (+X) Bot Tens	4.198 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.2040	Z Flexure (-X) Bot Tens	4.198 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.956	Min Steel X Flexure Bottom	0.346 in2/ft	0.362 in2/ft	n/a
PASS	0.1562	X Flexure (+Z) Bot Tens	3.215 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.1562	X Flexure (-Z) Bot Tens	3.215 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.956	Min Steel Z Flexure Bottom	0.346 in2/ft	0.362 in2/ft	n/a
PASS	0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.000	Min Steel X Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS	0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.000	Min Steel Z Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS	0.2715	1-way Shear (+X)	11.809 psi	43.495 psi	+1.20D+1.60L
PASS	0.2715	1-way Shear (-X)	11.809 psi	43.495 psi	+1.20D+1.60L
PASS	0.2193	1-way Shear (+Z)	9.538 psi	43.495 psi	+1.20D+1.60L
PASS	0.2193	1-way Shear (-Z)	9.538 psi	43.495 psi	+1.20D+1.60L
PASS	0.1684	2-way Punching	27.670 psi	164.317 psi	+1.20D+1.60L

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom Left	Top Left	Top Right	Bottom Right	
, D Only								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.7610	0.7610	0.7610	0.7610	0.381
, +D+L								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.8999	0.8999	0.8999	0.8999	0.450
, +D+0.750L								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.8652	0.8652	0.8652	0.8652	0.433
, +0.60D								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.4566	0.4566	0.4566	0.4566	0.228

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	11.08 psi	11.08 psi	11.08 psi	43.50 psi	0.25	OK
+1.20D+1.60L	11.81 psi	11.81 psi	11.81 psi	43.50 psi	0.27	OK
+1.20D+L	10.94 psi	10.94 psi	10.94 psi	43.50 psi	0.25	OK
+1.20D	9.50 psi	9.50 psi	9.50 psi	43.50 psi	0.22	OK
+0.90D	7.12 psi	7.12 psi	7.12 psi	43.50 psi	0.16	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

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DESCRIPTION: FOUNDATION (C) TO SUPPORT COLUMN 2 AT GREAT ROOM CENTER DOOR

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	8.95 psi	8.95 psi	8.95 psi	43.50 psi	0.21	OK
+1.20D+1.60L	9.54 psi	9.54 psi	9.54 psi	43.50 psi	0.22	OK
+1.20D+L	8.84 psi	8.84 psi	8.84 psi	43.50 psi	0.20	OK
+1.20D	7.67 psi	7.67 psi	7.67 psi	43.50 psi	0.18	OK
+0.90D	5.75 psi	5.75 psi	5.75 psi	43.50 psi	0.13	OK

All units k

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	25.96 psi	164.32 psi	0.16	OK
+1.20D+1.60L	27.67 psi	164.32 psi	0.17	OK
+1.20D+L	25.64 psi	164.32 psi	0.16	OK
+1.20D	22.26 psi	164.32 psi	0.14	OK
+0.90D	16.69 psi	164.32 psi	0.10	OK



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

FOUNDATION (C) TO SUPPORT COLUMN 2 AT TERRACE

$$\text{Areatrib} := \frac{22.0}{2} \cdot \text{ft} \cdot \frac{38.50}{2} \cdot \text{ft} = 211.75 \text{ ft}^2$$

$$\text{Upliftpressure} := 41.86 \cdot \text{psf}$$

UPLIFT LOAD

$$\text{UpliftLoad} := \text{Upliftpressure} \cdot \text{Areatrib}$$

$$\text{UpliftLoad} = 8864 \text{ lb}$$

VERTICAL LOADS

$$\text{BEAM} := 8 \cdot \text{in} \cdot 16 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot \frac{38.50}{2} \cdot \text{ft}$$

$$\text{BEAM} = 2567 \text{ lb}$$

$$\text{Column} := 8 \cdot \text{in} \cdot 16 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot 11.83 \cdot \text{ft}$$

$$\text{Column} = 1577 \text{ lb}$$

$$\text{SLAB} := 0 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot 6.50 \cdot \text{ft} \cdot 6.50 \cdot \text{ft}$$

$$\text{SLAB} = 0$$

$$\text{SOIL} := 16 \cdot \text{in} \cdot 110 \cdot \text{pcf} \cdot 6.50 \cdot \text{ft} \cdot 6.50 \cdot \text{ft}$$

$$\text{SOIL} = 6197 \text{ lb}$$

$$\text{FOUNDATION} := 6.0 \cdot \text{ft} \cdot 6.0 \cdot \text{ft} \cdot 1.33 \cdot \text{ft} \cdot 150 \cdot \text{pcf}$$

$$\text{FOUNDATION} = 7182 \text{ lb}$$

$$\text{TotalverticalLoads} := (\text{BEAM} + \text{Column} + \text{SLAB} + \text{SOIL} + \text{FOUNDATION}) \cdot 0.6$$

$$\text{TotalverticalLoads} = 10514 \text{ lb}$$

$$\text{Control} := \text{if}(\text{UpliftLoad} > \text{TotalverticalLoads}, \text{"NOT O.K."}, \text{"O.K."})$$

$$\text{Control} = \text{"O.K."}$$

CHECK FOUNDATION FOR GRAVITY

Beam Reactions $\text{ReactionDL} := 12.60 \cdot \text{K}$

$$\text{ReactionLL} := 7.80 \cdot \text{K}$$

THEN USE 6'-0"x 6'-0"x16" CONCRETE FOOTING W/ 7#5 TOP AND BOTTON EACH WAY. F'c=3000 psi

Project Title:
Engineer:
Project ID:
Project Descr:

Project File: structural calculations.ec6

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DESCRIPTION: FOUNDATION (C) TO SUPPORT COLUMN 2 AT TERRACE

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : ACI 318-19

Load Combinations Used : ASCE 7-22 / IBC 2024

Rho (or Omega) = 1.00

General Information

Material Properties

f_c : Concrete 28 day strength	=	3.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Soil Design Values

Allowable Soil Bearing	=	2.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

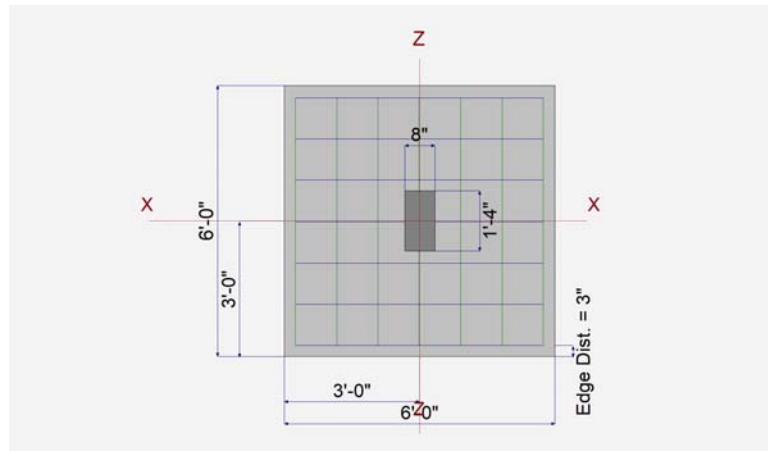
Footings base depth below soil surface	=	3.0 ft
Allow press. increase per foot of depth	=	ksf
when footing base is below	=	ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth = ksf
when max. length or width is greater than = ft

Dimensions

Width parallel to X-X Axis	=	6.0 ft
Length parallel to Z-Z Axis	=	6.0 ft
Footing Thickness	=	16.0 in



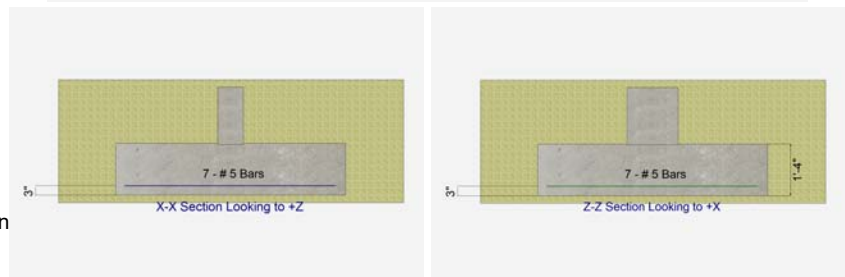
Pedestal dimensions...		
px : parallel to X-X Axis	=	8.0 in
pz : parallel to Z-Z Axis	=	16.0 in
Height	=	18.0 in

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation	n/a
# Bars required within zone	n/a
# Bars required on each side of zone	n/a

Bottom Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)			
Number of Bars	=		7
Reinforcing Bar Size	=	#	5
Bars parallel to Z-Z Axis (resisting X Flexure)			
Number of Bars	=		7
Reinforcing Bar Size	=	#	5
Rebar Centerline to Edge of Concrete...			
at Bottom of footing	=		3.0 in



Project Title:
 Engineer:
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General Footing

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

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DESCRIPTION: FOUNDATION (C) TO SUPPORT COLUMN 2 AT TERRACE

Applied Loads

		D	Lr	L	S	W	E	H
P : Column Load	=	13.000	0.000	8.000	0.000	0.000	0.000	0.000 k
OB : Overburden	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 ksf
M-xx	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
M-zz	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
V-x	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k
V-z	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.4778	Soil Bearing	0.9555 ksf	2.0 ksf	+D+L
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	999.0	Sliding - X-X	0.0 k	12.586 k	D Only
PASS	999.0	Sliding - Z-Z	0.0 k	12.586 k	D Only
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.2220	Z Flexure (+X) Bot Tens	4.568 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.2220	Z Flexure (-X) Bot Tens	4.568 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.956	Min Steel X Flexure Bottom	0.346 in2/ft	0.362 in2/ft	n/a
PASS	0.170	X Flexure (+Z) Bot Tens	3.498 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.170	X Flexure (-Z) Bot Tens	3.498 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.956	Min Steel Z Flexure Bottom	0.346 in2/ft	0.362 in2/ft	n/a
PASS	0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.000	Min Steel X Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS	0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.000	Min Steel Z Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS	0.2954	1-way Shear (+X)	12.849 psi	43.495 psi	+1.20D+1.60L
PASS	0.2954	1-way Shear (-X)	12.849 psi	43.495 psi	+1.20D+1.60L
PASS	0.2386	1-way Shear (+Z)	10.378 psi	43.495 psi	+1.20D+1.60L
PASS	0.2386	1-way Shear (-Z)	10.378 psi	43.495 psi	+1.20D+1.60L
PASS	0.1832	2-way Punching	30.107 psi	164.317 psi	+1.20D+1.60L

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom Left	Top Left	Top Right	Bottom Right	
, D Only								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.7333	0.7333	0.7333	0.7333	0.367
, +D+L								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.9555	0.9555	0.9555	0.9555	0.478
, +D+0.750L								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.8999	0.8999	0.8999	0.8999	0.450
, +0.60D								0.000
, 0.0 deg CCW	2.0	0.0	0.0	0.440	0.440	0.440	0.440	0.220

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	10.68 psi	10.68 psi	10.68 psi	43.50 psi	0.25	OK
+1.20D+1.60L	12.85 psi	12.85 psi	12.85 psi	43.50 psi	0.30	OK
+1.20D+L	11.46 psi	11.46 psi	11.46 psi	43.50 psi	0.26	OK
+1.20D	9.15 psi	9.15 psi	9.15 psi	43.50 psi	0.21	OK
+0.90D	6.86 psi	6.86 psi	6.86 psi	43.50 psi	0.16	OK

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DESCRIPTION: FOUNDATION (C) TO SUPPORT COLUMN 2 AT TERRACE

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	8.62 psi	8.62 psi	8.62 psi	43.50 psi	0.20	OK
+1.20D+1.60L	10.38 psi	10.38 psi	10.38 psi	43.50 psi	0.24	OK
+1.20D+L	9.26 psi	9.26 psi	9.26 psi	43.50 psi	0.21	OK
+1.20D	7.39 psi	7.39 psi	7.39 psi	43.50 psi	0.17	OK
+0.90D	5.54 psi	5.54 psi	5.54 psi	43.50 psi	0.13	OK

All units k

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	25.02 psi	164.32 psi	0.15	OK
+1.20D+1.60L	30.11 psi	164.32 psi	0.18	OK
+1.20D+L	26.86 psi	164.32 psi	0.16	OK
+1.20D	21.44 psi	164.32 psi	0.13	OK
+0.90D	16.08 psi	164.32 psi	0.10	OK



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

FOUNDATION (F) TO SUPPORT COLUMN 1 AT GREAT ROOM EXTERIOR

$$\text{Areatrib} := \frac{22.0}{2} \cdot \text{ft} \cdot \frac{24.50}{2} \cdot \text{ft} = 134.75 \text{ ft}^2$$

$$\text{Upliftpressure} := 41.86 \cdot \text{psf}$$

UPLIFT LOAD

$$\text{UpliftLoad} := \text{Upliftpressure} \cdot \text{Areatrib}$$

$$\text{UpliftLoad} = 5640.635 \text{ lb}$$

CHECK FOUNDATION FOR UPLIFT

$$\text{BEAM} := 8 \cdot \text{in} \cdot 16 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot \left(\frac{13.75 + 19.58}{2} + 3.0 \right) \cdot \text{ft}$$

$$\text{BEAM} = 2622 \text{ lb}$$

$$\text{Column} := 8 \cdot \text{in} \cdot 12 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot 10.33 \cdot \text{ft}$$

$$\text{Column} = 1033 \text{ lb}$$

$$\text{SLAB} := 4 \cdot \text{in} \cdot 150 \cdot \text{pcf} \cdot 5.50 \cdot \text{ft} \cdot 5.50 \cdot \text{ft}$$

$$\text{SLAB} = 1512.5 \text{ lb}$$

$$\text{SOIL} := 12 \cdot \text{in} \cdot 110 \cdot \text{pcf} \cdot 5.50 \cdot \text{ft} \cdot 5.50 \cdot \text{ft}$$

$$\text{SOIL} = 3327.5 \text{ lb}$$

$$\text{FOUNDATION} := 6.0 \cdot \text{ft} \cdot 5.0 \cdot \text{ft} \cdot 1.33 \cdot \text{ft} \cdot 150 \cdot \text{pcf}$$

$$\text{FOUNDATION} = 5985 \text{ lb}$$

$$\text{TotalverticalLoads} := (\text{BEAM} + \text{Column} + \text{SLAB} + \text{SOIL} + \text{FOUNDATION}) \cdot 0.6$$

$$\text{TotalverticalLoads} = 8688 \text{ lb}$$

$$\text{Control} := \text{if}(\text{UpliftLoad} > \text{TotalverticalLoads}, \text{"NOT O.K."}, \text{"O.K."})$$

$$\text{Control} = \text{"O.K."}$$

VERTICAL LOADS

Beam Reactions

$$\text{ReactionDL} := (10.89) \cdot \text{K}$$

$$\text{ReactionLL} := (5.0) \cdot \text{K}$$

$$\text{DL} := \text{ReactionDL} = 10.89 \cdot \text{K}$$

$$\text{LL} := \text{ReactionLL} = 5 \cdot \text{K}$$

THEN USE 6'-0"x 5'-0"x16" CONCRETE FOOTING W/ #5@10" TOP AND BOTTON EACH WAY. F'c=3000 psi

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: FOUNDATION (F) TO SUPPORT COLUMN 1 AT GREAT ROOM EXTERIOR

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : ACI 318-19

Load Combinations Used : ASCE 7-22 / IBC 2024

Rho (or Omega) = 1.00

General Information

Material Properties

f'_c : Concrete 28 day strength	=	3.0 ksi
f_y : Rebar Yield	=	60.0 ksi
E_c : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
ϕ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
Add Ftg Wt for Soil Pressure	:	Yes
Use ftg wt for stability, moments & shears	:	Yes
Add Pedestal Wt for Soil Pressure	:	No
Use Pedestal wt for stability, mom & shear	:	No

Soil Design Values

Allowable Soil Bearing	=	2.0 ksf
Soil Density	=	110.0 pcf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Footing base depth below soil surface	=	3.0 ft
Allow press. increase per foot of depth when footing base is below	=	ksf ft

Increases based on footing plan dimension

Allowable pressure increase per foot of depth when max. length or width is greater than	=	ksf ft
---	---	--------

Dimensions

Width parallel to X-X Axis	=	5.0 ft
Length parallel to Z-Z Axis	=	6.0 ft
Footing Thickness	=	16.0 in

Load location offset from footing center...

ex : Prl to X-X Axis	=	-19 in
ez : Prl to Z-Z Axis	=	0 in

Pedestal dimensions...

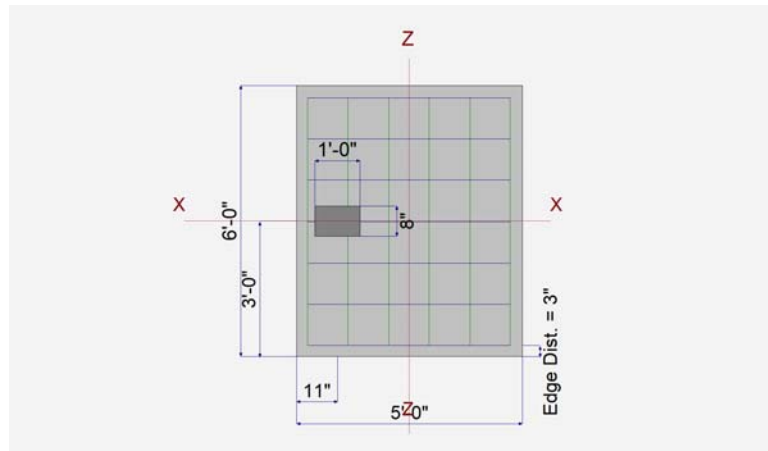
px : parallel to X-X Axis	=	12.0 in
pz : parallel to Z-Z Axis	=	8.0 in
Height	=	18.0 in

Bandwidth Distribution Check (ACI 15.4.4.2)

Direction Requiring Closer Separation Bars along X-X Axis

Bars required within zone 90.9 %

Bars required on each side of zone 9.1 %



Bottom Reinforcing

Bars parallel to X-X Axis (resisting Z Flexure)

Number of Bars	=	7
Reinforcing Bar Size	=	# 5

Bars parallel to Z-Z Axis (resisting X Flexure)

Number of Bars	=	6
Reinforcing Bar Size	=	# 5

Rebar Centerline to Edge of Concrete...
at Bottom of footing

= 3.0 in



Project Title:
 Engineer:
 Project ID:
 Project Descr:

General Footing

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: FOUNDATION (F) TO SUPPORT COLUMN 1 AT GREAT ROOM EXTERIOR

Applied Loads

		D	Lr	L	S	W	E	H
P : Column Load	=	10.890	0.000	4.940	0.000	0.000	0.000	0.000 k
OB : Overburden	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 ksf
M-xx	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
M-zz	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k-ft
V-x	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k
V-z	=	0.000	0.000	0.000	0.000	0.000	0.000	0.000 k

DESIGN SUMMARY

Design OK

	Min. Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.9585	Soil Bearing	1.917 ksf	2.0 ksf	+D+L
PASS	n/a	Overturning - X-X	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	999.0	Sliding - X-X	0.0 k	11.287 k	D Only
PASS	999.0	Sliding - Z-Z	0.0 k	10.509 k	D Only
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift
PASS	0.1724	Z Flexure (+X) Bot Tens	3.547 k-ft/ft	20.580 k-ft/ft	+1.40D
PASS	0.01072	Z Flexure (-X) Bot Tens	0.2207 k-ft/ft	20.580 k-ft/ft	+1.20D+1.60L
PASS	0.956	Min Steel X Flexure Bottom	0.346 in2/ft	0.362 in2/ft	n/a
PASS	0.3661	X Flexure (+Z) Bot Tens	7.744 k-ft/ft	21.151 k-ft/ft	+1.20D+1.60L
PASS	0.3695	X Flexure (-Z) Bot Tens	7.815 k-ft/ft	21.151 k-ft/ft	+1.20D+1.60L
PASS	0.929	Min Steel Z Flexure Bottom	0.346 in2/ft	0.372 in2/ft	n/a
PASS	0.0	Z Flexure (+X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	Z Flexure (-X) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.000	Min Steel X Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS	0.0	X Flexure (+Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.0	X Flexure (-Z) Top Tens	0 k-ft/ft	0.0 k-ft/ft	
PASS	0.000	Min Steel Z Flexure Top	0.000 in2/ft	0.000 in2/ft	n/a
PASS	0.2117	1-way Shear (+X)	9.208 psi	43.495 psi	+1.40D
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a
PASS	0.4961	1-way Shear (+Z)	21.781 psi	43.905 psi	+1.20D+1.60L
PASS	0.4962	1-way Shear (-Z)	21.785 psi	43.905 psi	+1.20D+1.60L
PASS	n/a	2-way Punching	22.929 psi	43.495 psi	+1.20D+1.60L

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Zecc (in)	Actual Soil Bearing Stress @ Location				Actual / Allow Ratio
				Bottom Left	Top Left	Top Right	Bottom Right	
, D Only								0.000
, 180.0 deg CCW	2.0	-9.271	0.0	1.411	1.411	0.06045	0.06045	0.706
, +D+L								0.000
, 180.0 deg CCW	2.0	-11.050	0.0	1.917	1.917	0.0	0.0	0.959
, +D+0.750L								0.000
, 180.0 deg CCW	2.0	-10.670	0.0	1.782	1.782	0.0	0.0	0.891
, +0.60D								0.000
, 180.0 deg CCW	2.0	-9.271	0.0	0.8464	0.8464	0.03627	0.03627	0.423

Overturning Stability

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

One Way Shear X

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0.00 psi	9.21 psi	9.21 psi	43.50 psi	0.21	OK
+1.20D+1.60L	0.00 psi	7.70 psi	7.70 psi	43.50 psi	0.18	OK
+1.20D+L	0.00 psi	7.84 psi	7.84 psi	43.50 psi	0.18	OK
+1.20D	0.00 psi	7.89 psi	7.89 psi	43.50 psi	0.18	OK
+0.90D	0.00 psi	5.92 psi	5.92 psi	43.50 psi	0.14	OK

Project Title:
Engineer:
Project ID:
Project Descr:

General Footing

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

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DESCRIPTION: FOUNDATION (F) TO SUPPORT COLUMN 1 AT GREAT ROOM EXTERIOR

One Way Shear Z

Load Combination...	Vu @ -Z	Vu @ +Z	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	17.46 psi	17.46 psi	17.46 psi	43.91 psi	0.40	OK
+1.20D+1.60L	21.79 psi	21.78 psi	21.79 psi	43.91 psi	0.50	OK
+1.20D+L	19.15 psi	19.14 psi	19.15 psi	43.91 psi	0.44	OK
+1.20D	14.97 psi	14.97 psi	14.97 psi	43.91 psi	0.34	OK
+0.90D	11.22 psi	11.22 psi	11.22 psi	43.91 psi	0.26	OK

All units k

Two-Way "Punching" Shear

Load Combination...	Vu	Phi*Vn	Vu / Phi*Vn	Status
+1.40D	21.10 psi	164.32 psi	0.13	OK
+1.20D+1.60L	22.93 psi	164.32 psi	0.14	OK
+1.20D+L	21.13 psi	164.32 psi	0.13	OK
+1.20D	18.09 psi	164.32 psi	0.11	OK
+0.90D	13.56 psi	164.32 psi	0.08	OK

CONCRETE BEAM DESIGN



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

CONCRETE BEAM DESIGN RB-1 AT NEW COVERED TERRACE TWO SPAN 19.58 AND 18.92 FT

$$\text{Rooftriblong} := \frac{22.0}{2} \cdot \text{ft} = 11 \text{ ft}$$

LOADS AT ROOF

$$\text{RoofDL} := 30 \cdot \text{psf} \cdot \text{Rooftriblong} \quad \text{RoofDL} = 330 \cdot \text{plf}$$

$$\text{RoofLL} := 30 \cdot \text{psf} \cdot \text{Rooftriblong} \quad \text{RoofLL} = 330 \cdot \text{plf}$$

TOTAL LOADS

$$\text{DL} := \text{RoofDL} \quad \text{LL} := \text{RoofLL}$$

$$\text{DL} = 330 \cdot \text{plf}$$

$$\text{LL} = 330 \cdot \text{plf}$$

By Calculation Annexed:

Use 8"x16" Concrete Beam W/ 2#7 Long. Cont Bottom and 2#7 Long. Cont Top, Ties #3 @6" O.C. F'c =3000 psi

Concrete Beam

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE BEAM DESIGN RB-1 AT NEW COVERED TERRACE TWO SPAN 19.58 AND 18.92 FT

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : ACI 318-19

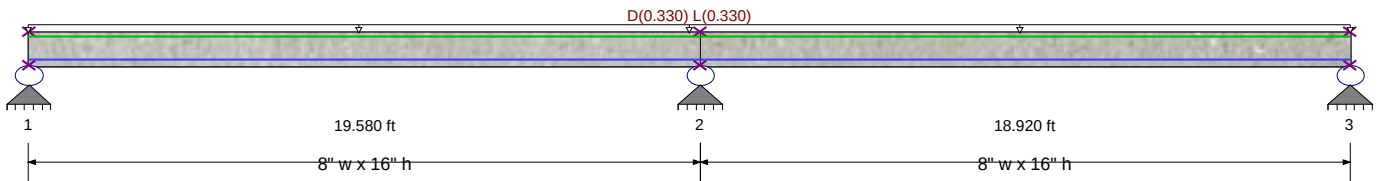
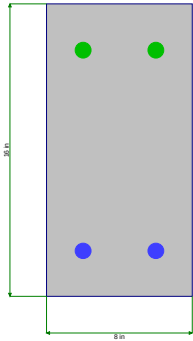
Load Combination Set : ASCE 7-22 / IBC 2024

Rho (or Omega) = 1.00

General Information

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups	=	60.0 ksi
fy - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2

Seismic Design Category = A



Cross Section & Reinforcing Details

Rectangular Section, Width = 8.0 in, Height = 16.0 in

Span #1 Reinforcing....

2-#7 at 2.50 in from Bottom, from 0.0 to 19.580 ft in this span

2-#7 at 2.50 in from Top, from 0.0 to 19.580 ft in this span

Span #2 Reinforcing....

2-#7 at 2.50 in from Bottom, from 0.0 to 18.920 ft in this span

2-#7 at 2.50 in from Top, from 0.0 to 18.920 ft in this span

Beam self weight calculated and added to loads

Loads on all spans...

D = 0.330, L = 0.330

Uniform Load on ALL spans : D = 0.330, L = 0.330 k/ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio	=	0.779 : 1
Section used for this span		Typical Section
Mu : Applied		-50.008 k-ft
Mn * Phi : Allowable		64.171 k-ft
Location of maximum on span		0.000 ft
Span # where maximum occurs		Span # 2

Design Limits

Tensile Strain >= Min Strain Limit	(Section 9.3.3.1)
0.01017 in / in >= 0.00507 in / in	OK
As Provided >= As,min	(Section 9.6.1.2)
1.200 in^2 >= 0.979 in^2	OK

Maximum Deflection

Max Downward Transient Deflection	0.073 in	Ratio =	3240 >= 360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0 < 360.0	L Only
Max Downward Total Deflection	0.276 in	Ratio =	849 >= 360.0	Span: 2 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0 < 360.0	Span: 2 : +D+L

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Beam

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE BEAM DESIGN RB-1 AT NEW COVERED TERRACE TWO SPAN 19.58 AND 18.92 FT

Cross Section Strength & Inertia

Top & Bottom references are for tension side of section

Cross Section Bar Layout Description		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
		Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1	2- #7 @ d=13.5", 2- #7 @ d=2.5",	64.17	64.17	2,730.67	1,185.67	1,185.67
Section 2	2- #7 @ d=13.5", 2- #7 @ d=2.5",	64.17	64.17	2,730.67	1,185.67	1,185.67

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	5.898	18.901	5.574
Max Upward from Load Combinations	5.898	18.901	5.574
Max Upward from Load Cases	3.479	10.895	3.293
D Only	3.479	10.895	3.293
+D+L	5.898	18.901	5.574
+D+0.750L	5.292	16.902	5.002
+0.60D	2.104	6.504	1.993
L Only	2.534	7.770	2.401

Shear Stirrup Requirements

Between 0.00 to 3.28 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 6 in
 Between 3.36 to 11.51 ft, Ties Not Req'd, Stirrups are not required.
 Between 11.59 to 27.30 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 6 in
 Between 27.38 to 35.57 ft, Ties Not Req'd, Stirrups are not required.
 Between 35.64 to 38.42 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 6 in

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span	Location (ft)	Load Combination	Max. "+" Defl (in) in Span	Location (ft)
1	+D+L	0.2764	8.112		0.0000	0.000
2	+D+L	0.2137	11.082		0.0000	0.000



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

CONCRETE BEAM DESIGN RB-4 TO SUPPORT TRUSS AT NEW GREAT ROOM SPAN 18.67 FT

$$\text{Rooftriblong} := \frac{7.0}{2} \cdot \text{ft} + 2.0 \cdot \text{ft} = 5.5 \text{ ft}$$

$$\text{Wallheight} := \frac{6.0}{2} \cdot \text{ft} = 3 \text{ ft}$$

LOADS AT ROOF

$$\text{RoofDL} := 30 \cdot \text{psf} \cdot \text{Rooftriblong}$$

$$\text{RoofDL} = 165 \cdot \text{plf}$$

$$\text{Tiebeam} := 8 \cdot \text{in} \cdot 12 \cdot \text{in} \cdot 150 \cdot \text{pcf}$$

$$\text{Tiebeam} = 100 \cdot \text{plf}$$

$$\text{Mansory} := \text{Wallheight} \cdot 55 \cdot \text{psf}$$

$$\text{Mansory} = 165 \cdot \text{plf}$$

$$\text{RoofLL} := 30 \cdot \text{psf} \cdot \text{Rooftriblong}$$

$$\text{RoofLL} = 165 \cdot \text{plf}$$

TOTAL LOADS

$$\text{DL} := \text{RoofDL} + \text{Tiebeam} + \text{Mansory}$$

$$\text{DL} = 430 \cdot \text{plf}$$

$$\text{LL} := \text{RoofLL}$$

$$\text{LL} = 165 \cdot \text{plf}$$

By Calculation Annexed:

Use 8"x16" Concrete Beam W/ 2#7 Long. Cont Bottom and 2#7 Long. Cont Top, Ties #3 @6" O.C. F'c =3000 psi

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE BEAM DESIGN RB-4 TO SUPPORT TRUSS AT NEW GREAT ROOM SPAN 18.67 FT

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : ACI 318-19

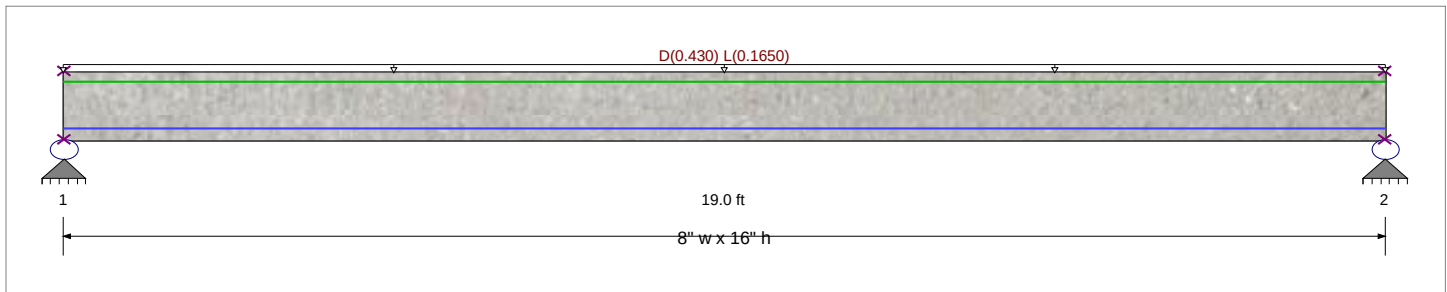
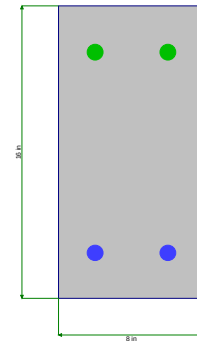
Load Combination Set : ASCE 7-22 / IBC 2024

Rho (or Omega) = 1.00

General Information

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups	=	60.0 ksi
fy - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2

Seismic Design Category = A



Cross Section & Reinforcing Details

Rectangular Section, Width = 8.0 in, Height = 16.0 in

Span #1 Reinforcing....

2-#7 at 2.50 in from Bottom, from 0.0 to 19.0 ft in this span

2-#7 at 2.50 in from Top, from 0.0 to 19.0 ft in this span

Beam self weight calculated and added to loads

Loads on all spans...

D = 0.430, L = 0.1650

Uniform Load on ALL spans : D = 0.430, L = 0.1650 k/ft

DESIGN SUMMARY

Maximum Bending Stress Ratio	=	0.657	: 1
Section used for this span		Typical Section	
Mu : Applied		42.177	k-ft
Mn * Phi : Allowable		64.171	k-ft
Location of maximum on span		9.483	ft
Span # where maximum occurs		Span # 1	

Design Limits

Tensile Strain >= Min Strain Limit	(Section 9.3.3.1)
0.01017 in / in >= 0.00507 in / in	OK
As Provided >= As,min	(Section 9.6.1.2)
1.200 in^2 >= 0.826 in^2	OK

Maximum Deflection

Max Downward Transient Deflection	0.057 in	Ratio =	4018	>=360.0	L Only
Max Upward Transient Deflection	0.000 in	Ratio =	0	<360.0	L Only
Max Downward Total Deflection	0.544 in	Ratio =	418	>=360.0	Span: 1 : +D+L
Max Upward Total Deflection	0.000 in	Ratio =	0	<360.0	Span: 1 : +D+L

Cross Section Strength & Inertia

Top & Bottom references are for tension side of section

Cross Section Bar Layout Description		Phi*Mn (k-ft)		Moment of Inertia (in^4)		
		Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1	2- #7 @ d=13.5", 2- #7 @ d=2.5",	64.17	64.17	2,730.67	1,185.67	1,185.67

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE BEAM DESIGN RB-4 TO SUPPORT TRUSS AT NEW GREAT ROOM SPAN 18.67 FT

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	6.877	6.877
Max Upward from Load Combinations	6.877	6.877
Max Upward from Load Cases	5.309	5.309
D Only	5.309	5.309
+D+L	6.877	6.877
+D+0.750L	6.485	6.485
+0.60D	3.186	3.186
L Only	1.568	1.567

Shear Stirrup Requirements

Between 0.00 to 4.74 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 6 in
Between 4.78 to 14.22 ft, Ties Not Req'd, Stirrups are not required.
Between 14.26 to 18.97 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 6 in

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span	Location (ft)	Load Combination	Max. "+" Defl (in) in Span	Location (ft)
1	+D+L	0.5444	9.500		0.0000	0.000



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

CONCRETE BEAM DESIGN RB-5 TO SUPPORT TRUSS AT NEW GREAT ROOM TWO SPAN 4.17 AND 13.58 FT

$$\text{Rooftriblong} := \frac{7.0}{2} \cdot \text{ft} + 2.0 \cdot \text{ft} = 5.5 \text{ ft}$$

$$\text{Wallheight} := \frac{6.0}{2} \cdot \text{ft} = 3 \text{ ft}$$

LOADS AT ROOF

$$\text{RoofDL} := 30 \cdot \text{psf} \cdot \text{Rooftriblong}$$

$$\text{RoofDL} = 165 \cdot \text{plf}$$

$$\text{Tiebeam} := 8 \cdot \text{in} \cdot 24 \cdot \text{in} \cdot 150 \cdot \text{pcf}$$

$$\text{Tiebeam} = 200 \cdot \text{plf}$$

$$\text{Mansory} := \text{Wallheight} \cdot 55 \cdot \text{psf}$$

$$\text{Mansory} = 165 \cdot \text{plf}$$

$$\text{RoofLL} := 30 \cdot \text{psf} \cdot \text{Rooftriblong}$$

$$\text{RoofLL} = 165 \cdot \text{plf}$$

TOTAL LOADS

$$\text{DL} := \text{RoofDL} + \text{Tiebeam} + \text{Mansory}$$

$$\text{DL} = 530 \cdot \text{plf}$$

$$\text{LL} := \text{RoofLL}$$

$$\text{LL} = 165 \cdot \text{plf}$$

REACTION LOADS ROOF BEAM RB-1

$$\text{RDL} := 3.50 \cdot \text{K}$$

$$\text{RLL} := 2.54 \cdot \text{K}$$

By Calculation Annexed:

Use 8"x16" Concrete Beam W/ 2#7 Long. Cont Bottom and 2#7 Long. Cont Top, Ties #3 @6" O.C. F'c =3000 psi

Concrete Beam

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE BEAM DESIGN RB-5 TO SUPPORT TRUSS AT NEW GREAT ROOM TWO SPAN 4.17

Code References

Governing Code : IBC 2024

Referenced Design Standard(s) : ACI 318-19

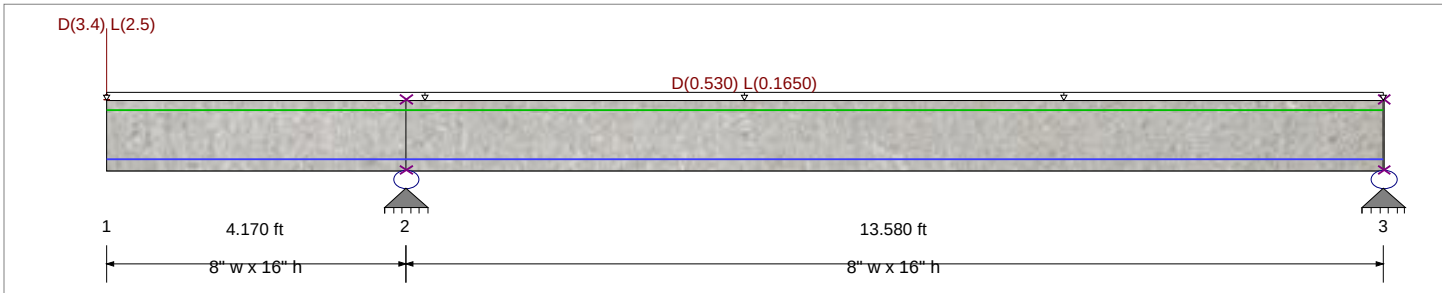
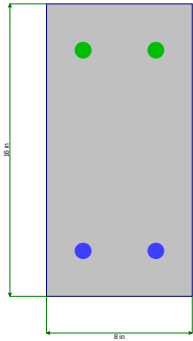
Load Combination Set : ASCE 7-22 / IBC 2024

Rho (or Omega) = 1.00

General Information

f'_c	=	3.0 ksi	ϕ Phi Values	Flexure :	0.90
$f_r = 7.5 * \lambda * f'_c^{1/2}$	=	410.792 psi		Shear :	0.750
ψ Density	=	145.0 pcf	β_1	=	0.850
λ LtWt Factor	=	1.0			
Elastic Modulus	=	3,122.0 ksi	Fy - Stirrups	=	60.0 ksi
fy - Main Rebar	=	60.0	E - Stirrups	=	29,000.0 ksi
E - Main Rebar	=	29,000.0 ksi	Stirrup Bar Size #	=	3
			Number of Resisting Legs Per Stirrup	=	2

Seismic Design Category = A



Cross Section & Reinforcing Details

Rectangular Section, Width = 8.0 in, Height = 16.0 in

Span #1 Reinforcing....

2-#7 at 2.50 in from Bottom, from 0.0 to 4.170 ft in this span

2-#7 at 2.50 in from Top, from 0.0 to 4.170 ft in this span

Span #2 Reinforcing....

2-#7 at 2.50 in from Bottom, from 0.0 to 13.580 ft in this span

2-#7 at 2.50 in from Top, from 0.0 to 13.580 ft in this span

Beam self weight calculated and added to loads

Loads on all spans...

D = 0.530, L = 0.1650

Uniform Load on ALL spans : D = 0.530, L = 0.1650 k/ft

Load for Span Number 1

Point Load : D = 3.40, L = 2.50 k @ 0.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.668 : 1
Section used for this span	Typical Section
Mu : Applied	-42.857 k-ft
Mn * Phi : Allowable	64.171 k-ft
Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 2

Design Limits

Tensile Strain >= Min Strain Limit (Section 9.3.3.1)	
0.01017 in / in >= 0.00507 in / in	OK
As Provided >= As,min (Section 9.6.1.2)	
1.200 in^2 >= 0.839 in^2	OK

Maximum Deflection

Max Downward Transient Deflection	0.057 in	Ratio = 1756	>=360.0	L Only
Max Upward Transient Deflection	-0.016 in	Ratio = 10504	>=360.0	L Only
Max Downward Total Deflection	0.179 in	Ratio = 560	>=360.0	Span: 2 : D Only
Max Upward Total Deflection	-0.028 in	Ratio = 5885	>=360.0	Span: 2 : +D+L

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Beam

Project File: structural calculations.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: CONCRETE BEAM DESIGN RB-5 TO SUPPORT TRUSS AT NEW GREAT ROOM TWO SPAN 4.17

Cross Section Strength & Inertia

Top & Bottom references are for tension side of section

Cross Section Bar Layout Description		Phi*Mn (k-ft)		Moment of Inertia (in ⁴)		
		Bottom	Top	I gross	Icr - Bottom	Icr - Top
Section 1	2- #7 @ d=13.5", 2- #7 @ d=2.5",	64.17	64.17	2,730.67	1,185.67	1,185.67
Section 2	2- #7 @ d=13.5", 2- #7 @ d=2.5",	64.17	64.17	2,730.67	1,185.67	1,185.67

Vertical Reactions

Support notation : Far left is #1

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions	17.269	3.255	
Max Upward from Load Combinations	17.269	3.255	
Max Upward from Load Cases	12.087	3.008	
D Only	12.087	3.008	
+D+L	17.269	3.255	
+D+0.750L	15.973	3.194	
+0.60D	7.252	1.805	
L Only	5.182	0.247	

Shear Stirrup Requirements

Between 0.00 to 0.00 ft, Ties Not Req'd, Stirrups are not required.
Between 0.02 to 9.71 ft, Max spacing per 9.7.6.2.2, use #3 stirrups spaced at 6 in
Between 9.77 to 17.69 ft, Ties Not Req'd, Stirrups are not required.

Overall Maximum Deflections

Span	Load Combination	Max. "-" Defl (in) in Span	Location (ft)	Load Combination	Max. "+" Defl (in) in Span	Location (ft)
1	+D+L	0.1785	0.000	+D+L	-0.0044	4.364
2	D Only	0.0132	8.730	+D+L	-0.0277	2.522

CONCRETE COLUMNS DESIGN



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

CONCRETE COLUMN DESIGN (1) AT TERRACE SUPPORT BEAM (RB-2)

WindPress := 41.86·psf

$$\text{Tributaryleng} := \frac{13.58}{2} \cdot \text{ft} = 6.79 \text{ ft}$$

REACTION CONCRETE BEAM RB-1

ReactBeamDL := 9.70·K

ReactBeamLL := 5.0·K

TotalDL := ReactBeamDL

TotalDL = 9.7·K

TotalLL := ReactBeamLL

TotalLL = 5·K

LATERAL WIND LOADS

LaterWindWL := WindPress·Tributaryleng·1.66 = 471.82·plf

By Calculation Annexed:

USE 8"x12" WITH 4#5 VERTICAL AND TIES #3@8" F_c = 3000 psi



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

CONCRETE COLUMN DESIGN (1) AT TERRACE SUPPORT BEAM (RB-4)

WindPress := 41.86·psf

$$\text{Tributaryleng} := \frac{13.58}{2} \cdot \text{ft} = 6.79 \text{ ft}$$

REACTION CONCRETE BEAM RB-1

ReactBeamDL := 9.70·K

ReactBeamLL := 5.0·K

TotalDL := ReactBeamDL

TotalDL = 9.7·K

TotalLL := ReactBeamLL

TotalLL = 5·K

LATERAL WIND LOADS

LaterWindWL := WindPress·Tributaryleng·1.66 = 471.82·plf

By Calculation Annexed:

USE 8"x12" WITH 4#5 VERTICAL AND TIES #3@8" F_c = 3000 psi



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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

CONCRETE COLUMN DESIGN (2) AT GREAT ROOM SUPPORT BEAM (RB-1 AND RB-4)

$$\text{WindPress} := 41.86 \cdot \text{psf}$$

$$\text{Tributaryleng} := \frac{32.58}{2} \cdot \text{ft} = 16.29 \text{ ft}$$

REACTION CONCRETE BEAM RB-1 AND RB-4

$$\text{ReactBeamDL} := (9.82 + 3.50) \cdot \text{K}$$

$$\text{ReactBeamLL} := (2.25 + 2.54) \cdot \text{K}$$

$$\text{TotalDL} := \text{ReactBeamDL}$$

$$\text{TotalDL} = 13.32 \cdot \text{K}$$

$$\text{TotalLL} := \text{ReactBeamLL}$$

$$\text{TotalLL} = 4.79 \cdot \text{K}$$

LATERAL WIND LOADS

$$\text{LaterWindWL} := \text{WindPress} \cdot \text{Tributaryleng} \cdot 1.66 = 1131.95 \cdot \text{plf}$$

By Calculation Annexed:

USE 8"x16" WITH 4#6 VERTICAL AND TIES #3@8" F'c = 3000 psi

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Column

Project File: column.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: CONCRETE COLUMN DESIGN (2) AT GREAT ROOM SUPPORT BEAM (RB-1 AND RB-4)

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : ACI 318-19
Load Combinations Used : ASCE 7-22 / IBC 2024

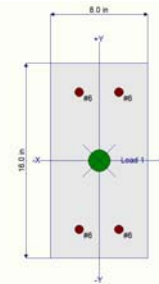
General Information

f'_c : Concrete 28 day streng	=	3.0 ksi	Overall Column Height	=	11.830 ft
E =	=	3,122.0 ksi	End Fixity	Top & Bottom Pinned	
Density	=	150.0 pcf	Brace condition for deflection (buckling) along colum		
β	=	0.850	X-X (width) axis :		
f_y - Main Rebar	=	60.0 ksi	Unbraced Length for buckling ABOUT X-X Axis = 11.83 ft, K = 1.0		
E - Main Rebar	=	29,000.0 ksi	Y-Y (depth) axis :		
Allow. Reinforcing Limits	ASTM A615 Bars Used				
Min. Reinf.	=	1.0 %	Unbraced Length for buckling ABOUT Y-Y Axis = 11.83 ft, K = 1.0		
Max. Reinf.	=	8.0 %			
Seismic Design Category	=	A			

Column Cross Section

Column Dimensions : 16.0in high x 8.0in Wide, Column
Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #6 bars @ corners,



Entered loads are factored per load combinations specified by user.

Applied Loads

Column self weight included : 1,577.33 lbs * Dead Load Factor
AXIAL LOADS . . .

Axial Load at 11.830 ft above base, D = 13.320, L = 4.80 k

BENDING LOADS . . .

Lat. Uniform Load creating Mx-x, W = 1.132 k/ft

DESIGN SUMMARY

Load Combination	+1.20D+L+W			Maximum SERVICE Load Reactions .			
Location of max.above base	11.751 ft			Top along Y-Y	0.0 k	Bottom along Y-Y	0.0 k
Maximum Stress Ratio	0.293 : 1			Top along X-X	6.696 k	Bottom along X-X	6.696 k
Ratio = (Pu^2+Mu^2)^.5 / (PhiPn^2+PhiMn^2)^.5							
Pu =	22.677 k	φ * Pn =	77.242 k	Maximum SERVICE Load Deflections . .			
Mu-x =	20.393 k-ft	φ * Mn-x =	69.688 k-ft	Along Y-Y	0.05915 in	at	5.955 ft above base
Mu-y =	1.587 k-ft	φ* Mn-y =	0.7286 k-ft	for load combination : W Only			
		φ =	0.7361	Along X-X	0.0in	at	0.0 ft above base
Mu Angle =	5.0 deg			for load combination :			
Mu at Angle =	20.454 k-ft	φMn at Angle =	69.844 k-ft				
<i>Pn & Mn values located at Pu-Mu vector intersection with capacity curve</i>							
Column Capacities . .				General Section Information			
Pnmax : Nominal Max. Compressive Axial Capacit	427.512 k			ρ : % Reinforcing	1.375 %	Rebar	β = 0.850 θ = 0.80
Pnmin : Nominal Min. Tension Axial Capacity	k			Reinforcing Area	1.760 in^2	% Ok	
φ Pn, max : Usable Compressive Axial Capacity	195.709 k			Concrete Area	128.0 in^2		
φ Pn, min : Usable Tension Axial Capacity	k						

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Column

Project File: column.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

(c) ENERCALC, LLC 1982-2026

DESCRIPTION: CONCRETE COLUMN DESIGN (2) AT GREAT ROOM SUPPORT BEAM (RB-1 AND RB-4)

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k			Bending Analysis k-ft						Utilization	
	X-X	Y-Y		Pu	ϕ	* Pn	δx	δx * Mux	δy	δy * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D	Actual	M2,min	11.75	20.86	210.60	1.000		1.000	1.46	90.000	1.46	14.72		0.099
+1.40D	M2,min	Actual	11.75	20.86	222.31	1.000	1.88	1.000		0.000	1.88	19.52		0.095
+1.20D+1.60L	Actual	M2,min	11.75	25.56	210.60	1.000		1.000	1.79	90.000	1.79	14.72		0.121
+1.20D+1.60L	M2,min	Actual	11.75	25.56	222.31	1.000	2.30	1.000		0.000	2.30	19.52		0.116
+1.20D+L	Actual	M2,min	11.75	22.68	210.60	1.000		1.000	1.59	90.000	1.59	14.72		0.108
+1.20D+L	M2,min	Actual	11.75	22.68	222.31	1.000	2.04	1.000		0.000	2.04	19.52		0.103
+1.20D+0.50W	Actual	M2,min	11.75	17.88	108.67	1.023	10.13	1.000	1.25	7.000	10.21	61.87		0.165
+1.20D+L+W	Actual	M2,min	11.75	22.68	77.24	1.030	20.39	1.000	1.59	5.000	20.45	69.84		0.293
+0.90D+W	Actual	M2,min	11.75	13.41	46.69	1.017	20.15	1.000	0.94	3.000	20.17	69.58		0.290
+0.90D	Actual	M2,min	11.75	13.41	210.60	1.000		1.000	0.94	90.000	0.94	14.72		0.064
+0.90D	M2,min	Actual	11.75	13.41	222.31	1.000	1.21	1.000		0.000	1.21	19.52		0.061

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	Mx - End Moments		k-ft	My - End Moments	
	@ Base	@ Top		@ Base	@ Top	@ Base	@ Base	@ Top		@ Base	@ Top
D Only						14.897					
+D+L						19.697					
+D+0.750L						18.497					
+D+0.60W				4.017	4.017	14.897					
+D+0.750L+0.450W				3.013	3.013	18.497					
+0.60D+0.60W				4.017	4.017	8.938					
+0.60D						8.938					
L Only						4.800					
W Only				6.696	6.696						

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis			Moment About Y-Y Axis	
	@ Base	@ Top		@ Base	@ Top
D Only			k-ft		k-ft
+D+L			k-ft		k-ft
+D+0.750L			k-ft		k-ft
+D+0.60W			k-ft		k-ft
+D+0.750L+0.450W			k-ft		k-ft
+0.60D+0.60W			k-ft		k-ft
+0.60D			k-ft		k-ft
L Only			k-ft		k-ft
W Only			k-ft		k-ft

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
D Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.60W	0.0000	in	0.000 ft	0.035	in	5.955 ft
+D+0.750L+0.450W	0.0000	in	0.000 ft	0.027	in	5.955 ft
+0.60D+0.60W	0.0000	in	0.000 ft	0.035	in	5.955 ft
+0.60D	0.0000	in	0.000 ft	0.000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
W Only	0.0000	in	0.000 ft	0.059	in	5.955 ft

Concrete Column

Project File: column.ec6

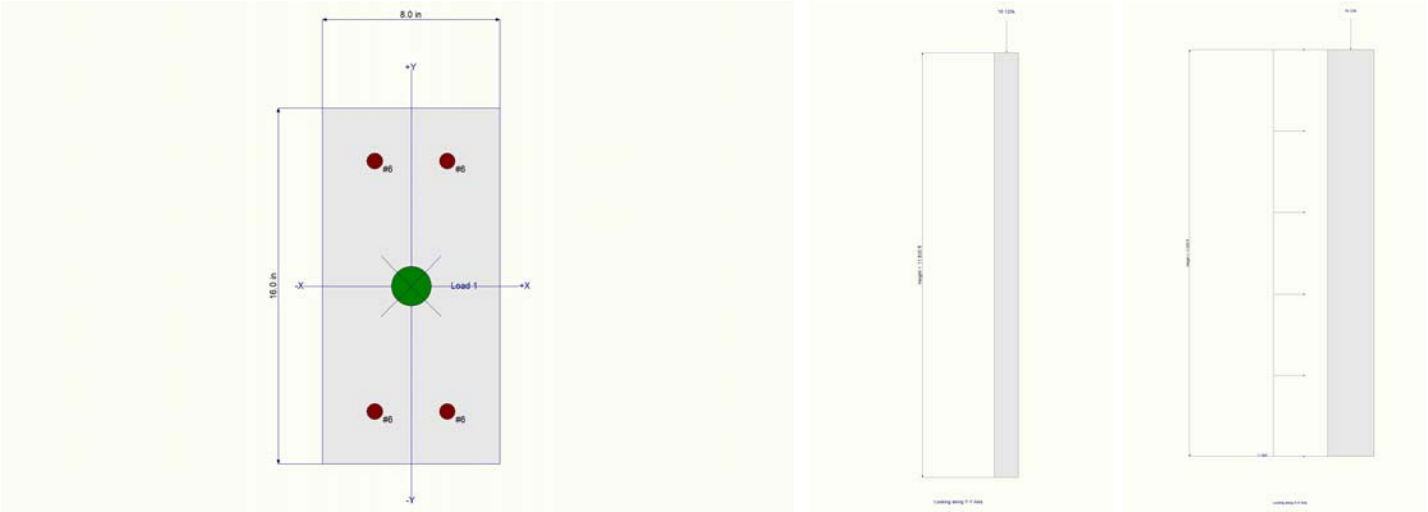
LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE COLUMN DESIGN (2) AT GREAT ROOM SUPPORT BEAM (RB-1 AND RB-4)

Sketches





DSD
DIVERSIFIED STRUCTURAL DESIGN, INC.

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JOB ADDITION AND RENOVATION RESIDENCE

SHEET No. _____ JOB No. 22-22

CALCULATE BY AM DATE 11.06.2025

CHECKED BY _____ DATE _____

SCALE _____

CONCRETE COLUMN DESIGN (2) AT TERRACE SUPPORT BEAM (RB-1)

WindPress := 41.86·psf

Tributaryleng := 1.33·ft = 1.33 ft

REACTION CONCRETE BEAM RB-1

ReactBeamDL := 10.9·K

ReactBeamLL := 7.77·K

TotalDL := ReactBeamDL

TotalDL = 10.9·K

TotalLL := ReactBeamLL

TotalLL = 7.77·K

LATERAL WIND LOADS

LaterWindWL := WindPress·Tributaryleng·1.66 = 92.42·plf

By Calculation Annexed:

USE 8"x16" WITH 4#6 VERTICAL AND TIES #3@8" F_c = 3000 psi

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Column

Project File: column.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE COLUMN DESIGN (2) AT TERRACE SUPPORT BEAM (RB-1)

Code References

Governing Code : IBC 2024
Referenced Design Standard(s) : ACI 318-19
Load Combinations Used : ASCE 7-22 / IBC 2024

General Information

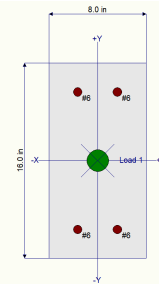
f'_c : Concrete 28 day streng = 3.0 ksi
 E = 3,122.0 ksi
Density = 150.0 pcf
 β = 0.850
 f_y - Main Rebar = 60.0 ksi
 E - Main Rebar = 29,000.0 ksi
Allow. Reinforcing Limits *ASTM A615 Bars Used*
Min. Reinf. = 1.0 %
Max. Reinf. = 8.0 %
Seismic Design Category = A

Overall Column Height = 11.830 ft
End Fixity Top & Bottom Pinned
Brace condition for deflection (buckling) along colum
X-X (width) axis :
Unbraced Length for buckling ABOUT X-X Axis = 11.83 ft, $K = 1.0$
Y-Y (depth) axis :
Unbraced Length for buckling ABOUT Y-Y Axis = 11.83 ft, $K = 1.0$

Column Cross Section

Column Dimensions : 16.0in high x 8.0in Wide, Column
Edge to Rebar Edge Cover = 2.0in

Column Reinforcing : 4 - #6 bars @ corners,



Entered loads are factored per load combinations specified by user.

Applied Loads

Column self weight included : 1,577.33 lbs * Dead Load Factor

AXIAL LOADS . . .

Axial Load at 11.830 ft above base, $D = 11.0$, $L = 7.80$ k

BENDING LOADS . . .

Lat. Uniform Load creating M_y -y, $W = 0.10$ k/ft

DESIGN SUMMARY

Load Combination +1.20D+1.60L
Location of max. above base 11.751 ft
Maximum Stress Ratio 0.131 : 1
Ratio = $(P_u^2 + M_u^2)^{.5} / (\Phi P_n^2 + \Phi M_n^2)^{.5}$
 P_u = 27.573 k $\Phi * P_n$ = 210.596 k
 M_u -x = 0.0 k-ft $\Phi * M_n$ -x = 0.0 k-ft
 M_u -y = 1.930 k-ft $\Phi * M_n$ -y = 14.602 k-ft
 Φ = 0.650
 M_u Angle = 90.0 deg
 M_u at Angle = 1.930 k-ft ΦM_n at Angle = 14.719 k-ft

P_n & M_n values located at P_u - M_u vector intersection with capacity curve

Column Capacities . .

P_{nmax} : Nominal Max. Compressive Axial Capacity 427.512 k
 P_{nmin} : Nominal Min. Tension Axial Capacity k
 ΦP_n , max : Usable Compressive Axial Capacity 195.709 k
 ΦP_n , min : Usable Tension Axial Capacity k

Maximum SERVICE Load Reactions .

Top along Y-Y	0.5915 k	Bottom along Y-Y	0.5915 k
Top along X-X	0.0 k	Bottom along X-X	0.0 k

Maximum SERVICE Load Deflections . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination :
Along X-X 0.02090 in at 5.955 ft above base
for load combination : W Only

General Section Information

β = 0.850 θ = 0.80
 ρ : % Reinforcing 1.375 % Rebar % Ok
Reinforcing Area 1.760 in²
Concrete Area 128.0 in²

Project Title:
 Engineer:
 Project ID:
 Project Descr:

Concrete Column

Project File: column.ec6

LIC# : KW-06014285, Build:20.26.03.03

DIVERSIFIED STRUCTURAL DESIGN, INC.

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DESCRIPTION: CONCRETE COLUMN DESIGN (2) AT TERRACE SUPPORT BEAM (RB-1)

Governing Load Combination Results

Governing Factored Load Combination	Moment		Dist. from base ft	Axial Load k				Bending Analysis k-ft				Utilization	
	X-X	Y-Y		Pu	ϕ * Pn	δ x	δ x * Mux	δ y	δ y * Muy	Alpha (deg)	δ Mu	ϕ Mn	Ratio
+1.40D	Actual	M2,min	11.75	17.61	210.60	1.000		1.000	1.23	90.000	1.23	14.72	0.084
+1.40D	M2,min	Actual	11.75	17.61	222.31	1.000	1.58	1.000		0.000	1.58	19.52	0.080
+1.20D+1.60L	Actual	M2,min	11.75	27.57	210.60	1.000		1.000	1.93	90.000	1.93	14.72	0.131
+1.20D+1.60L	M2,min	Actual	11.75	27.57	222.31	1.000	2.48	1.000		0.000	2.48	19.52	0.126
+1.20D+L	Actual	M2,min	11.75	22.89	210.60	1.000		1.000	1.60	90.000	1.60	14.72	0.109
+1.20D+L	M2,min	Actual	11.75	22.89	222.31	1.000	2.06	1.000		0.000	2.06	19.52	0.104
+1.20D+0.50W	Actual	M2,min	11.75	15.09	204.66	1.000		1.084	1.14	90.000	1.14	15.63	0.074
+1.20D+0.50W	M2,min	Actual	11.75	15.09	222.31	1.000	1.36	1.084	0.95	33.000	1.66	24.12	0.068
+1.20D+L+W	M2,min	Actual	11.75	22.89	221.60	1.000	2.06	1.132	1.98	40.000	2.86	27.24	0.104
+0.90D+W	M2,min	Actual	11.75	11.32	182.48	1.000	1.02	1.061	1.86	60.000	2.12	34.35	0.062
+0.90D	Actual	M2,min	11.75	11.32	210.60	1.000		1.000	0.79	90.000	0.79	14.72	0.054
+0.90D	M2,min	Actual	11.75	11.32	222.31	1.000	1.02	1.000		0.000	1.02	19.52	0.052

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	X-X Axis Reaction		k	Y-Y Axis Reaction		Axial Reaction	Mx - End Moments		k-ft	My - End Moments	
	@ Base	@ Top		@ Base	@ Top		@ Base	@ Top		@ Base	@ Top
D Only						12.577					
+D+L						20.377					
+D+0.750L						18.427					
+D+0.60W	0.355	0.355				12.577					
+D+0.750L+0.450W	0.266	0.266				18.427					
+0.60D+0.60W	0.355	0.355				7.546					
+0.60D						7.546					
L Only						7.800					
W Only	0.592	0.591									

Maximum Moment Reactions

Note: Only non-zero reactions are listed.

Load Combination	Moment About X-X Axis		k-ft	Moment About Y-Y Axis		k-ft
	@ Base	@ Top		@ Base	@ Top	
D Only						
+D+L						
+D+0.750L						
+D+0.60W						
+D+0.750L+0.450W						
+0.60D+0.60W						
+0.60D						
L Only						
W Only						

Maximum Deflections for Load Combinations

Load Combination	Max. X-X Deflection		Distance	Max. Y-Y Deflection		Distance
D Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.750L	0.0000	in	0.000 ft	0.000	in	0.000 ft
+D+0.60W	-0.0125	in	5.955 ft	0.000	in	0.000 ft
+D+0.750L+0.450W	-0.0094	in	5.955 ft	0.000	in	0.000 ft
+0.60D+0.60W	-0.0125	in	5.955 ft	0.000	in	0.000 ft
+0.60D	0.0000	in	0.000 ft	0.000	in	0.000 ft
L Only	0.0000	in	0.000 ft	0.000	in	0.000 ft
W Only	-0.0209	in	5.955 ft	0.000	in	0.000 ft

Project Title:
Engineer:
Project ID:
Project Descr:

Concrete Column

Project File: column.ec6

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Sketches

