

PRCTI20240892

**City of Puyallup  
Building  
REVIEWED  
FOR  
COMPLIANCE**

BSnowden

06/25/2024

10:26:42 AM



May 22, 2024

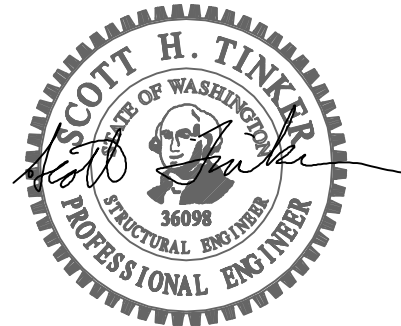
**STRUCTURAL CALCULATIONS**  
(Permit Submittal)

**CENTERIS DATA CENTER  
ELECTRICAL CMU WALL OPENINGS**  
1023 39<sup>th</sup> Avenue SE  
Puyallup, WA 98374

Quantum Job Number: 23444.01

*Prepared for:*  
CENTERIS DATA CENTERS  
18300 Cascade Avenue S  
Seattle, WA 98118

*Prepared by:*  
QUANTUM CONSULTING ENGINEERS  
1511 Third Avenue, Suite 323  
Seattle, WA 98101  
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FAX 206.957.3901



Calculations required to be provided by  
the Permittee on site for all Inspections



**QUANTUM** | CONSULTING ENGINEERS

## STRUCTURAL DESIGN CRITERIA

CENTERIS – DATA CENTER  
1023 39<sup>TH</sup> AVENUE SE  
PUYALLUP, WA 98374

QUANTUM JOB NUMBER: 23444.01

### CODE CRITERIA:

BUILDING CODE..... 2021 INTERNATIONAL BUILDING CODE  
BUILDING DEPARTMENT..... CITY OF PUYALLUP  
SEISMIC ZONE..... SDC = D  
..... SITE CLASS = D  
..... R 3.5  
.....  $S_s = 1.26$   $S_1 = 0.43$   
.....  $S_{DS} = 1.01$   $S_{D1} = 0.50$

### MATERIALS CRITERIA:

#### CONCRETE (28 DAY STRENGTH):

FOUNDATION/S.O.G.....  $f'_c=3,000$  PSI

#### REINFORCING STEEL:

GRADE 60.....  $F_y=60,000$  PSI

#### STRUCTURAL STEEL:

WIDE-FLANGE SECTIONS: A-992.....  $F_y=50,000$  PSI

MISCELLANEOUS SECTIONS: A-36.....  $F_y=36,000$  PSI

TUBE SECTIONS: A-500.....  $F_y=46,000$  PSI

WELDING.....  $F_y=70,000$  PSI

**Steel Beam**

Project File: Openings in Masonry Wall.ec6

LIC# : KW-06016450, Build:20.24.05.02

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(c) ENERCALC INC 1983-2023

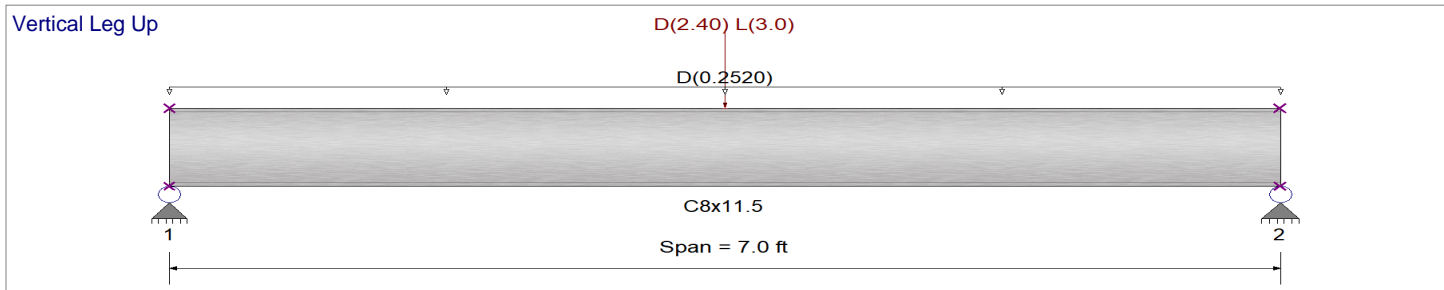
**DESCRIPTION:** Double Channel Openings At (E) CMU. Half Load Applied to Beam

**CODE REFERENCES**

Calculations per AISC 360-16, IBC 2021, ASCE 7-16  
 Load Combination Set : ASCE 7-16

**Material Properties**

Analysis Method : Allowable Strength Design	Fy : Steel Yield :	36.0 ksi
Beam Bracing : Completely Unbraced	E: Modulus :	29,000.0 ksi
Bending Axis : Major Axis Bending		



**Applied Loads**

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

Beam self weight NOT internally calculated and added

Load(s) for Span Number 1

Point Load : D = 2.40, L = 3.0 k @ 3.50 ft, (Beam (1/2"))

Uniform Load : D = 0.0840 ksf, Tributary Width = 3.0 ft, (CMU Above)

**DESIGN SUMMARY**

**Design OK**

Maximum Bending Stress Ratio =	<b>0.647</b> : 1	Maximum Shear Stress Ratio =	<b>0.157</b> : 1
Section used for this span	<b>C8x11.5</b>	Section used for this span	<b>C8x11.5</b>
Ma : Applied	10.994 k-ft	Va : Applied	3.582 k
Mn / Omega : Allowable	16.980 k-ft	Vn/Omega : Allowable	22.764 k
Load Combination	+D+L	Load Combination	+D+L
Span # where maximum occurs	Span # 1	Location of maximum on span	0.000 ft
		Span # where maximum occurs	Span # 1
<b>Maximum Deflection</b>			
Max Downward Transient Deflection	0.039 in	Ratio = 2,128	>=600. Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio = 0	<600.0 n/a
Max Downward Total Deflection	0.086 in	Ratio = 982	>=240. Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio = 0	<240.0 n/a

**Maximum Forces & Stresses for Load Combinations**

Load Combination	Segment Length	Span #	Max Stress Ratios		Summary of Moment Values						Summary of Shear Values			
			M	V	Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Va Max	Vnx	Vnx/Omega
D Only														
Dsgn. L =	7.00 ft	1	0.345	0.091	5.74		5.74	27.81	16.65	1.26	1.00	2.08	38.02	22.76
+D+L														
Dsgn. L =	7.00 ft	1	0.647	0.157	10.99		10.99	28.36	16.98	1.29	1.00	3.58	38.02	22.76
+D+0.750L														
Dsgn. L =	7.00 ft	1	0.572	0.141	9.68		9.68	28.27	16.93	1.28	1.00	3.21	38.02	22.76
+0.60D														
Dsgn. L =	7.00 ft	1	0.207	0.055	3.45		3.45	27.81	16.65	1.26	1.00	1.25	38.02	22.76

**Overall Maximum Deflections**

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.0856	3.520		0.0000	0.000

**Vertical Reactions**

Support notation : Far left is #'

Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	3.582	3.582
Max Upward from Load Combinations	3.582	3.582
Max Upward from Load Cases	2.082	2.082
D Only	2.082	2.082

Project Title:  
Engineer:  
Project ID:  
Project Descr:

**Steel Beam**

Project File: Openings in Masonry Wall.ec6

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**Vertical Reactions**

Support notation : Far left is #

Values in KIPS

Load Combination	Support 1	Support 2
+D+L	3.582	3.582
+D+0.750L	3.207	3.207
+0.60D	1.249	1.249
L Only	1.500	1.500