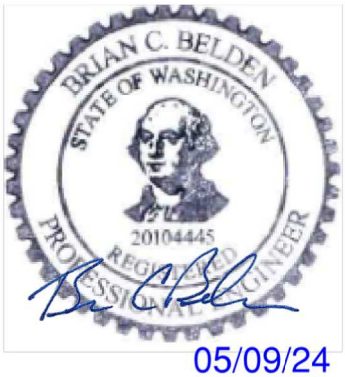
JOHNSTON BURKHOLDER ASSOCIATES
930 CENTRAL ST.
KANSAS CITY, MO 64105
813-421-4200

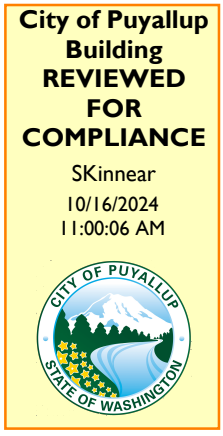
JOB TITLE	2403 - Puyallup, WA		
JOB NO.	2401802403	**SHEET NO.**	
CALCULATED BY	NLC	**DATE**	5/8/24
CHECKED BY	JSH	**DATE**	5/8/24

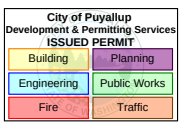
STRUCTURAL CALCULATIONS

FOR

2403 - Puyallup, WA



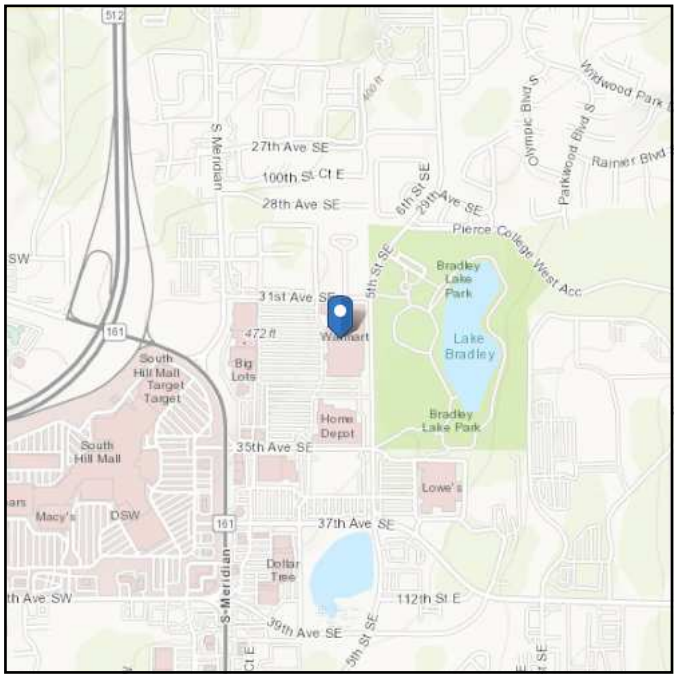


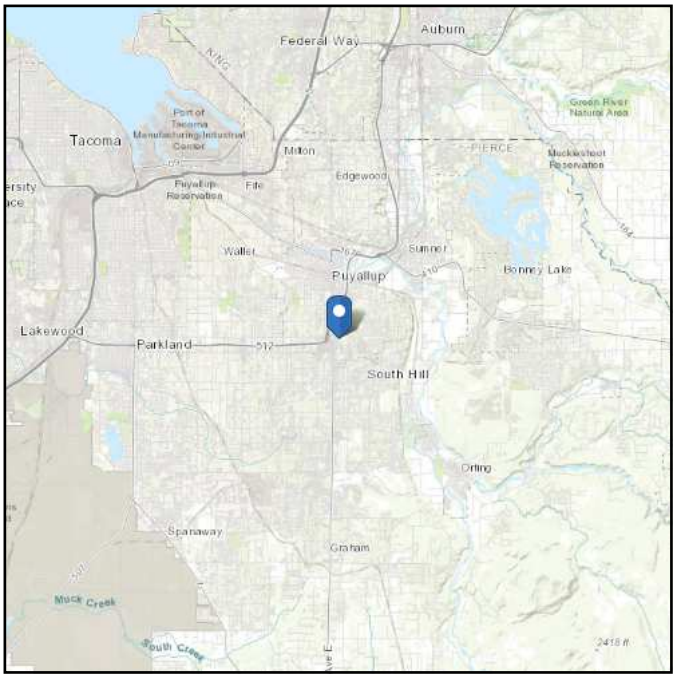


ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	47.1611
Risk Category:	II	**Longitude:**	-122.2889
Soil Class:	D - Stiff Soil	**Elevation:**	447.0684665141957 ft (NAVD 88)





Wind

Results:

Wind Speed	98 Vmph
10-year MRI	67 Vmph
25-year MRI	73 Vmph
50-year MRI	78 Vmph
100-year MRI	83 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2

Date Accessed: Tue Mar 26 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

Seismic

Site Soil Class: D - Stiff Soil

Results:

S_S :	1.261	S_{D1} :	N/A
S_1 :	0.435	T_L :	6
F_a :	1	PGA :	0.5
F_v :	N/A	PGA_M :	0.55
S_{MS} :	1.261	F_{PGA} :	1.1
S_{M1} :	N/A	I_e :	1
S_{DS} :	0.841	C_v :	1.352

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Tue Mar 26 2024

Date Source: USGS Seismic Design Maps

Snow

Results:

Ground Snow Load, p_g :	18 lb/ft^2
Mapped Elevation:	0.0 ft
Data Source:	
Date Accessed:	Tue Mar 26 2024

Statutory requirements of the Authority Having Jurisdiction are not included.

Snow load values are mapped to a 0.5 mile resolution. This resolution can create a mismatch between the mapped elevation and the site-specific elevation in topographically complex areas. Engineers should consult the local authority having jurisdiction in locations where the reported 'elevation' and 'mapped elevation' differ significantly from each other.

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Code Search

Code: California Building Code 2022 - w/ Chapter 16A

Occupancy:

Occupancy Group = B Business

Risk Category & Importance Factors:

Risk Category =	II	
Wind Factor =	1.00	use 0.60 NOTE: Output will be nominal wind pressures
Importance Factor	1.00	
Seismic Importance factor =	1.00	use 0.70

Type of Construction:

Fire Rating:

Roof =	0.0 hr
Floor =	0.0 hr

Building Geometry:

Roof angle (θ)	0.25 / 12	1.2 deg
Building length	244.0 ft	
Least width	160.3 ft	
Mean Roof Ht (h)	15.7 ft	
Parapet ht above grd	23.3 ft	
Minimum parapet ht	5.0 ft	
hb for Elevated bldg	0.0 ft	

Live Loads:

Roof 0 to 200 sf: 20 psf
200 to 600 sf: 24 - 0.02Area, but not less than 12 psf
over 600 sf: 12 psf

Roofs used for roof gardens 100 psf

Floor:

Typical Floor	50 psf
Partitions	15 psf
Corridors above first floor	80 psf
Lobbies & first floor corridors	100 psf
Stairs and exit ways	100 psf

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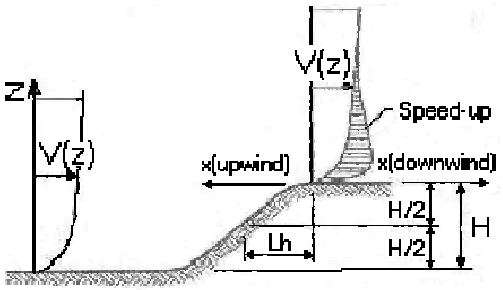
Wind Loads : ASCE 7- 16

Ultimate Wind Speed	110 mph
Nominal Wind Speed	85.2 mph
Risk Category	II
Exposure Category	C
Enclosure Classif.	Enclosed Building
Internal pressure	+/-0.18
Bldg Directionality (Kd)	0.85
Kh MWFRS<=60	0.857
Kh all other	0.857
Type of roof	Monoslope

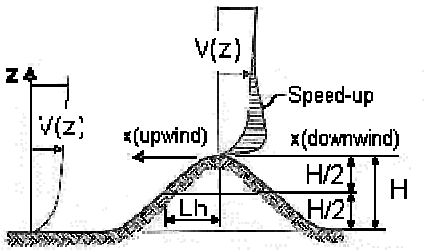
Topographic Factor (Kzt)

Topography		Flat
Hill Height	(H)	80.0 ft
Half Hill Length (Lh)		100.0 ft
Actual H/Lh	=	0.80
Use H/Lh	=	0.50
Modified Lh	=	160.0 ft
From top of crest: x =		50.0 ft
Bldg up/down wind?		downwind

H/Lh= 0.50 K_1 = 0.000
x/Lh = 0.31 K_2 = 0.792
z/Lh = 0.10 K_3 = 1.000
At Mean Roof Ht:
Kzt = $(1+K_1K_2K_3)^2$ = 1.00



ESCARPMENT



2D RIDGE or 3D AXISYMMETRICAL HILL

Gust Effect Factor

h =	15.7 ft
B =	160.3 ft
/z (0.6h) =	15.0 ft

Flexible structure if natural frequency < 1 Hz (T > 1 second).
If building h/B>4 then may be flexible and should be investigated.
h/B = 0.10 Rigid structure (low rise bldg)

G = 0.85 Using rigid structure formula

Rigid Structure

$\bar{e}$ =	0.20
ℓ =	500 ft
z_{min} =	15 ft
c =	0.20
g_Q, g_v =	3.4
L_z =	427.1 ft
Q =	0.86
I_z =	0.23
G =	**0.85**

Flexible or Dynamically Sensitive Structure

Natural Frequency (η_1) =	0.7 Hz		
Damping ratio (β) =	0.01		
/b =	0.650		
/α =	0.154		
Vz =	92.9		
N_1 =	3.22		
R_n =	0.067		
R_h =	0.718	η = 0.543	h = 15.7 ft
R_B =	0.164	η = 5.558	
R_L =	0.035	η = 28.316	
g_R =	4.104		
R =	0.656		
Gf =	1.013		

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Ground Elevation Factor (Ke)

Grd level above sea level = 0 ft
Constant = 0.00256
0.00256Ke = 0.00256

Ke = 1.0000

Enclosure Classification

Test for Enclosed Building: Ao < 0.01Ag or 4 sf, whichever is smaller

Test for Open Building: All walls are at least 80% open.
Ao ≥ 0.8Ag

Test for Partially Enclosed Building: Predominately open on one side only

	Input			Test	
Ao	500.0	sf	Ao ≥ 1.1Aoi	NO	
Ag	600.0	sf	Ao > 4sf or 0.01Ag	YES	
Aoi	1000.0	sf	Aoi / Agi ≤ 0.20	YES	Building is NOT
Agi	10000.0	sf			Partially Enclosed

Conditions to qualify as Partially Enclosed Building. Must satisfy all of the following:
Ao ≥ 1.1Aoi
Ao > smaller of 4sf or 0.01 Ag
Aoi / Agi ≤ 0.20
Where:
Ao = the total area of openings in a wall that receives positive external pressure.
Ag = the gross area of that wall in which Ao is identified.
Aoi = the sum of the areas of openings in the building envelope (walls and roof) not including Ao.
Agi = the sum of the gross surface areas of the building envelope (walls and roof) not including Ag.

Test for Partially Open Building: A building that does not qualify as open, enclosed or partially enclosed.
(This type building will have same wind pressures as an enclosed building.)

Reduction Factor for large volume partially enclosed buildings (Ri) :

If the partially enclosed building contains a single room that is unpartitioned , the internal pressure coefficient may be multiplied by the reduction factor Ri.

Total area of all wall & roof openings (Aog): - SF
Unpartitioned internal volume (Vi) : - CF
Ri = 1.00

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JOB TITLE 2403 - Puyallup, WA
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Nominal Wind Pressures

Wind Loads - Components & Cladding : h ≤ 60'

		Kh =	0.857		~~100.0 ft~~	~~30.0 ft~~
Base pressure (qh) =	**13.5 psf**	h =	15.7 ft	0.2h = 3.1 ft	~~100.0 ft~~	
Minimum parapet ht =	5.0 ft	0.6h =	9.4 ft		~~100.0 ft~~	
Roof Angle (θ) =	1.2 deg	GCpi =	+/-0.18			
Type of roof =	Monoslope	qi = qh =	13.5 psf			

Roof

	Surface Pressure (psf)								User input	
Area	10 sf	20 sf	50 sf	100 sf	200 sf	350 sf	500 sf	1000 sf	80 sf	200 sf
Negative Zone 1	-25.40	-23.80	-21.50	-19.90	-18.2	-16.8	-16.0	-16.0	-20.4	-18.2
Negative Zone 1'	-14.60	-14.60	-14.60	-14.60	-12.6	-10.9	-10.0	-10.0	-14.6	-12.6
Negative Zone 2	-33.60	-31.40	-28.60	-26.40	-24.2	-22.5	-21.4	-21.4	-27.1	-24.2
Negative Zone 3	-33.60	-31.40	-28.60	-26.40	-24.2	-22.5	-21.4	-21.4	-27.1	-24.2
Positive Zone 1 & 1'	10.00	10.00	10.00	10.00	10.0	10.0	10.0	10.0	10.0	10.0
Positive Zones 2 & 3	14.60	14.00	13.10	12.50	11.8	11.3	11.0	10.3	12.7	11.8
Overhang Zone 1&1'	-23.00	-22.60	-22.10	-21.70	-18.2	-15.3	-13.5	-13.5	-21.8	-18.2
Overhang Zone 2	-31.10	-28.30	-24.40	-21.60	-18.7	-16.4	-14.9	-14.9	-22.5	-18.7
Overhang Zone 3	-31.10	-28.30	-24.40	-21.60	-18.7	-16.4	-14.9	-14.9	-22.5	-18.7

Negative zone 3 = zone 2, since parapet >= 3ft.
Overhang pressures in the table above assume an internal pressure coefficient (Gcpi) of 0.0
Overhang soffit pressure equals adj wall pressure (which includes internal pressure of 2.4 psf)

Parapet

qp = 14.7 psf

		Surface Pressure (psf)						User input
Solid Parapet Pressure		10 sf	20 sf	50 sf	100 sf	200 sf	500 sf	150 sf
CASE A:	Zone 2 :	47.1	44.0	40.0	37.0	33.9	29.9	35.2
	Zone 3 :	47.1	44.0	40.0	37.0	33.9	29.9	35.2
CASE B:	Interior zone :	-27.8	-26.4	-24.5	-23.1	-21.7	-19.9	-22.3
	Corner zone :	-31.8	-29.7	-26.9	-24.8	-22.7	-19.9	-23.5

wall a = 6.4 ft

Walls

	GCp +/- GCpi				Surface Pressure at h				User input	
Area	10 sf	100 sf	200 sf	500 sf	10 sf	100 sf	200 sf	500 sf	150 sf	200 sf
Negative Zone 4	-1.17	-1.01	-0.96	-0.90	-15.8	-13.7	-13.0	-12.2	-13.3	-13.0
Negative Zone 5	-1.44	-1.12	-1.03	-0.90	-19.5	-15.2	-13.9	-12.2	-14.4	-13.9
Positive Zone 4 & 5	1.08	0.92	0.87	0.81	14.6	12.5	11.8	11.0	12.1	11.8

Note: GCp reduced by 10% due to roof angle <= 10 deg.

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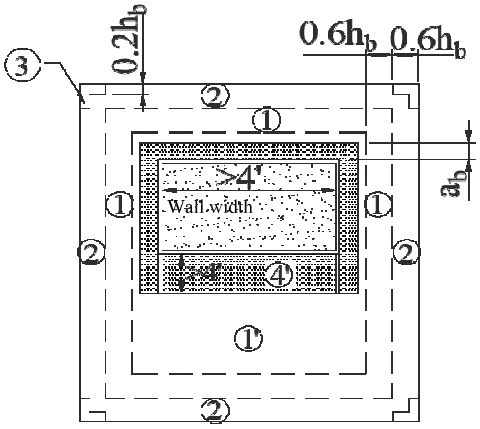
Elevated building procedure is from ASCE 7 -22

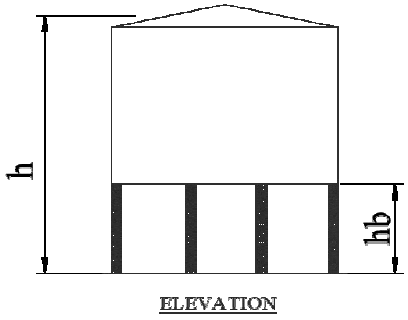
Bottom Horizontal Surface of Elevated Buildings

	0.86	h =	15.7 ft	0.2hb =	0.00
Base pressure (qh) =	**13.5 psf**	hb =	0.0 ft	0.6hb =	0.00
Wall width =	5.0 ft			ab =	0.00

	GCp				Surface Pressure (psf)				User input	
Area	10 sf	100 sf	500 sf	1000 sf	10 sf	100 sf	500 sf	1000 sf	80 sf	200 sf
Negative Zone 1	-1.70	-1.29	-1.00	-1.00	-25.4	-19.9	-16.0	-16.0	-20.4	-18.2
Negative Zone 1'	-0.90	-0.90	-0.55	-0.40	-14.6	-14.6	-10.0	-10.0	-14.6	-12.6
Negative Zone 2	-2.30	-1.77	-1.40	-1.40	-33.6	-26.4	-21.4	-21.4	-27.1	-24.2
Negative Zone 3	-3.20	-1.77	-1.40	-1.40	-45.7	-26.4	-21.4	-21.4	-27.1	-24.2
Positive Zones 1-3	0.30	0.20	0.20	0.20	10.0	10.0	10.0	10.0	10.0	10.0
Negative Zone 4'	-0.99	-0.83	-0.72	-0.72	-15.8	-13.7	-12.2	-12.2	-13.9	-13.0
Positive Zone 4'	0.90	0.74	0.63	0.63	14.6	12.5	11.0	11.0	12.7	11.8

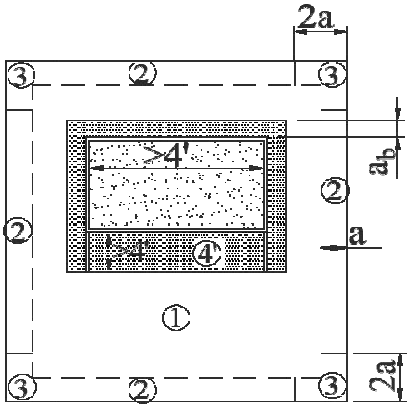
Negative pressures are downward

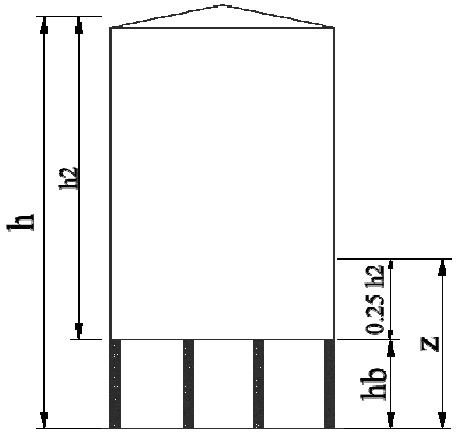




ELEVATION

Building Bottom Plan: h ≤ 60' and alternate design 60'<h<90'





ELEVATION

Building Bottom Plan: h> 60 feet

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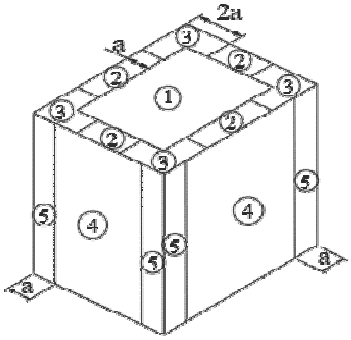
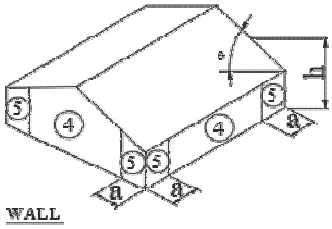
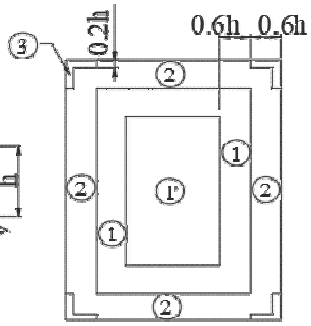
Location of C&C Wind Pressure Zones - ASCE 7-22



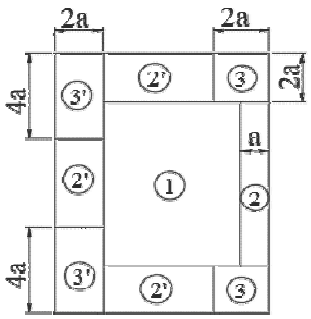
Roofs w/ θ ≤ 10°
and all walls
h > 60'



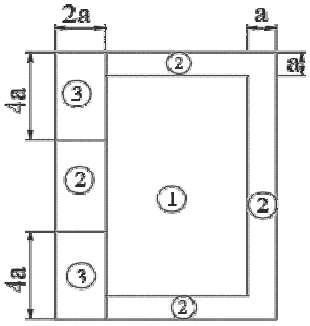
Walls h ≤ 60'
& alt design h<90'



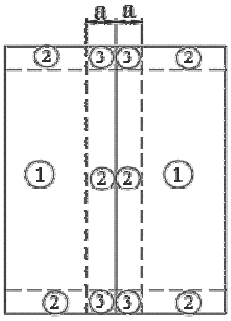
Multispan Gable & Sawtooth ≤ 10°
& Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'



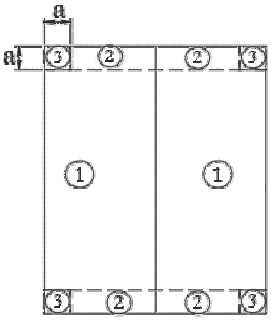
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'



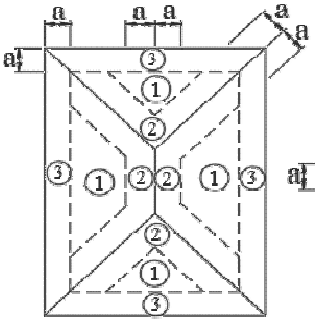
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'



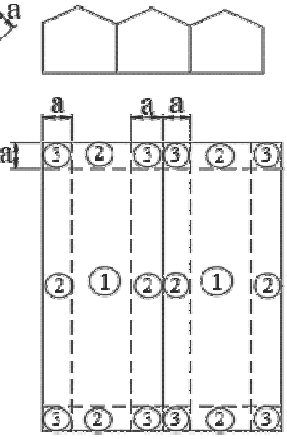
Gable 7° < θ ≤ 27°



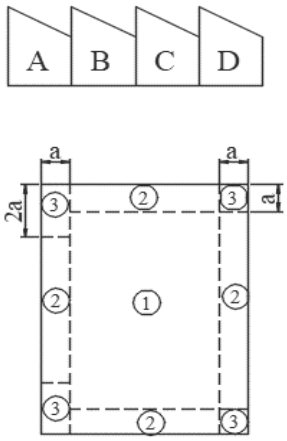
Gable 27° < θ ≤ 45°



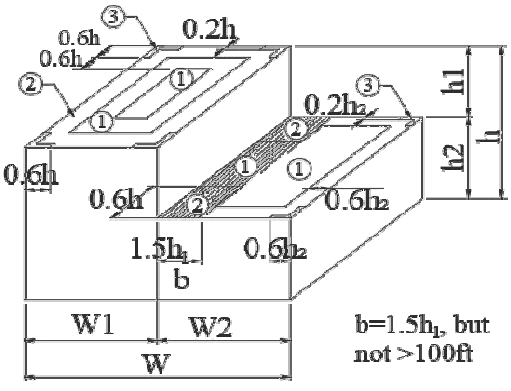
Hip 7° < θ ≤ 45°

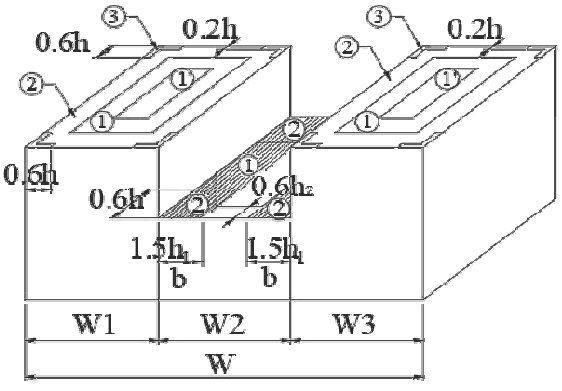


Multispan gable 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'



Sawtooth 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'





Stepped roofs θ ≤ 3°
h ≤ 60' & alt design h<90'

Note: The hatched area indicates where roof positive pressures are equal to the adjacent wall positive pressure.

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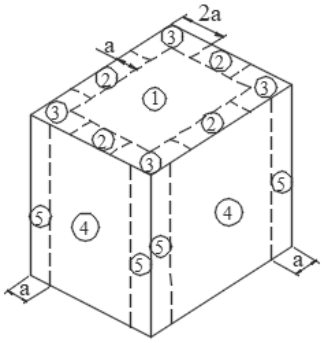
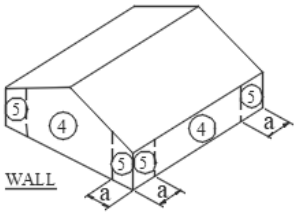
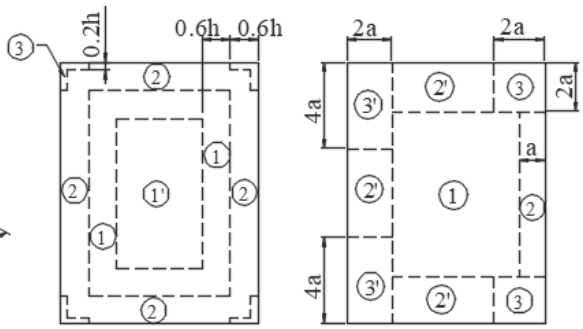
Location of C&C Wind Pressure Zones - ASCE 7-16



Roofs w/ θ ≤ 10°
and all walls
h > 60'

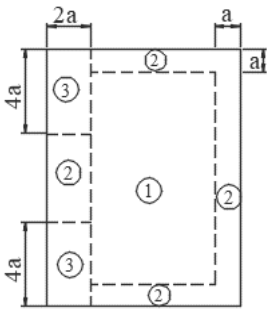


Walls h ≤ 60'
& alt design h<90'

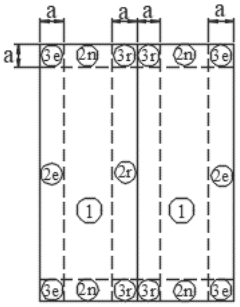


Multispan Gable & Sawtooth ≤ 10°
and Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'

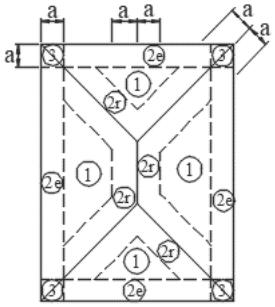
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'



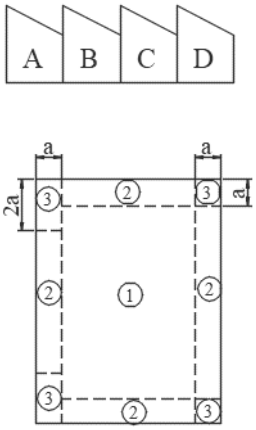
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'



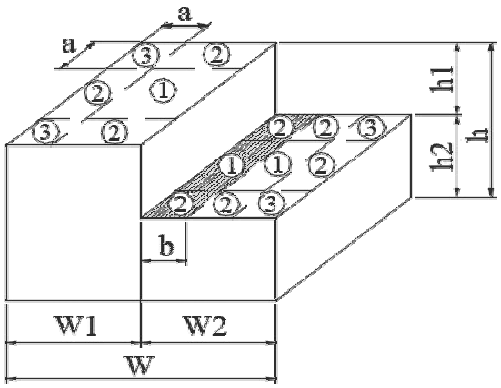
Multispan Gable > 10°
& Gable 7° < θ ≤ 45°



Hip 7° < θ ≤ 27°

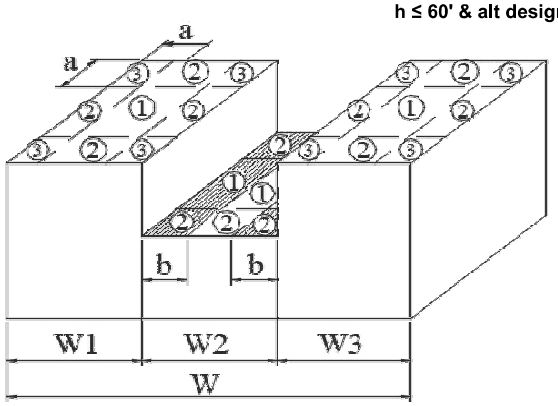


Sawtooth 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'



Note: The hatched area indicates where roof positive pressures are equal to the adjacent wall positive pressure.

Stepped roofs θ ≤ 3°
h ≤ 60' & alt design h<90'



Note: The stepped roof zones above are as shown in ASCE 7-16 . Prior editions didn't show zones, but the notes sent you to the low slope gable figure. The note in ASCE 7-16 still sends you to the low slope gable figure, but for some reason the zones shown are per editions prior to ASCE 7-16. Therefore, the above zones may be a code mistake and the correct zone locations may be per the low slope gable roof shown at the top of this page.

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JOB TITLE	2403 - Puyallup, WA		
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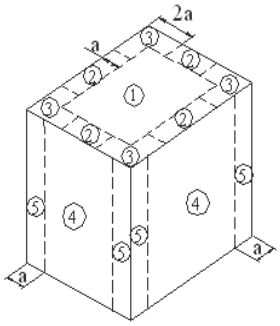
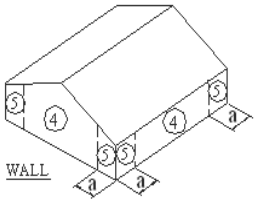
CALCULATED BY	NLC	**DATE**	5/8/24
CHECKED BY	JSH	**DATE**	5/8/24

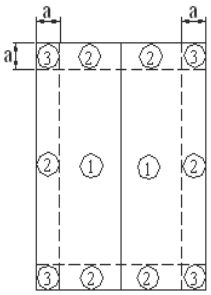
Location of C&C Wind Pressure Zones - ASCE 7-10 & earlier

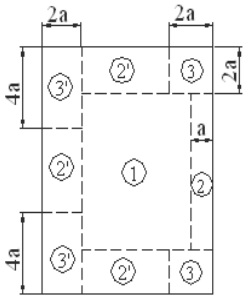


Roofs w/ θ ≤ 10°
and all walls
h > 60'



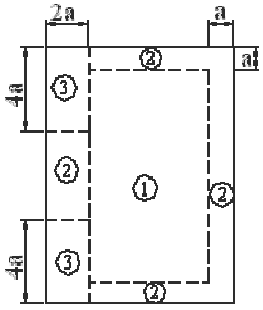
Walls h ≤ 60'
& alt design h<90'



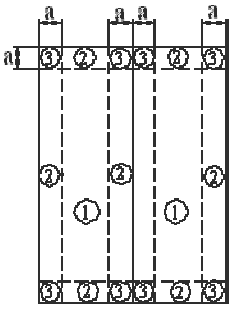


Gable & Sawtooth ≤ 10 degrees
& Gable θ ≤ 7 degrees &
Monoslope ≤ 3 degrees
h ≤ 60' & alt design h<90'

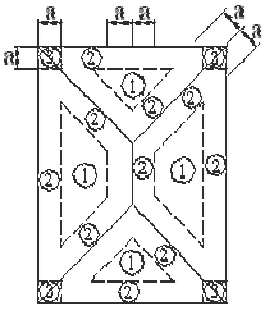
Monoslope roofs
3° < θ ≤ 10°
h ≤ 60' & alt design h<90'



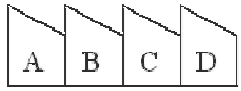
Monoslope roofs
10° < θ ≤ 30°
h ≤ 60' & alt design h<90'

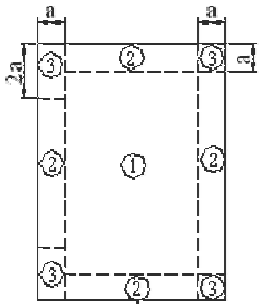


Multispan Gable > 10°
& Gable 7° < θ ≤ 45°

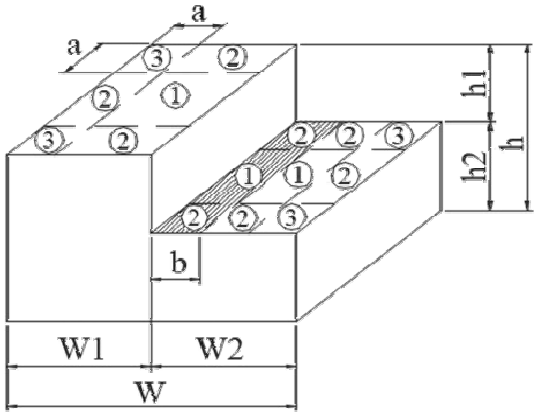


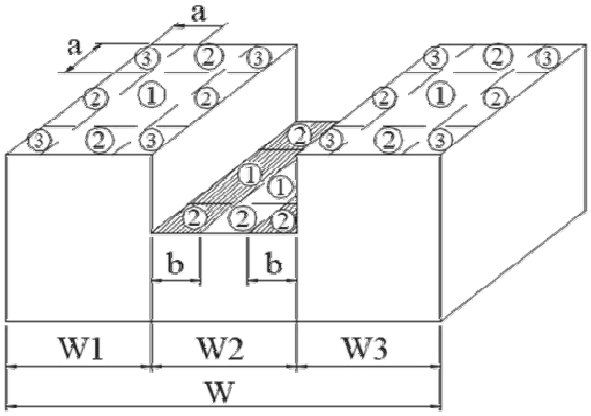
Hip 7° < θ ≤ 27°





Sawtooth 10° < θ ≤ 45°
h ≤ 60' & alt design h<90'





Stepped roofs θ ≤ 3°
h ≤ 60' & alt design h<90'

Note: The hatched area indicates where roof positive pressures are equal to the adjacent wall positive pressure.

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JOB TITLE	2403 - Puyallup, WA		
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Snow Loads : ASCE 7-16

Nominal Snow Forces

Roof slope		=	1.2 deg
Horiz. eave to ridge dist (W)		=	160.3 ft
Roof length parallel to ridge (L)		=	244.0 ft
Type of Roof			Monoslope
Ground Snow Load	Pg	=	25.0 psf
Risk Category		=	II
Importance Factor	I	=	1.0
Roof R value	Rroof	=	30
Thermal Factor	Ct	=	1.000
Exposure Factor	Ce	=	1.0
Pf = 0.7*Ce*Ct*I*Pg		=	17.1 psf
Unobstructed Slippery Surface			no
Sloped-roof Factor	Cs	=	1.00
Balanced Snow Load		**=**	**17.1 psf**
Rain on Snow Surcharge Angle			3.21 deg
Code Maximum Rain Surcharge			5.0 psf
Rain on Snow Surcharge		=	0.0 psf
Ps plus rain surcharge		=	17.1 psf
Minimum Snow Load	Pm	=	20.0 psf
Uniform Roof Design Snow Load		=	**20.0 psf**

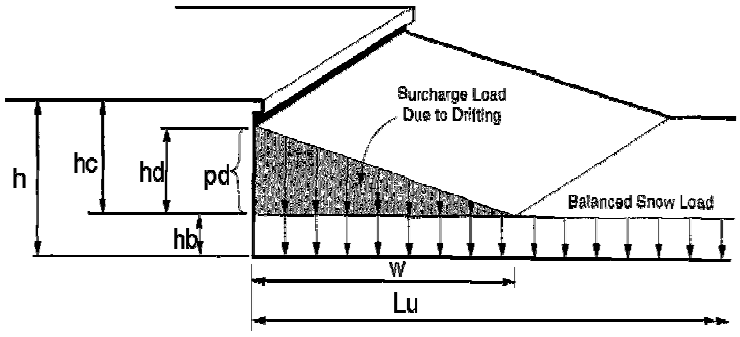
Near ground level surface balanced snow load = **25.0 psf**

NOTE: Alternate spans of continuous beams shall be loaded with half the design roof snow load so as to produce the greatest possible effect - see code for loading diagrams and exceptions for gable roofs

~~0.55~~

Snow Drift 1 - Against roof projections, parapets, etc

Up or downwind fetch	lu	=	316.0 ft
Projection height	h	=	5.2 ft
Projection width/length	lp	=	150.0 ft
Snow density	γ	=	17.3 pcf
Balanced snow height	hb	=	0.99 ft
	hd	=	4.22 ft
	hc	=	4.21 ft
hc/hb >0.2 = 4.3	**Therefore, design for drift**		
Drift height (hc)		=	4.21 ft
Drift width	w	=	16.90 ft
Surcharge load:	pd = γ*hd	=	**72.6 psf**
Balanced Snow load:		=	17.1 psf
			89.7 psf



Note: If bottom of projection is at least 2 feet above hb then snow drift is not required.

Snow Drift 2- Against roof projections, parapets, etc

Up or downwind fetch	lu	=	150.0 ft
Projection height	h	=	4.0 ft
Projection width/length	lp	=	316.0 ft
Snow density	γ	=	17.3 pcf
Balanced snow height	hb	=	0.99 ft
	hd	=	3.04 ft
	hc	=	3.01 ft
hc/hb >0.2 = 3.0	**Therefore, design for drift**		
Drift height (hc)		=	3.01 ft
Drift width	w	=	12.30 ft
Surcharge load:	pd = γ*hd	=	**51.9 psf**
Balanced Snow load:		=	17.1 psf
			69.0 psf

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CALCULATED BY	NLC	DATE	5/8/24
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Seismic Loads: CBC 2022

Strength Level Forces

Risk Category : II
Importance Factor (Ie) : 0.70

Site Class : D - code default

Ss (0.2 sec) =	1.26 g	Fa =	1.000
S1 (1.0 sec) =	0.44 g	Fv =	1.865

Site specific ground motion analysis performed:

Sms =	1.261	S_{DS} =	0.841	Design Category =	D
Sm1 =	0.811	S_{D1} =	0.541	Design Category =	D

Seismic Design Category = **D**
Redundancy Coefficient ρ = 1.00 Code exception must be met for ρ to equal 1.0
Number of Stories: 1

Structure Type: All other building systems
Horizontal Struct Irregularities: No plan Irregularity
Vertical Structural Irregularities: No vertical Irregularity

Flexible Diaphragms: Yes
Building System: **Bearing Wall Systems**
Seismic resisting system: **Intermediate precast shear walls**
System Structural Height Limit: **40ft (see code footnote for exception)**
Actual Structural Height (hn) = 15.7 ft
See ASCE7 Section 12.2.5 for exceptions and other system limitations

DESIGN COEFFICIENTS AND FACTORS

Response Modification Coefficient (R) =	4	To = 0.2(Sd1/Sds) =	0.129
Over-Strength Factor (Ωo) =	2	Ts = Sd1/Sds =	0.643
Deflection Amplification Factor (Cd) =	4	Long Period Transition Period (TL) =	12 sec

S_{DS} = 0.841
S_{D1} = 0.541

Seismic Load Effect (E) = Eh +/-Ev = ρ Q_E +/- 0.2S_{DS} D = Qe +/- 0.168D — Q_E = horizontal seismic force
Special Seismic Load Effect (Em) = Emh +/- Ev = Ωo Q_E +/- 0.2S_{DS} D = &G40&"(0.168D — D = dead load

ALLOWABLE STORY DRIFT

Structure Type: All other structures

Allowable story drift Δa = 0.020hsx where hsx is the story height below level x

PERMITTED ANALYTICAL PROCEDURES

Index Force Analysis - Method Not Permitted (only applies to Seismic Category A)

Model & Seismic Response Analysis - Permitted (see code for procedure)

Equivalent Lateral-Force (ELF) Analysis - Permitted

Building period coef. (C_T) =	0.020			Cu =	1.40
Approx fundamental period (Ta) =	$C_T h_n^x$ =	0.158 sec	x= 0.75	Tmax = CuTa =	0.221 sec
User calculated fundamental period =				T =	0.158 sec

Seismic response coef. (Cs) =	SdsI/R =	0.147	ASCE7 11.4.8 exception 2 equations used
but not less than Cs =	0.044Sds*I =	0.026	
USE Cs =		0.147	

Design Base Shear V = 0.147W

SEISMIC FORCES AT FLOORS - ELF Procedure

Total Stories =	1	Floor Dead Load =	80.0 psf	Roof Snow Load =	0.0 psf
Building length L =	244.0 ft	Floor LL to include =	0.0 psf	Roof Equip wt =	0.0 kips
Building width W =	160.3 ft	Floor Equip wt =	0.0 kips	Parapet weight =	0.0 psf
hn =	15.7 ft	Partition weight =	10.0 psf	Parapet height =	0.0 ft
k =	1.000	Ext Wall Weight =	50.0 psf		
V =		Roof Dead Load =	20.0 psf		

Bottom Floor (level 1) is a slab on grade

Diaphragm shall be designed for level force Fx, but not less than Fpx = (Σ Fi / Σ wi) wpx, but :
Fpx min = $0.2S_{DS}$ Ie wpx = 0.118 wpx
Fpx max = $0.4S_{DS}$ Ie wpx = 0.235 wpx

Seismic Forces (Including all exterior walls)

V = 159.7k

Level (x)	EL above Seismic Base hx (ft)	Level Weight Wx (kips)	Wx hx^k (ft-kips)	Cvx = Wx hx^k / Σ Wi hi^k	Base Shear Distribution Fx=CvxV	Σ Fx (k)	Story M	Diaphragm Force Fpx Σ Wi (k)	Fpx	Design Fpx
Roof	15.00	1,086	16,285	1.000	159.72	159.7	0	1,086	159.7	159.7
1	0.00	0	0	0.000	0.00	0.0	0	0	0.0	0.0
Base		1,086		1.000		159.7	2,396			
							2,396 = Base M			

Diaphragm Forces excluding parallel exterior walls

Diaphragm Force Fpx Parallel to Bldg Length V= 133k

Cvx =	Fx=CvxV	Σ Fx (k)	Σ Wi (k)	Fpx	Design Fpx
1.000	132.80	132.8	903	132.8	132.8
0.000	0.00	0.0	0	0.0	0.0
1.000		132.8			

Diaphragm Force Fpx Normal to Bldg Length V= 142k

Level (x)	Cvx =	Fx=CvxV	Σ Fx (k)	Σ Wi (k)	Fpx	Design Fpx
Roof	1.000	142.0	142.0	965	142.0	142.0
1	0.000	0.0	0.0	0	0.0	0.0
Base	1.000		142.0			

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Seismic Loads - cont. :

Strength Level Forces

Seismic Design Category (SDC)= D
Ie = 0.70
Sds = 0.841

CONNECTIONS

Force to connect smaller portions of structure to remainder of structure

$Fp = 0.133 Sds w_p$ = 0.112 w_p
or $Fp = 0.05 w_p$ = 0.05 w_p Use Fp = 0.11 w_p w_p = weight of smaller portion

Beam, girder or truss connection for resisting horizontal force parallel to member

F_P = no less than 0.05 times dead plus live load vertical reaction

Anchorage of Structural Walls to elements providing lateral support

Fp = not less than 0.2KaIeWp Flexible diaphragm span Lf =
Enter Lf to calculate Fp for flexible diaphragm
Fp =0.4SdskaIeWp = 0.235 Wp, but not less than 0.14Wp (rigid diaphragm) ka= 1 Fp = 0.235 Wp
w/ anchor adjustment factor but Fp shall not be less than 5 psf
h= 15.7 Flexible Diaphragm: Fp= Wp
z= 15.7 Rigid Diaphragm: Fp= 0.235 Wp factor = 1.000

MEMBER DESIGN

Bearing Walls and Shear Walls (out of plane force)

$Fp = 0.4 Sds Ie Ww$ = 0.235 w_w
but not less than 0.10 w_w Use Fp = 0.24 w_w

Diaphragms

Fp = (Sum Fi / Sum Wi)Wpx + Vpx = (Sum Fi / Sum Wi)Wpx + Vpx
need not exceed 0.4 SdsIeWpx + Vpx = 0.235 Wpx + Vpx
but not less than 0.2 SdsIeWpx + Vpx = 0.118 Wpx + Vpx

ARCHITECTURAL COMPONENTS SEISMIC COEFFICIENTS

Architectural Component : Cantilever Elements (Braced to Structural Frame Above Its Center of Mass): Parapets
Importance Factor (Ip) : 1.0
Component Amplification Factor (a_p) = 1 h= 21.6 feet
Comp Response Modification Factor (R_p) = 2.5 z= 21.6 feet z/h = 1.00
Over-Strength Factor (Ωo) = 2
$Fp = 0.4 a_p SdsIpWp(1+2z/h)/Rp$ = 0.404 Wp
not greater than $Fp = 1.6 SdsIpWp$ = 1.345 Wp
but not less than $Fp = 0.3 SdsIpWp$ = 0.252 Wp use Fp = 0.404 Wp

MECH AND ELEC COMPONENTS SEISMIC COEFFICIENTS

Seismic Design Category D & Ip=1.0, therefore see ASCE7 Section 13.1.4 for exceptions

Mech or Electrical Component : Wet-side HVAC, boilers, furnaces, atmospheric tanks and bins, chillers, water heaters, etc plus other mechanical components constructed of high-deformability materials.
Importance Factor (Ip) : 1.0
Component Amplification Factor (a_p) = 1 h= 15.7 feet
Comp Response Modification Factor (R_p) = 2.5 z= 50.0 feet z/h = 1.00
Over-Strength Factor (Ωo) = 2
$Fp = 0.4 a_p SdsIpWp(1+2z/h)/Rp$ = 0.404 Wp
not greater than $Fp = 1.6 SdsIpWp$ = 1.345 Wp
but not less than $Fp = 0.3 SdsIpWp$ = 0.252 Wp use Fp = 0.404 Wp

Prototype	41

Project No.	Sheet No:	Project Name:	Made By:	Date:
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CMU WALL DESIGN WORKSHEET

IBC 2012 (ACI 530-11)

Version 2.0

Wall Lateral Forces

Wall Location	14.50		Seismic	
Main Wall	Wall WL, Service =	13.3 psf	OOP Wall(serv.) 0.7*EQ =	0.235
Parapet Only	Parapet WL, Service =	22.3 psf	Parapet(serv.) 0.7*EQ =	0.404
DL= 25 psf	RoofLL= 20 psf		SL= 20 psf	

Wall Properties

CMU Density= 125 pcf

Masonry Inspection =	Y	Steel Mod. Of Elasticity, E_s=	29,000 ksi
Masonry, f'_m =	1,500 psi	Fm =	675 psi
Rebar yield strength, F_y=	60,000 psi	Fs =	32000 psi
Masonry Mod. Of Elasticity, E_m =	1,350 ksi	n = E_s/E_m =	21.48

General Wall Information												Seismic Loads		Roof Uniform Loads			Wall Properties								
Wall Location	Bearing Wall	Wind Girt Location	Top of Wall Elev.	Jst. Brg. Elev.	Roof Elev. h	Depth to T.O. Ftg h_f	Nominal Wall Thk. t	Rebar Location	Face Shell Thick. t_f	Depth to Rebar d	Wall Weight Wt	Wall EQ_w	Parapet EQ_p	DL wd	RLL wl	SL ws	Steel Ratio p	Radius of Gyration r	Eff. Wall Area A_w	k_1	k_1*d	j_1	k_2	k_2*d	j_2
	Y / N	Y / N	(ft)	(ft)	(ft)	(ft)	(in)	c/e/comp	(in)	(in)	(psf)	(psf)	(psf)	(plf)	(plf)	(plf)		(in)	(in^2)		(in)			(in)	
Front Wall	Y	N	26	21.63	22.04	1.33	12	Edge	1.25	8.875	72.45	17.03	29.27	102	141	141	0.001033	3.984073	195.8288	0.18963	1.68298	0.93679	0.19693	1.74776	0.93136

Project No.	Sheet No:	Project Name:	Made By:	Date:
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CMU WALL DESIGN WORKSHEET

Wall Location	Bending Forces												Rectangular Section Stresses				T-Beam Section Stresses				Applied Axial Stresses			Allow. Axial Stress	Axial Check
	Wind				Seismic				Roof Loads + Self Wt.				CMU Comp. Str.		Steel Stress		CMU Comp. Str.		Steel Stress		Roof Loads + Self Wt.				
	M_{span}	$M_{parapet}$	M_{max}	h_m	M_{span}	$M_{parapet}$	M_{max}	h_m	eccent. e	DL M_{roof}	RLL M_{roof}	SL M_{roof}	Wind f_{b1}	EQ f_{b1eq}	Wind f_{s1}	EQ f_{s1eq}	Wind f_{b2}	EQ f_{b2eq}	Wind f_{s2}	EQ f_{s2eq}	DL f_{ad}	RLL f_{al}	SL f_{as}	F_a	
	lb-ft	lb-ft	lb-ft	ft	lb-ft	lb-ft	lb-ft	ft	in.	lb-ft	lb-ft	lb-ft	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	psi	
Front Wall	3403	699	3403	16	4387	917	4387	16	4	136	188	188	122	157	11163	14391	128	165	11228	14475	26	3	3	280	O.K.

Project No.	Sheet No:	Project Name:	Made By:	Date:
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CMU WALL DESIGN WORKSHEET

Wall Location	Masonry Combined Stress Ratios Due to Axial & Bending						Steel Combined Stress Ratios Due to Axial Eccentric & Bending					
	DL+RLL	DL+SL	DL+WL	DL+EQ	DL+ 0.75WL+ .75(LorS)	DL+ 0.75EQ+ .75(LorS)	DL+RLL	DL+SL	DL+WL	DL+EQ	DL+ 0.75WL+ .75(LorS)	DL+ 0.75EQ+ .75(LorS)
Front Wall	0.060	0.060	0.232	0.287	0.191	0.233	0.033	0.033	0.358	0.459	0.277	0.353

Design Summary

Wall Location	Bar Spacing Sb (in)	Bar Size	Bar Area Ab (in^2)	Max CMU Stress Ratio	Max Steel Stress Ratio	Check	Does Parapet or Wall Control?
Front Wall	48	6	0.44	0.29	0.46	O.K.	Wall

Project No.	Project Name:	Made By:	Sheet No:
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JAMB DESIGN

		CMU Wall Details								Low Roof Loads			Jamb Details							Jamb Design Values			Final Design Check		
Calc #		Girt	CMU Wall Thick.	Rebar Size	Bar Spacing	CMU Wall Weight	Top of Wall El.	Roof El.	Top of Ftg El below FF	Low Roof Trib Width	Low Roof Drift Only	Add'l Wall Weight	Jamb Type	Jamb Reinf Location	1st Opening Width	2nd Opening Width	Top of Opening El.	Lintel End Brg.	Pier or End Jamb Width	# of Cells Grouted	# of Tension Bars	Jamb Rebar Size	Grout, Reinf, and Stress Design Check	Max CMU Stress Ratio	Max Steel Stress Ratio
	Wall Location	Y/N	in	#	in	psf	(ft)	(ft)	(ft.)	(ft)	(plf)	(plf)			(ft)	(ft)	(ft)	(in)	(ft)	n_c	n_b	#			
1	Front Wall	N	12	6	48	72.45	26.00	22.04	1.33				End	Edge	3.33		7.33	8.00	4.00	1	1	6	OK	0.37	0.64

Note: Parapet lateral trib is taken as the spacing of the wall reinforcement plus the spacing of the jamb bars, unless the height of the opening exceeds 75% of the height of the roof, in which case the lateral trib becomes half the spacing of the wall reinforcement plus the spacing of the jamb bars plus half the width of the opening

Note: Wall wind is used on the parapet when checking the wall moment, parapet wind is used on the parapet when checking the parapet moment

User Notes:
1. Number of Reinforced Cells should only include full height reinforcement.
2. Number of Grouted Cells should include grout below steel lintel bearing.
3. Pier or End Length should be the full width of masonry jamb and include any steel lintel bearing length (refer to diagrams below)
4. Jamb design assumes a uniform lateral trib on the jamb trib width.

Project No.	Project Name:	Made By:	Sheet No:
2401803139	Bakersfield, CA	ENGR	2

JAMB DESIGN

	Uniform Load											Wind Moment							Seismic Moment						
	Roof Loads			Wind				Seismic				Moment				Applied Location			Moment				Applied Location		
	DL	RLL	SL	w Jamb wall	w Jamb parapet	Rf	w Jamb parapet	eq Jamb wall	eq Jamb parapet	Rf	eq Jamb parapet	Opening Mopen	Span Mspan	Parapet Mparapet	Mwall Design	Xspan	Xpara	Xwall	Opening Mopen	Span Mspan	Parapet Mparapet	Mwall Design	Xspan	Xpara	Xwall
Location	(plf)	(plf)	(plf)	plf	plf	lb	plf	plf	plf	lb	plf	lb-ft	lb-ft	lb-ft	lb-ft	ft	ft	ft	lb-ft	lb-ft	lb-ft	lb-ft	ft	ft	ft
Front Wall	102	141	141	75.34	79.80	756	133.80	96.45	102.15	1093	175.62	4526	4802	1048	4802	11.37	23.37	11.37	5420	6192	1376	6192	11.33	23.37	11.33

Notes:
1. Girt uses a simple span condition with a reduced wall span (TOF to Roof) factor of 0.75.

Project No.	Project Name:	Made By:	Sheet No:
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JAMB DESIGN

	CMU Jamb Dimensions			Eff. Beam Width		Jamb Design Parameters				Area Calcs			CMU Wall Parameters										
	Block Thickness t_s	Faceshell Thickness t_f	Depth to Rebar d	At Opening b_o	Above Opening b_w	Trib Width at Opening Sw	Trib Width Above Roof Sp	X open	Jamb Width b	Wall Area Below A_o	Wall Area Above A_w	Steel Area A_s	Axial Jamb Width S_w	Wall Height above X h_m	Axial Load Below	Axial Load Above	Moment of Inertia I_{solid}	Moment of Inertia I_{hollow}	Wall Area Grouted A_{solid}	Wall Area Hollow A_{hollow}	Radius of Gyration		
																					I_{net}	A_{net}	Final r
Location	in	in	in	in	in	ft	ft	ft	ft	in^2	in^2	in^2	ft	ft	plf	plf	in^4	in^4	in^2	in^2	in^4	in^2	in
Front Wall	11.625	1.25	8.875	48	68	5.67	6.00	8.66	5.67	193	243	0.44	5.667	15.961	1454.6	1258.4	1571	971.5	139.5	53.1	51428	3240	3.98

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JAMB DESIGN

	Applied Axial Stresses						Allowable Axial Stress			Bending Stress Parameters						
	Opening			Wall							Wall		Opening			
	DL	RLL	SL	DL	RLL	SL				% Jamb reinf					Above Op. % Jamb Reinf	Below Op. % Jamb Reinf
	$fa\text{-}dl_o$	$fa\text{-}ll_o$	$fa\text{-}sl_o$	$fa\text{-}dl_w$	$fa\text{-}ll_w$	$fa\text{-}sl_w$	Fa_1	Fa_2	Fa	r	k_{1w}	$k_{1w}*d$	k_{1o}	$k_{1o}*d$	r_w	r_o
Location	psi	psi	psi	psi	psi	psi	psi	psi	psi	%/100		in		in	%/100	%/100
Front Wall	42.70	4.14	4.14	29.35	3.29	3.29	280	371	280	0.0007	0.1620	1.44	0.1896	1.68	0.0007	0.0010

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JAMB DESIGN

	Bending Stress - If $k_1d < t_f$										Bending Stress - If $k_1d >= t_f$ (T-Beam Condition)													
			Wind				Seismic										Wind				Seismic			
	Wall	Opening	CMU Comp.		Steel Stress		CMU Comp. Stress		Steel Stress		Wall			Opening			CMU Comp Stress		Steel Stress		CMU Comp Stress		Steel Stress	
	j_{1w}	j_{1o}	$fb1_w$	$fb1_o$	$fs1_w$	$fs1_o$	$fb1_w$	$fb1_o$	$fs1_w$	$fs1_o$	k_{2w}	$k_{2w} * d$	j_{2w}	k_{2o}	$k_{2o} * d$	j_{2o}	fb_{2w}	fb_{2o}	fs_{2w}	fs_{2o}	fb_{2w}	fb_{2o}	fs_{2w}	fs_{2o}
Location			psi	psi	psi	psi	psi	psi	psi	psi		in			in		psi	psi	psi	psi	psi	psi	psi	psi
Front Wall	0.946	0.937	140	162	15600	14847	181	194	20113	17778	0.163	1.451	0.931	0.197	1.748	0.931	144	170	15845	14933	186	204	20429	17882

Project No.	Project Name:	Project Name:	Made By:	Sheet No:
2401803139		Bakersfield, CA	ENGR	6

JAMB RESULTS

	Applied Bending Stresses								Final Design Stress Ratios																			
	Wind				Seismic				Axial Stress Ratio		Masonry Combined Stress Ratios Due to Axial and Bending Loads														Steel Stress Ratios				
	CMU Comp Stress		Steel Stress		CMU Comp Stress		Steel Stress		DL+RLL/SL		LOAD CASE 1		LOAD CASE 2		LOAD CASE 3		LOAD CASE 4		LOAD CASE 5		LOAD CASE 6		Wind		EQ		Stress Design Check
	fb_w	fb_o	fsw	fso	fb_w	fb_o	fsw	fso																				
Location	psi	psi	psi	psi	psi	psi	psi	psi	WALL	OPEN.	WALL	OPEN.	WALL	OPEN.	WALL	OPEN.	WALL	OPEN.	WALL	OPEN.	WALL	OPEN.	WALL	OPEN.	WALL	OPEN	
Front Wall	144	170	15845	14933	186	204	20429	17882	0.116	0.167	0.048	0.069	0.048	0.069	0.257	0.316	0.319	0.366	0.207	0.257	0.301	0.340	0.495	0.467	0.638	0.559	OK

Project No.	Project Name:	Made By:	Sheet No:
2401803139	Bakersfield, CA	ENGR	7

JAMB SUPPORT DATA & DETAILS

Applied Loads

Roof DL =	25.00	psf
Roof LL =	20.00	psf
Roof SL =	20.00	psf

Wall Lateral Forces

Wall WL, Service =	13.3	psf
Parapet WL, Service =	22.3	psf
OOP Wall(serv.) 0.7*EQ =	0.235	*weight
Parapet(serv.) 0.7*EQ =	0.404	*weight

Wall Properties

Masonry Inspection =	Y	y/n
Masonry, f'_m =	1,500	psi
Rebar yield strength, F_y=	60,000	psi
Masonry Mod. Of Elasticity, E_m =	1,350	ksi
Steel Mod. Of Elasticity, E_s=	29,000	ksi

Fm =	675	psi
Fs =	32000	psi
n = E_s/E_m =	21.48	

Reinforcing Bar Properties

size	area
4	0.20 in^2
5	0.31 in^2
6	0.44 in^2
7	0.60 in^2
8	0.79 in^2

Wall Thickness Properties

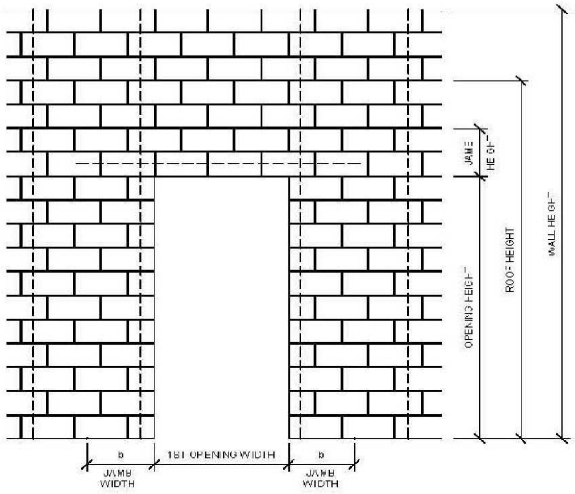
Unit	tf	d(edge)	d(center)	Isolid	Ihollow	Asolid	Ahollow	ta
6	1.00	2.875	2.813	178	139.3	67.5	32.2	5.625
8	1.25	4.875	3.813	443.3	334	91.5	41.5	7.625
10	1.25	6.875	4.813	891.7	606.3	115.5	48	9.625
12	1.25	8.875	5.813	1571	971.5	139.5	53.1	11.625

Jamb Schedule - Double Bars

Wall Thick.	Opening Width	Jamb Width
8 in	0.00 ft	8 in
8 in	0.00 ft	16 in
8 in	0.00 ft	24 in
12 in	3.33 ft	8 in
12 in	10.00 ft	16 in
12 in	10.00 ft	24 in

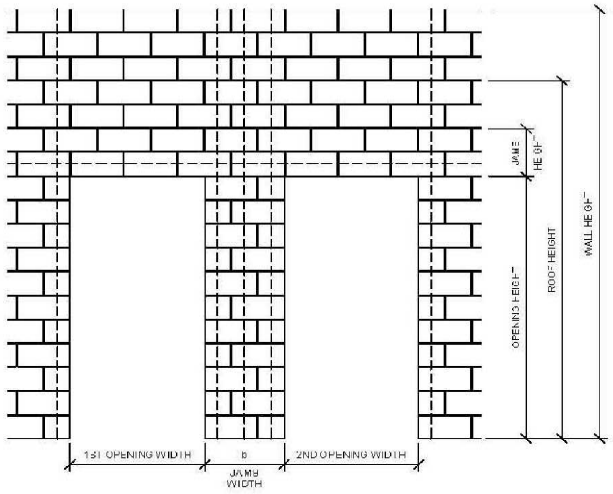
Load Combinations

1	1.00	DL	1.00	RLL	0.00	SL	0.00	WL	0.00	EQ
2	1.00	DL	0.00	RLL	1.00	SL	0.00	WL	0.00	EQ
3	1.00	DL	0.00	RLL	0.00	SL	1.00	WL	0.00	EQ
4	1.00	DL	0.00	RLL	0.00	SL	0.00	WL	1.00	EQ
5	1.00	DL	0.75	RLL	0.75	SL	0.75	WL	0.00	EQ
6	0.60	DL	0.00	RLL	0.00	SL	0.00	WL	1.00	EQ



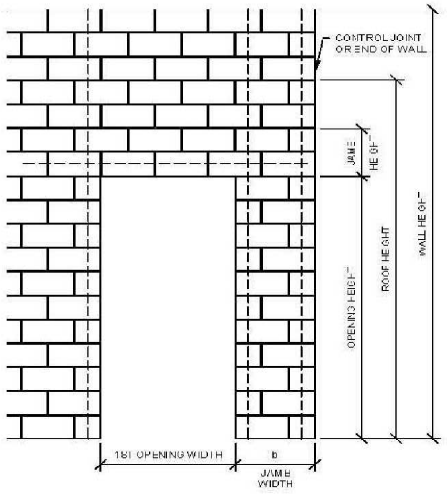
JAMB

(TYPICAL WALL JAMB CONDITION AWAY FROM CONTROL JOINTS OR END OF WALL)



PIER

(WALL JAMB CONDITION WITH OPENINGS ON BOTH SIDE)



END

(WALL JAMB CONDITION WITH CONTROL JOINT OR END OF WALL AT ONE SIDE)

Project No.	Project Name:	Made By:	Sheet No:
2401803139	Bakersfield, CA	ENGR	1

LINTEL DESIGN

	CMU Wall Details					Low Roof Loads			Jamb Details				Lintel Details										Final Design Check				
	Girt	CMU Wall Thick.	CMU Wall Weight	Top of Wall El.	Roof El.	Low Roof Trib Width	Low Roof Drift Only	Add'l Wall Weight	1st Opening Width	2nd Opening Width	Top of Opening El.	Lintel End Brg.	Lintel Type	Lintel Depth	Horiz Reinf Size	# of Bottom Reinf Bars	# of Top Reinf Bars	Bottom Reinf Bar Clearance	Arching Action Eligible	Include Arching Action	Check Lateral Loads	Defl. Limit Vert	Defl. Limit Horiz	CMU	Steel	Shear	Steel Deflect	Design Check
Wall Location	Y/N	in	psf	ft	ft	ft	plf	plf	ft	ft	ft	in		in	#			in	Yes/No	Yes/No	Yes/No	L/x	L/x					
Front Wall	N	12	72.45	26.00	22.04	0.00	0	0	3.33	0.00	7.33	8.00	W8X24						Yes	No	Yes	600	600	0.00	0.07	0.00	OK	OK

Notes:
1. Girt uses a simple span condition equal to the wall span (TOF to Roof) multipled by a factor of 0.75.
2. Lintel lateral trib assumes 1/2 height of wall trib (TOF to Roof) trib to lintel in lateral direction.
3. Steel lintels are assumed to be braced at the mid-span for design.

Notes:
4. Deflection is only checked for steel lintels.
5. Shear is only checked for Masonry Lintels
6. Refer to page 7 for load combinations.

Project No.	Project Name:	Made By:	Sheet No:
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LINTEL LOAD ANALYSIS

	Lintel Dead Load			Lintel Uniform Load														
				High & Low Roof Loads			Vertical Dead Load			Vertical Live/Snow Load			Horizontal Wind Load			Horizontal Seismic Load		
	Effective Span	Lintel Weight DL	Wall Weight DL	DL	RLL	SL	DL Vert	DL Mspan	DL Vspan	LL/SL Vert	LL/SL Mspan	LL/SL Vspan	WL Horiz	WL Mspan	WL Vspan	EQ Horiz	EQ Mspan	EQ Vspan
Location	ft	plf	plf	plf	plf	plf	plf	lb-ft	lb	plf	lb-ft	lb	plf	lb-ft	lb	plf	lb-ft	lb
Front Wall	4.00	24	1353	102	141	141	1479	2953	2955	141	282	282	147	293	293	188	375	375

Project No.	Project Name:	Made By:	Sheet No:
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STEEL LINTEL DESIGN

	Steel Beam Bending																										Steel Deflection					
	Unbraced Length & Flange Compactness						Steel Section Properties													Moment Capacities (Cb = 1.3)										Deflection			
	L_b	Lp	Lr	λ	λpf	λft	bf	tf	Z_{xx}	S_{xx}	I_{xx}	Z_{yy}	S_{yy}	I_{yy}	r_y	rts	h0	Jc	Cw	Fcr xx	Mn/Ω (F2-1)	Mn/Ω (F2-2)	Mn/Ω (F2-3)	Mn/Ω (F3-1)	Mn/Ω (F6-1)	Mn/Ω (F6-2)	Mnx allow	Mny allow	$D_{x\,Max}$	$D_{y\,Max}$	DL Vert Δ	LL/SL Vert Δ	WL Vert Δ	EQ Vert Δ
Location	in	in	in				in	in	in^3	in^3	in^4	in^3	in^3	in^4	in	in	in	in^4	in^6	ksi	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	kip-ft	in	in	in	in	in	in
Front Wall	24.0	68.2	227.7	8.12	9.15	24.08	6.50	0.40	23.10	20.90	83	8.57	5.63	18.30	1.61	1.81	7.53	0.35	259	#####	57.6	82.6	2255.9	59.1	21.38	22.18	57.63	21.38	0.08	0.08	0.0035	0.0003	0.0016	0.0020

Project No.	Project Name:	Made By:	Sheet No:
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LINTEL DESIGN RESULTS

	Final Design																										
	Combined Stress Ratios with Load Combinations																										
	LOAD COMBINDATION 1					LOAD COMBINDATION 2					LOAD COMBINDATION 3					LOAD COMBINDATION 4					LOAD COMBINDATION 5					LOAD COMBINDATION 6				
Location	CMU	Steel	Shear	Vert Δ	Horiz Δ	CMU	Steel	Shear	Vert Δ	Horiz Δ	CMU	Steel	Shear	Vert Δ	Horiz Δ	CMU	Steel	Shear	Vert Δ	Horiz Δ	CMU	Steel	Shear	Vert Δ	Horiz Δ	CMU	Steel	Shear	Vert Δ	Horiz Δ
Front Wall		0.05		0.00	0.00		0.06		0.00	0.00		0.07		0.00	0.00		0.06		0.00	0.00		0.07		0.00	0.00		0.05		0.00	0.00

Project No.	Project Name:	Made By:	Sheet No:
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LINTEL SUPPORT DATA & DETAILS

Applied Loads

Roof DL =	25.00	psf
Roof LL =	20.00	psf
Roof SL =	20.00	psf

Wall Lateral Forces

Wall WL, Service =	13.3	psf
Parapet WL, Service =	22.3	psf
OOP Wall(serv.) 0.7*EQ =	0.235	*weight
Parapet(serv.) 0.7*EQ =	0.404	*weight

Wall Properties

Masonry Inspection =	Y	y/n
Masonry, f_m =	1,500	psi
Rebar yield strength, F_y=	60,000	psi
Masonry Mod. Of Elasticity, E_m =	1,350	ksi
Steel Mod. Of Elasticity, E_s=	29,000	ksi

Fm =	675	psi
Fs =	32000	psi
Fv =	38.7	psi
n = E_s/E_m =	21.48	

Reinforcing Bar Properties

size	area
4	0.20 in^2
5	0.31 in^2
6	0.44 in^2
7	0.60 in^2
8	0.79 in^2

Wall Thickness Properties

Unit	tf	d(edge)	d(center)	Isolid	Ihollow	Asolid	Ahollow	ta	Wsolid
	in	in	in	in^4	in^4	in^2	in^2	in	psf
6	1.00	2.875	2.813	178	139.3	67.5	32.2	5.625	63
8	1.25	4.875	3.813	443.3	334	91.5	41.5	7.625	84
10	1.25	6.875	4.813	891.7	606.3	115.5	48	9.625	104
12	1.25	8.875	5.813	1571	971.5	139.5	53.1	11.625	133

Steel Design Properties

F_y =	50.00	ksi
C_b =	1.00	

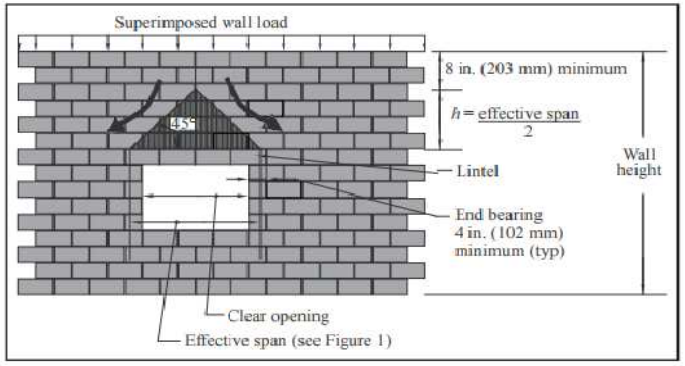
Load Combinations

1	1.00	DL	0.00	RLL/SL	0.00	WL	0.00	EQ
2	1.00	DL	1.00	RLL/SL	0.00	WL	0.00	EQ
3	1.00	DL	0.75	RLL/SL	0.75	WL	0.00	EQ
4	1.00	DL	0.00	RLL/SL	1.00	WL	0.00	EQ
5	1.00	DL	0.00	RLL/SL	0.00	WL	1.00	EQ
6	0.60	DL	0.00	RLL/SL	0.00	WL	1.00	EQ

Lintel Schedule

Wall Thick.	Opening Width	Lintel Depth	Bottom Reinf	Top Reinf
8 in	0.00 ft	16 in	(0) #6	(0) #6
8 in	0.00 ft	32 in	(0) #6	(0) #6
12 in	0.00 ft	16 in	(0) #6	(0) #6
12 in	0.00 ft	32 in	(0) #6	(0) #6
	0.00 ft		(0) #6	(0) #6
	0.00 ft		(0) #6	(0) #6

Masonry Lintel Arching Diagram



This program uses the roof height for the wall height when checking arching. When arching is selected roof loads are neglected.

General Wall Information										Roof Uniform Loads									Grid A-D slope	0.0210		
Wall Location	Bearing Wall Y / N	Wind Girt Location Y / N	Top of Wall Elev. (ft)	Jst. Brg. Elev. (ft)	Roof Elev. h (ft)	Parapet Height h (ft)	Depth to T.O. Ftg h_f (ft)	Nominal Wall Thk. t (in)	Rebar Location c/e/comp	DL wd (plf)	RLL wl (plf)	SL ws (plf)	Bar Spacing Sb (in)	Bar Size	Max CMU Stress Ratio	Max Steel Stress Ratio	Check	Does Parapet or Wall Control?	Individual Panels			
																			Panel Length	Beginning Jst Brg.	Ending Jst Brg.	Average Jst Brg.
Front Wall	Y	N	26.00	21.63	22.04	3.96	1.33	12	Edge	102	141	141	48	6	0.29	0.46	O.K.	Wall				21.625
Interior Wall	Y	N	21.93	21.33	21.75	0.18	0.00	12	Edge	102	141	141	48	6	0.26	0.42	O.K.	Wall				21.33

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Jamb Lintel.ec6

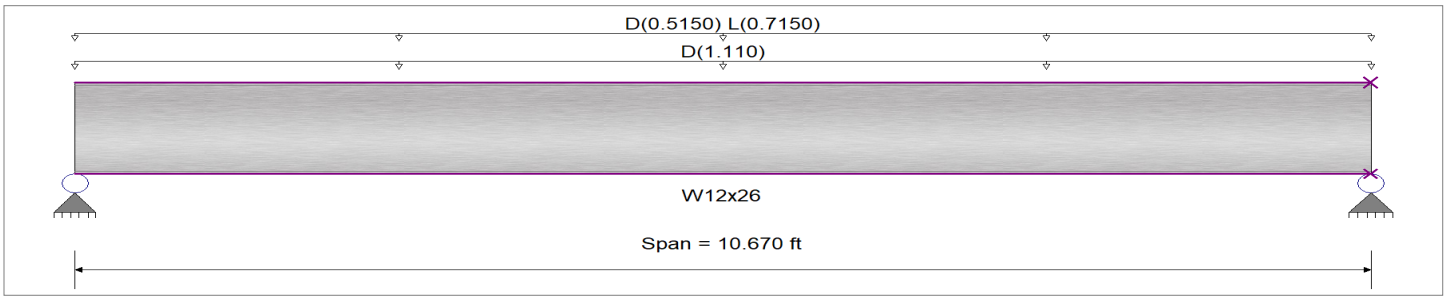
DESCRIPTION: --None--

CODE REFERENCES

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

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	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
Uniform Load : D = 1.110 k/ft, Tributary Width = 1.0 ft

Uniform Load : D = 0.5150, L = 0.7150 k/ft, Tributary Width = 1.0 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.359 : 1	Maximum Shear Stress Ratio =	0.222 : 1
Section used for this span	W12x26	Section used for this span	W12x26
Ma : Applied	33.301 k-ft	Va : Applied	12.484 k
Mn / Omega : Allowable	92.814 k-ft	Vn/Omega : Allowable	56.120 k
Load Combination	+D+L	Load Combination	+D+L
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.035 in	Ratio =	3,616	>=360	Span: 1 : L Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.116 in	Ratio =	1105	>=600.	Span: 1 : +D+L
Max Upward Total Deflection	0 in	Ratio =	0	<600.0	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 10.67 ft	1	0.249	0.154	23.13		23.13	155.00	92.81	1.00	1.00	8.67	84.18 56.12
+D+L												
Dsgn. L = 10.67 ft	1	0.359	0.222	33.30		33.30	155.00	92.81	1.00	1.00	12.48	84.18 56.12
+D+0.750L												
Dsgn. L = 10.67 ft	1	0.331	0.205	30.76		30.76	155.00	92.81	1.00	1.00	11.53	84.18 56.12
+0.60D												
Dsgn. L = 10.67 ft	1	0.149	0.093	13.88		13.88	155.00	92.81	1.00	1.00	5.20	84.18 56.12

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+L	1	0.1159	5.365		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	12.484	12.484
Max Upward from Load Combinations	12.484	12.484
Max Upward from Load Cases	8.669	8.669
D Only	8.669	8.669
+D+L	12.484	12.484

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Jamb Lintel.ec6

DESCRIPTION: --None--

Vertical Reactions

Support notation : Far left is #' Values in KIPS

Load Combination	Support 1	Support 2
+D+0.750L	11.530	11.530
+0.60D	5.202	5.202
L Only	3.815	3.815

EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

Current Building Code: 2018 IBC

Notes & Comments

-
-
-
-

Conclusions

- Shear reinf left end :
- Shear reinf right end :
- Moment reinf :
-

General and Design Information

Key Plan Mark/Reference =	
Left/Front Reference =	
Right/Rear Reference =	
Tributary Width (ft) =	6.19
Joist Depth (inches) =	24
Span (ft) =	48
% End Reaction for Min. Shear =	25%
Allowable Overstress (AOS) =	5%
No Stress Reference =	120%
Total Trib (sqft) =	297
Reduced Roof Live Load =	18.06
Use LL reduction?	y

Deflection Check

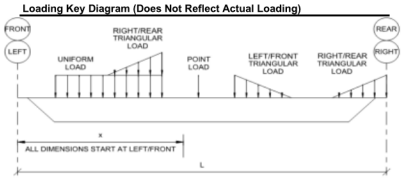
E (ksi) =	29000
I (in^4) =	290
Approx. Original Deflection (in) =	3.69
Approx. New Deflection (in) =	3.71
Approx. Deflection Ratio = L/	155

Results Summary at Each End, Maximum Moment, and User-Specified Locations

No.	Location from L/F (ft)	Original Shear (k)	Original Shear w/ AOS (k)	New Shear (k) & (U.C.)	Original Moment (k-ft)	Orig. Moment w/ AOS (k-ft)	New Moment (k-ft) & (U.C.)
L/F	0	6.24	6.55	7.06 (1.131)	-	-	-
R/R	48	-6.24	-6.55	-6.16 (0.988)	-	-	-
MNT	24 & 23.76	-	-	-	74.9	78.6	74.9 (1)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Note: Maximum allowable overstress (AOS) in gravity members is defined per the applicable building code

Loading Key Diagram (Does Not Reflect Actual Loading)



Maximum Stress Ratios

Shear: UC = 1.156 at 3.36 ft
Moment: UC = 1 at 23.76 ft

Maximum Added Forces

Shear: 0.84 kips at 3.36 ft
Moment: 0 ft-kips at 23.76 ft

Original Loading ("As-Built", "As-Designed", or "In-Place" Capacity)

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1			
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End
1	Original TL	0.26	0	48
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0.26		

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

New Loading

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1		1.04	3.4
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

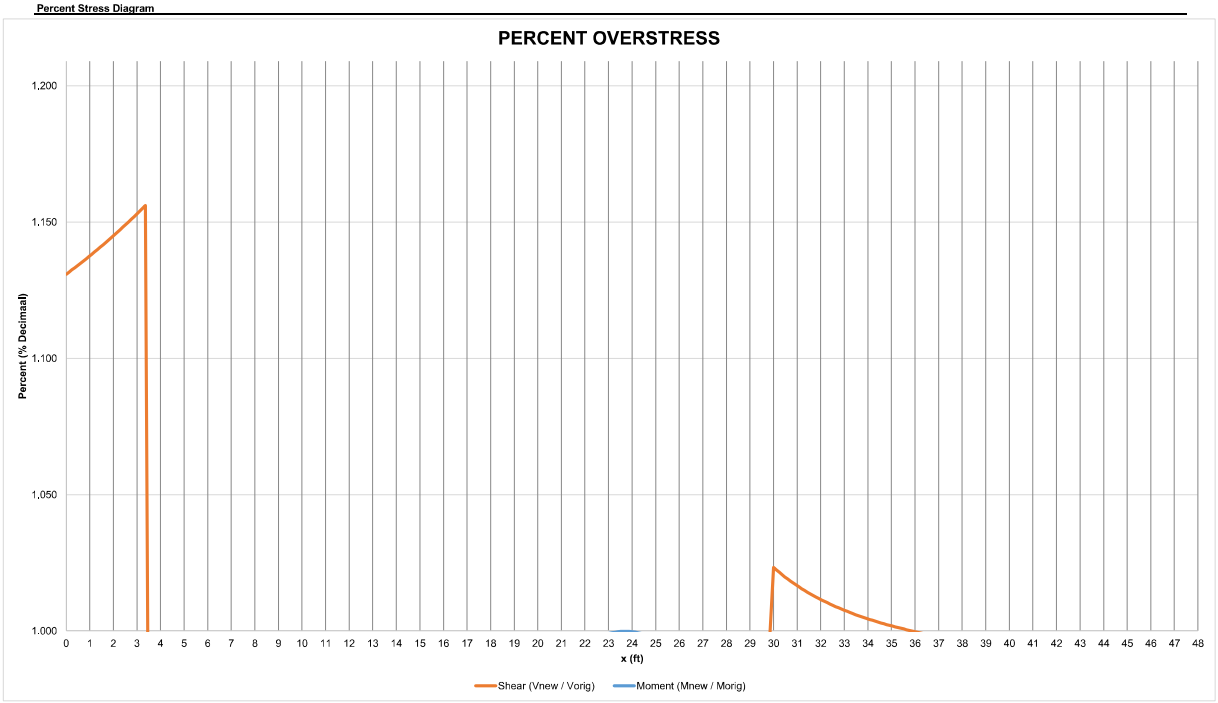
Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End	
1		0.099	0	48	16 psf DL
2		0.155	0	48	25 psf SL
3					
4					
5					
6					
7					
8					
9					
10					
		0.254			

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Percent Stress Diagram



EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

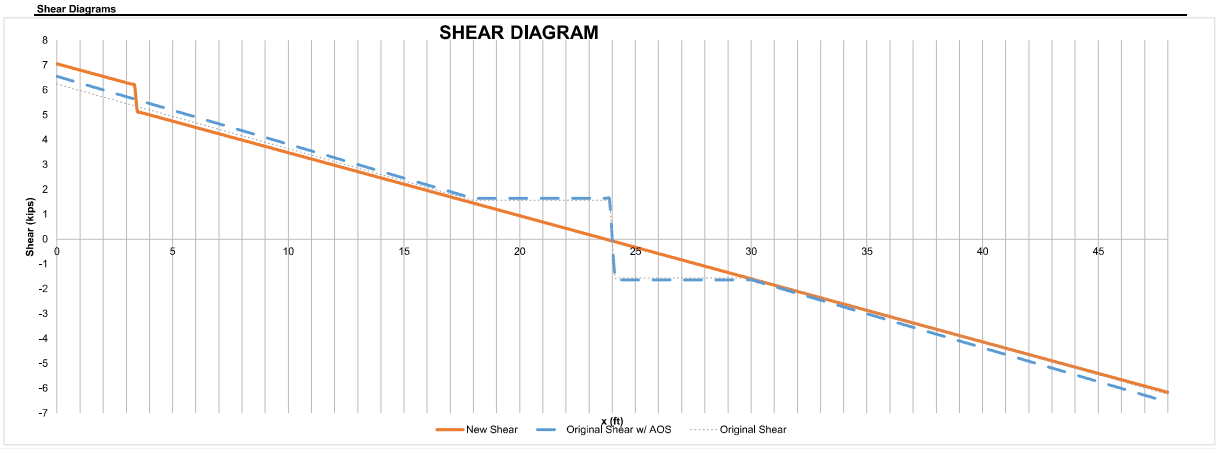
Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

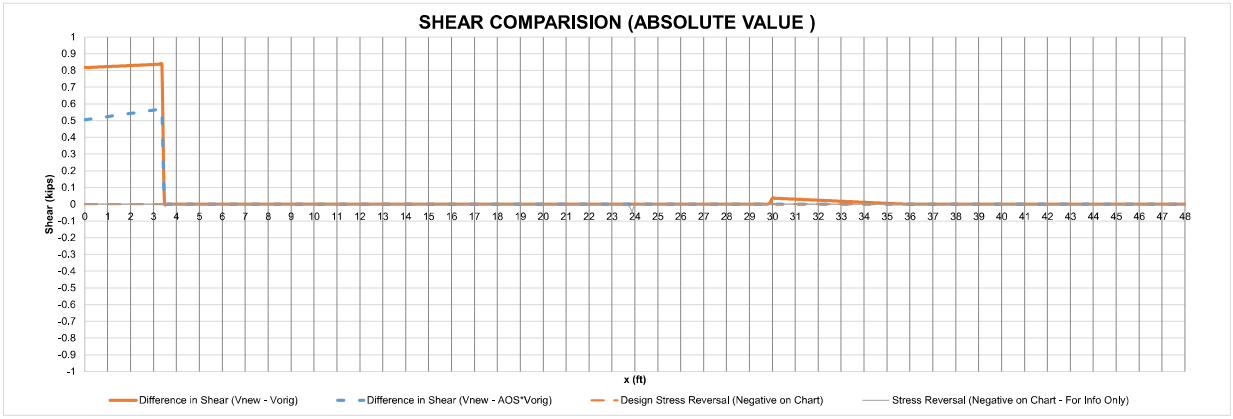
ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

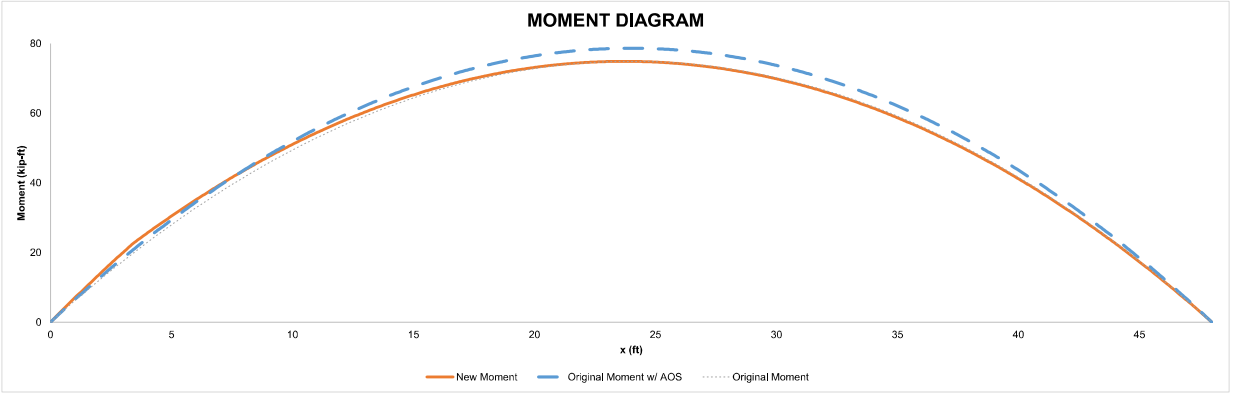
Current Building Code: 2018 IBC

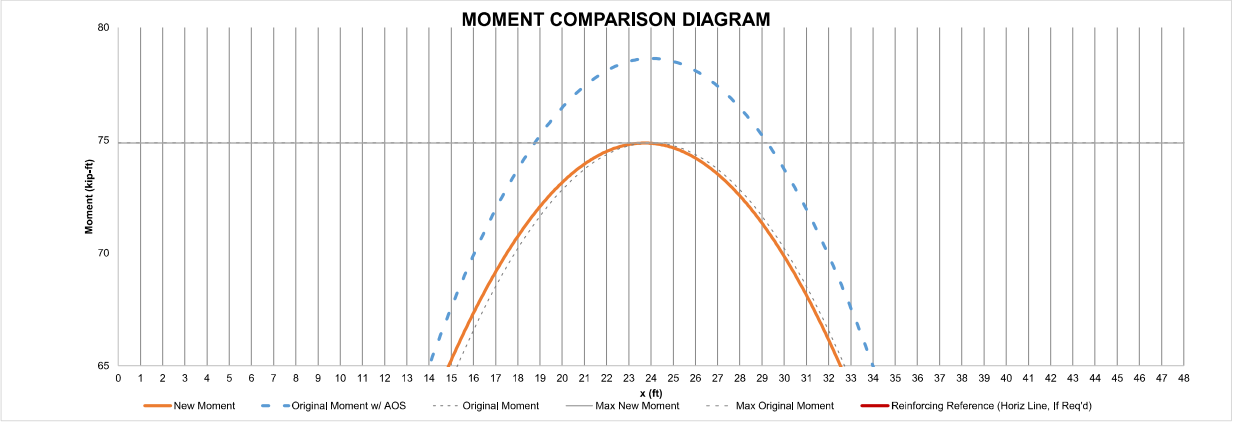
Shear Diagrams





Moment Diagrams





EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

Current Building Code: 2018 IBC

Notes & Comments

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Conclusions

- Shear reinf left end :
- Shear reinf right end :
- Moment reinf :
-

General and Design Information

Key Plan Mark/Reference =	
Left/Front Reference =	
Right/Rear Reference =	
Tributary Width (ft) =	6.19
Joist Depth (inches) =	24
Span (ft) =	48
% End Reaction for Min. Shear =	25%
Allowable Overstress (AOS) =	5%
No Stress Reference =	120%
Total Trib (sqft) =	297
Reduced Roof Live Load =	18.06
Use LL reduction?	y

Deflection Check

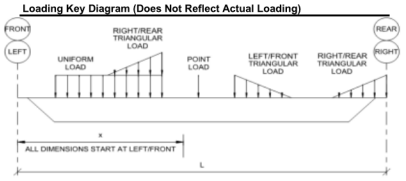
E (ksi) =	29000
I (in^4) =	290
Approx. Original Deflection (in) =	3.69
Approx. New Deflection (in) =	3.66
Approx. Deflection Ratio = L/	158

Results Summary at Each End, Maximum Moment, and User-Specified Locations

No.	Location from L/F (ft)	Original Shear (k)	Original Shear w/ AOS (k)	New Shear (k) & (U.C.)	Original Moment (k-ft)	Orig. Moment w/ AOS (k-ft)	New Moment (k-ft) & (U.C.)
L/F	0	6.24	6.55	6.57 (1.054)	-	-	-
R/R	48	-6.24	-6.55	-6.13 (0.983)	-	-	-
MNT	24 & 23.88	-	-	-	74.9	78.6	74.0 (0.988)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Note: Maximum allowable overstress (AOS) in gravity members is defined per the applicable building code

Loading Key Diagram (Does Not Reflect Actual Loading)



Maximum Stress Ratios

Shear: UC = 1.066 at 3.36 ft
Moment: UC = 0.988 at 23.88 ft

Maximum Added Forces

Shear: 0.36 kips at 3.36 ft
Moment: 0 ft-kips at 23.88 ft

Original Loading ("As-Built", "As-Designed", or "In-Place" Capacity)

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1			
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End
1	Original TL	0.26	0	48
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0.26		

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

New Loading

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1		0.52	3.4
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

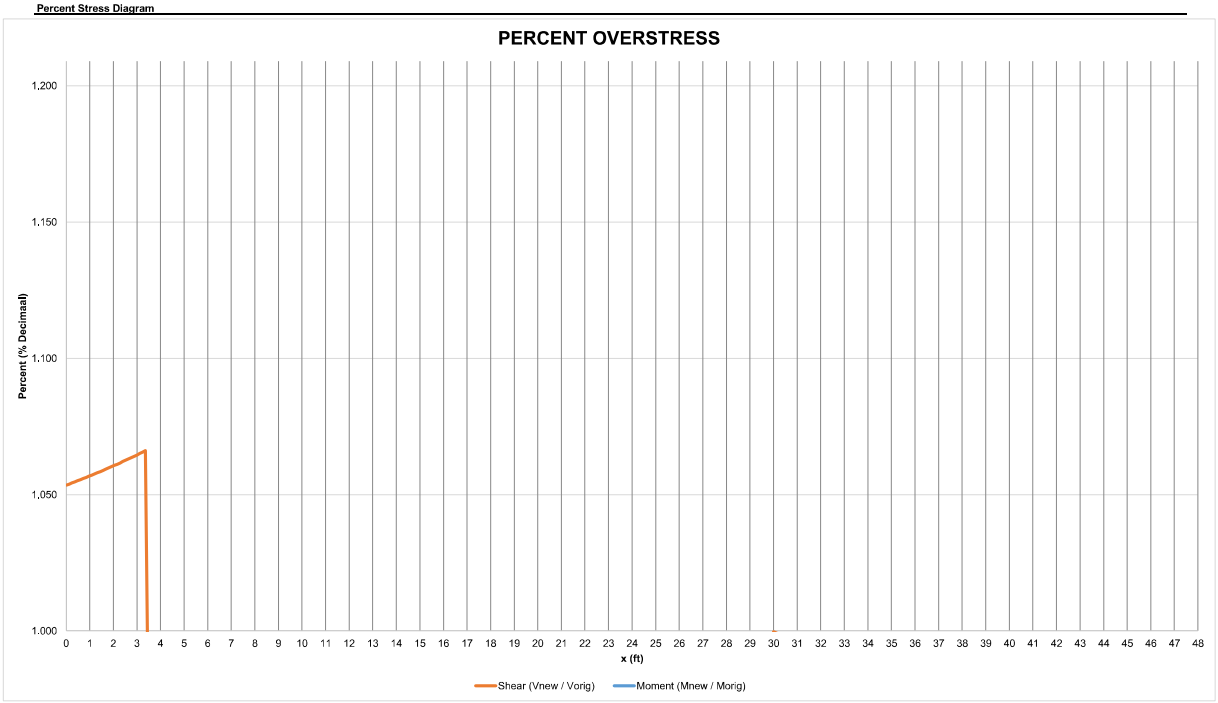
Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End	
1		0.099	0	48	16 psf DL
2		0.155	0	48	25 psf SL
3					
4					
5					
6					
7					
8					
9					
10					
		0.254			

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Percent Stress Diagram



EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

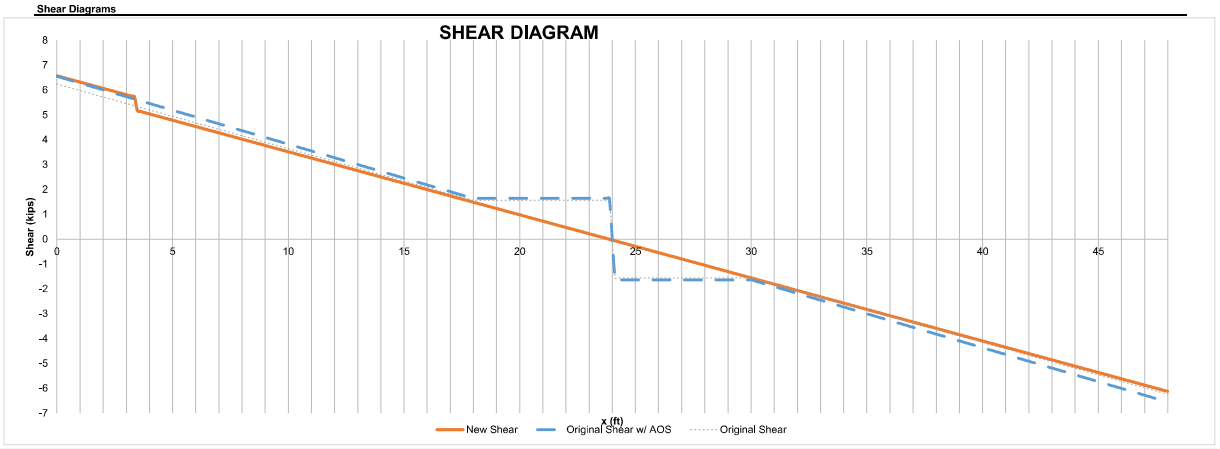
Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

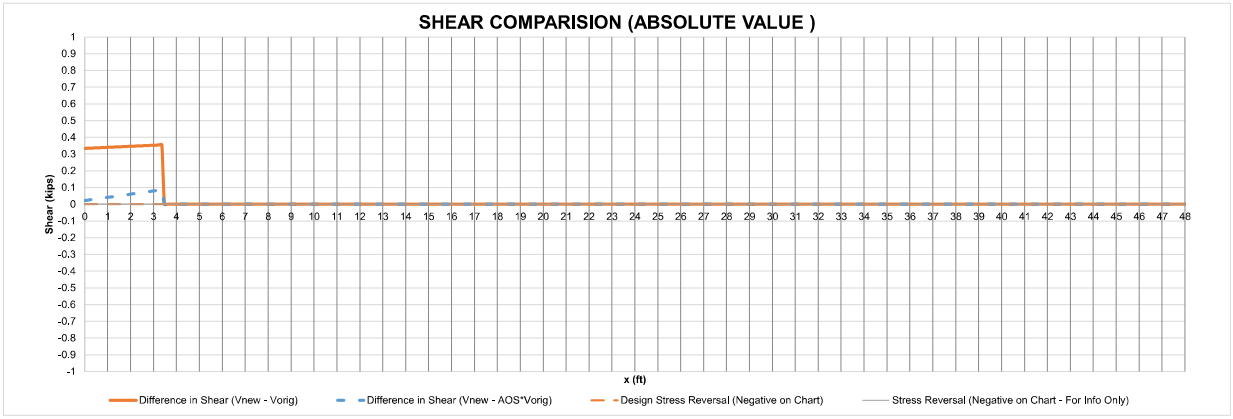
ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

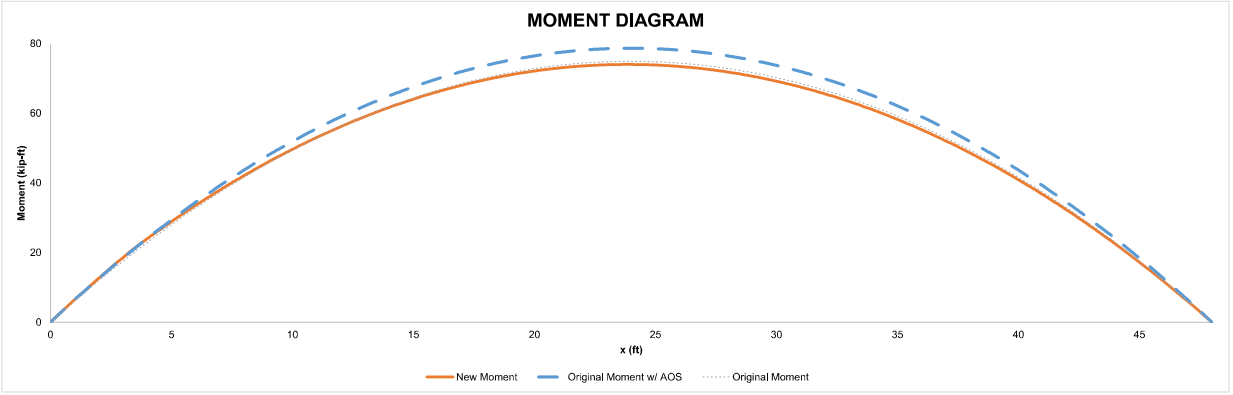
Current Building Code: 2018 IBC

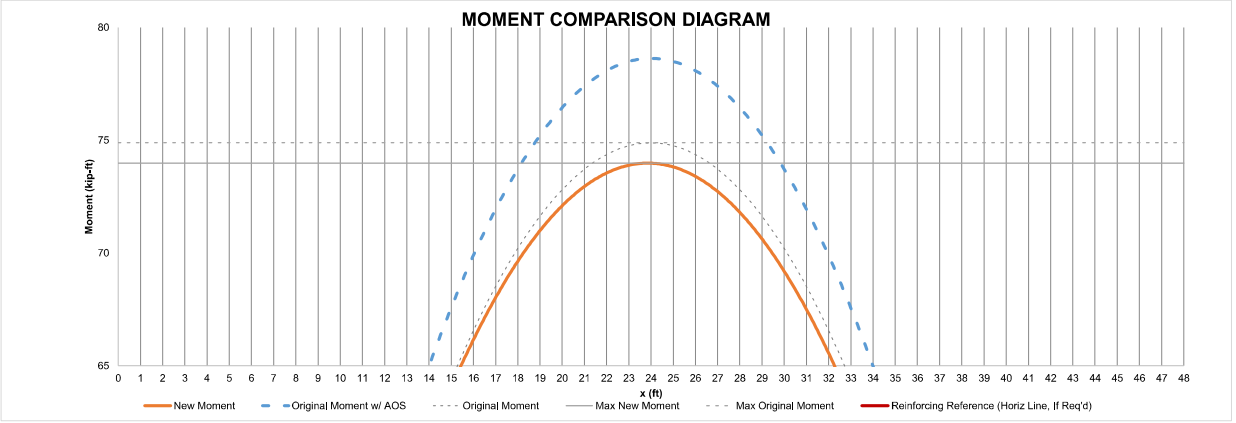
Shear Diagrams





Moment Diagrams





EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

Current Building Code: 2018 IBC

Notes & Comments

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Conclusions

- Shear reinf left end :
- Shear reinf right end :
- Moment reinf :
-

General and Design Information

Key Plan Mark/Reference =	
Left/Front Reference =	
Right/Rear Reference =	
Tributary Width (ft) =	5.76
Joist Depth (inches) =	24
Span (ft) =	48
% End Reaction for Min. Shear =	25%
Allowable Overstress (AOS) =	5%
No Stress Reference =	120%
Total Trib (sqft) =	276
Reduced Roof Live Load =	18.47
Use LL reduction?	y

Deflection Check

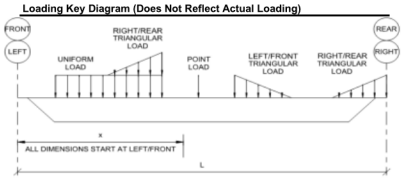
E (ksi) =	29000
I (in^4) =	290
Approx. Original Deflection (in) =	3.69
Approx. New Deflection (in) =	3.46
Approx. Deflection Ratio = L/	167

Results Summary at Each End, Maximum Moment, and User-Specified Locations

No.	Location from L/F (ft)	Original Shear (k)	Original Shear w/ AOS (k)	New Shear (k) & (U.C.)	Original Moment (k-ft)	Orig. Moment w/ AOS (k-ft)	New Moment (k-ft) & (U.C.)
L/F	0	6.24	6.55	6.63 (1.064)	-	-	-
R/R	48	-6.24	-6.55	-5.74 (0.921)	-	-	-
MNT	24 & 23.64	-	-	-	74.9	78.6	69.8 (0.933)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Note: Maximum allowable overstress (AOS) in gravity members is defined per the applicable building code

Loading Key Diagram (Does Not Reflect Actual Loading)



Maximum Stress Ratios

Shear: UC = 1.088 at 3.36 ft
Moment: UC = 0.932 at 23.64 ft

Maximum Added Forces

Shear: 0.48 kips at 3.36 ft
Moment: 0 ft-kips at 23.64 ft

Original Loading ("As-Built", "As-Designed", or "In-Place" Capacity)

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1			
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End
1	Original TL	0.26	0	48
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0.26		

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

New Loading

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1		1.04	3.4
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

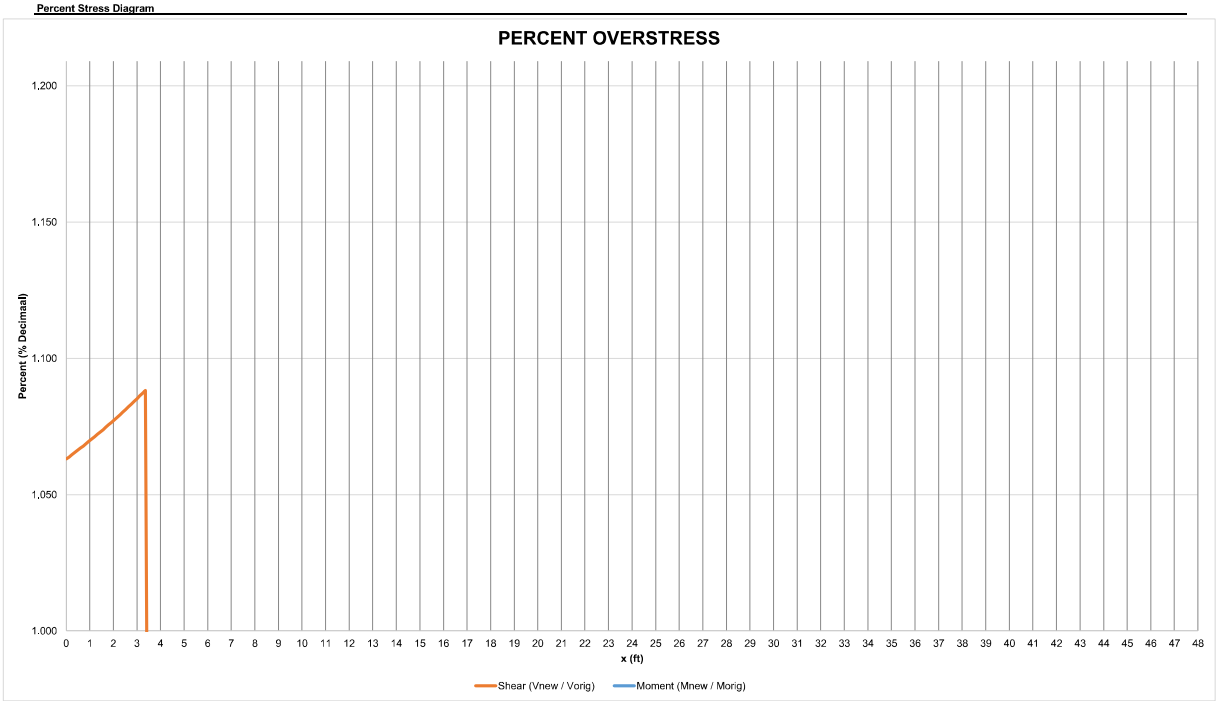
Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End	
1		0.092	0	48	16 psf DL
2		0.144	0	48	25 psf SL
3					
4					
5					
6					
7					
8					
9					
10					
		0.236			

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Percent Stress Diagram



EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

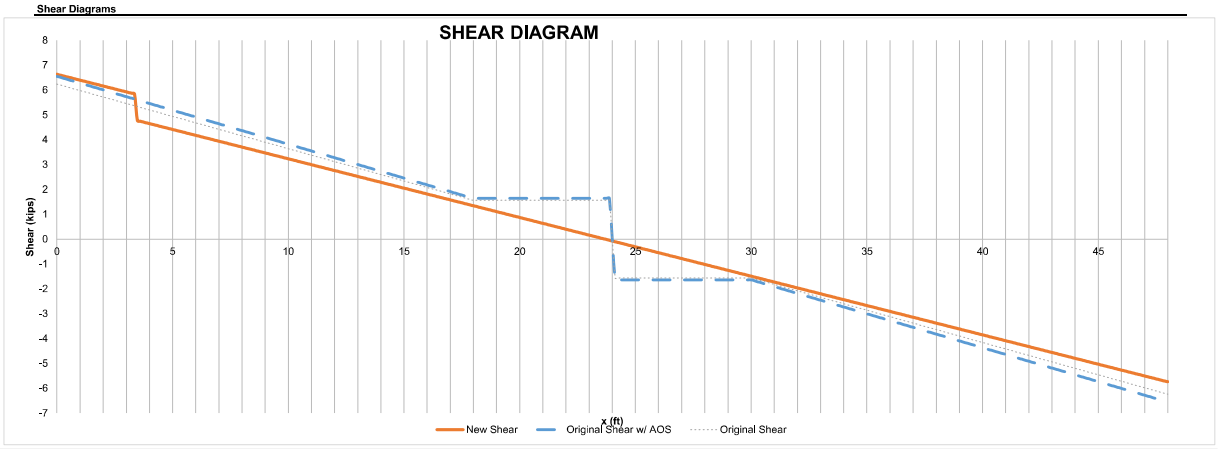
Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

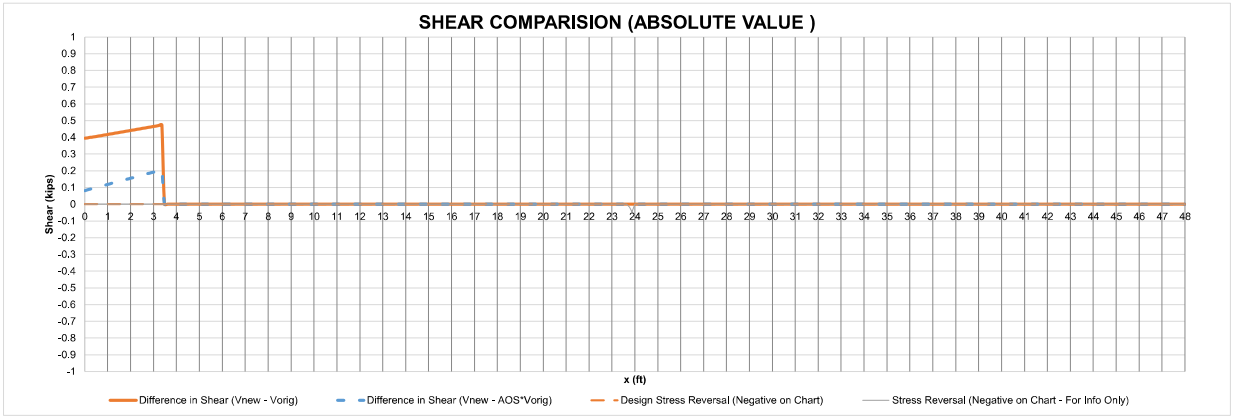
ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

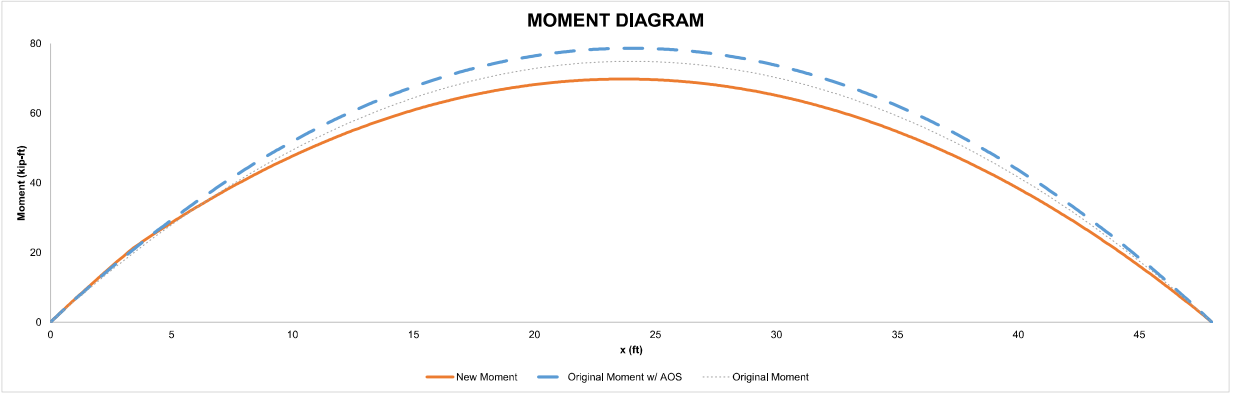
Current Building Code: 2018 IBC

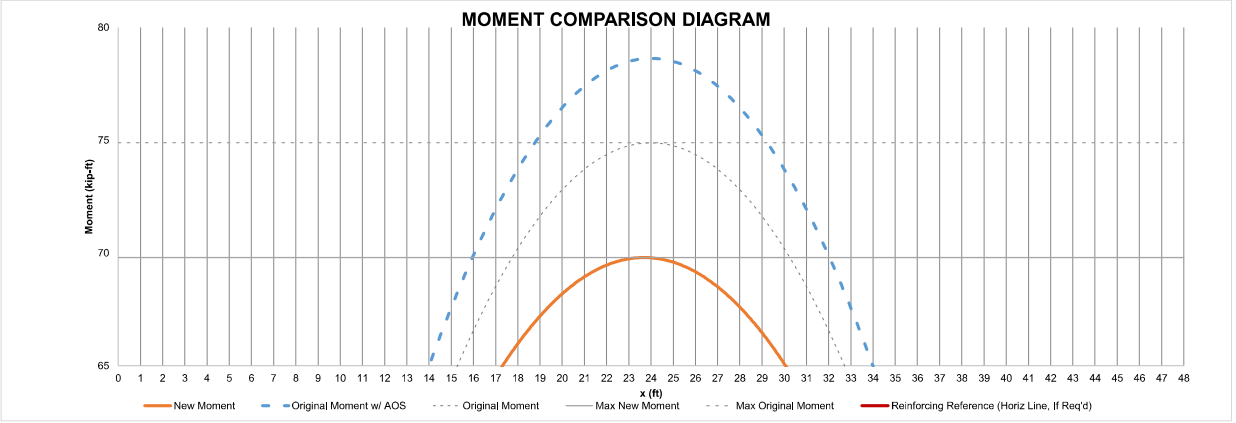
Shear Diagrams





Moment Diagrams





EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

Current Building Code: 2018 IBC

Notes & Comments

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Conclusions

- Shear reinf left end :
- Shear reinf right end :
- Moment reinf :
-

General and Design Information

Key Plan Mark/Reference =	
Left/Front Reference =	
Right/Rear Reference =	
Tributary Width (ft) =	5.76
Joist Depth (inches) =	24
Span (ft) =	48
% End Reaction for Min. Shear =	25%
Allowable Overstress (AOS) =	5%
No Stress Reference =	120%
Total Trib (sqft) =	276
Reduced Roof Live Load =	18.47
Use LL reduction?	y

Deflection Check

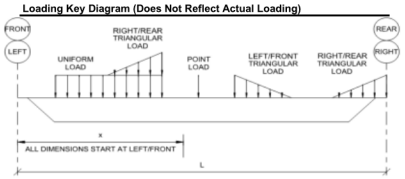
E (ksi) =	29000
I (in^4) =	290
Approx. Original Deflection (in) =	3.69
Approx. New Deflection (in) =	3.41
Approx. Deflection Ratio = L/	169

Results Summary at Each End, Maximum Moment, and User-Specified Locations

No.	Location from L/F (ft)	Original Shear (k)	Original Shear w/ AOS (k)	New Shear (k) & (U.C.)	Original Moment (k-ft)	Orig. Moment w/ AOS (k-ft)	New Moment (k-ft) & (U.C.)
L/F	0	6.24	6.55	6.15 (0.986)	-	-	-
R/R	48	-6.24	-6.55	-5.70 (0.915)	-	-	-
MNT	24 & 23.88	-	-	-	74.9	78.6	68.9 (0.921)
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							

Note: Maximum allowable overstress (AOS) in gravity members is defined per the applicable building code

Loading Key Diagram (Does Not Reflect Actual Loading)



Maximum Stress Ratios

Shear: UC = 0.998 at 3.36 ft
Moment: UC = 0.92 at 23.88 ft

Maximum Added Forces

Shear: 0 kips at 0 ft
Moment: 0 ft-kips at 23.88 ft

Original Loading ("As-Built", "As-Designed", or "In-Place" Capacity)

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1			
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End
1	Original TL	0.26	0	48
2				
3				
4				
5				
6				
7				
8				
9				
10				
		0.26		

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

New Loading

Point Loads

No.	Mark	Magnitude (k)	Location (ft)
1		0.52	3.4
2			
3			
3			
4			
5			
6			
7			
8			
9			
10			

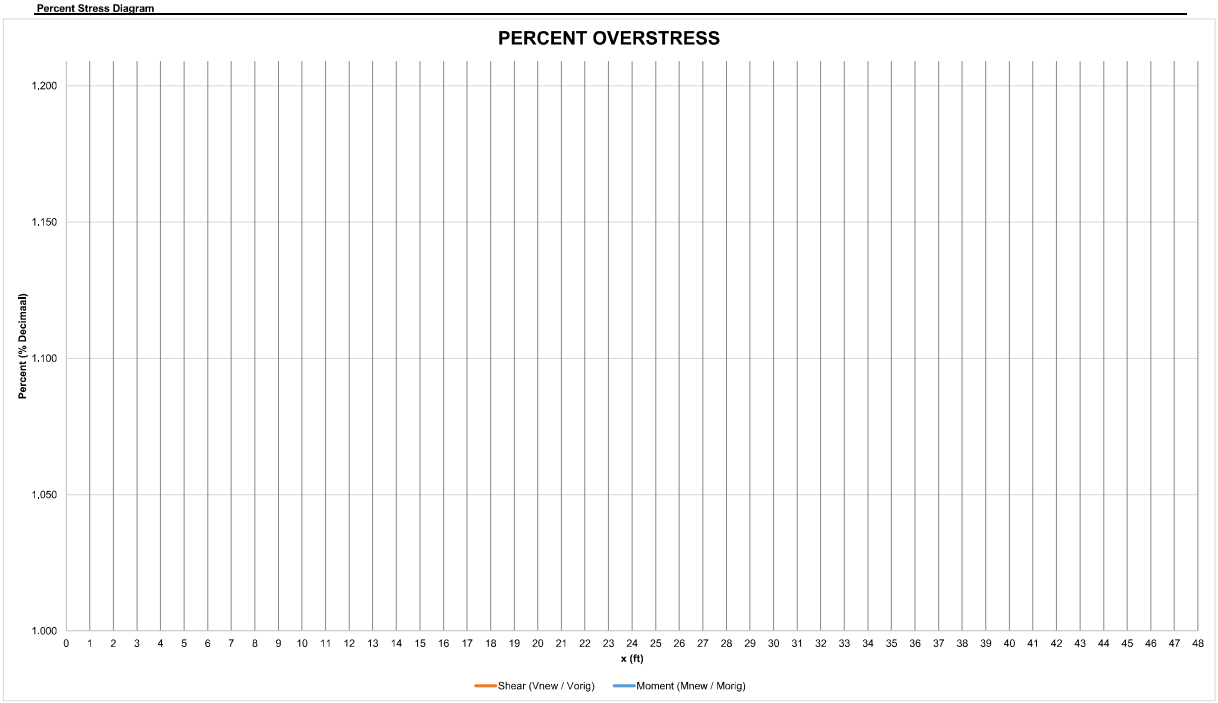
Uniform Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Location (ft) Start	Location (ft) End	
1		0.092	0	48	16 psf DL
2		0.144	0	48	25 psf SL
3					
4					
5					
6					
7					
8					
9					
10					
		0.236			

Triangular Loads (Full or Partial)

No.	Mark	Magnitude (klf)	Peak Mag. Orientation	Location (ft) Start	Location (ft) End
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Percent Stress Diagram



EXISTING FRAMING EVALUATION & ANALYSIS WORKSHEET

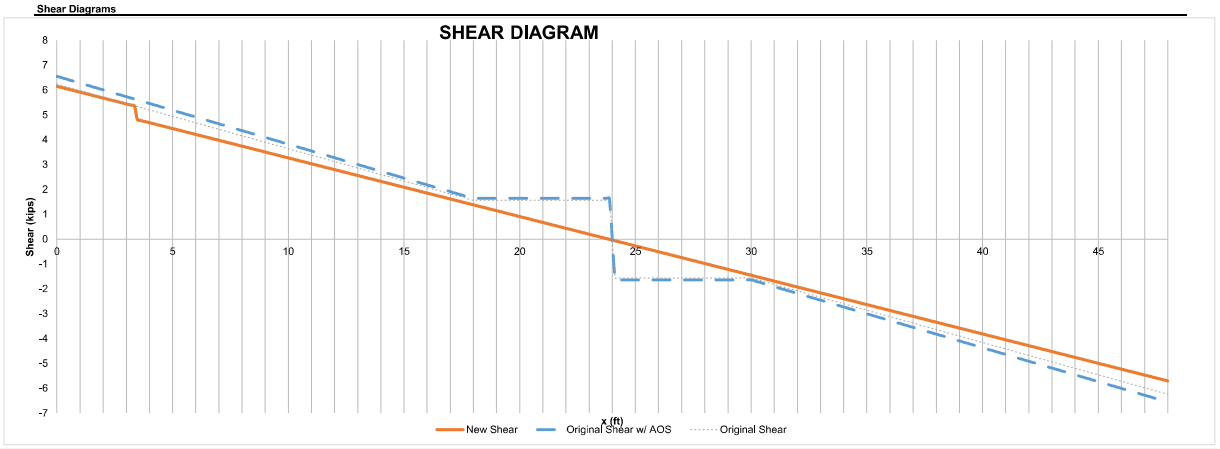
Project No.	Project Name	Made By:	Date:
0	#0xxxx Walmart CAPX Remodel	0	5/8/2024

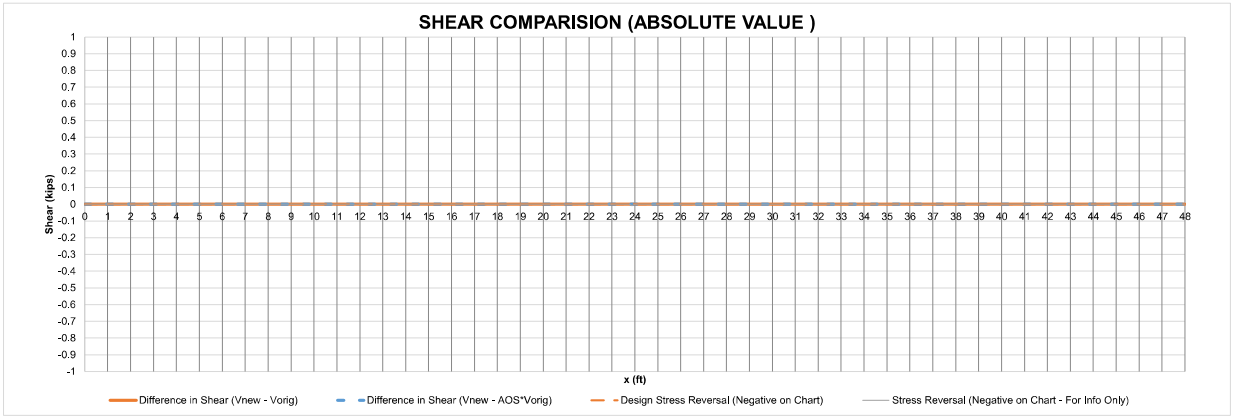
ENVELOPE ANALYSIS OF A SIMPLY SUPPORTED SECTION

Original Building Code: 0

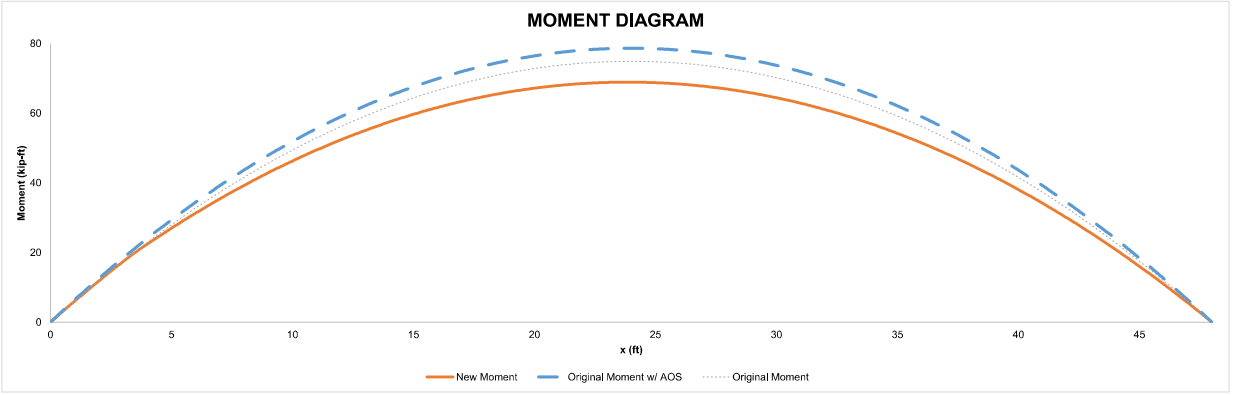
Current Building Code: 2018 IBC

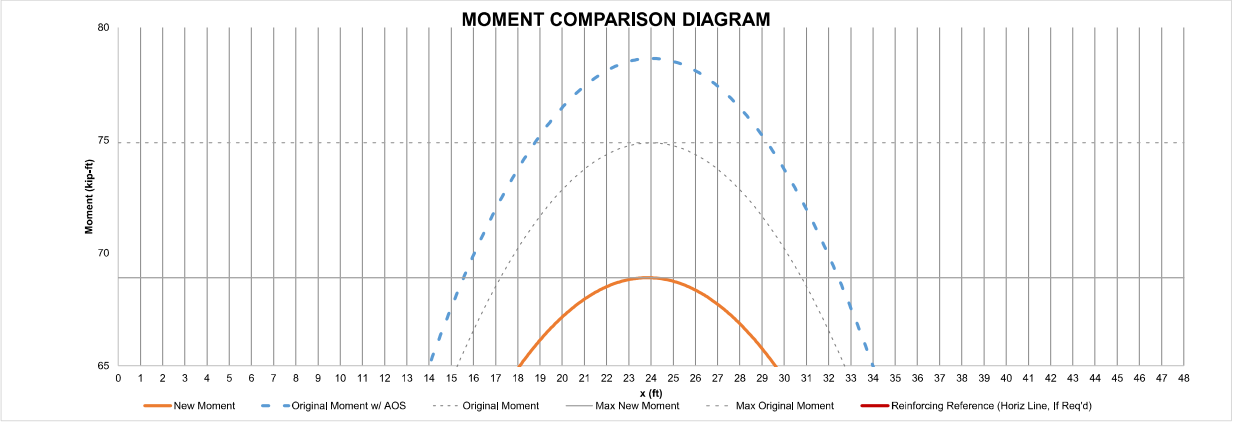
Shear Diagrams





Moment Diagrams





STOOP INSULATION DESIGN

Project: WMR #2403 - Puyallup, WA
Number: 2401802403

Engr: NLC
Date: 5/8/2024

Air Freezing Index ->	Fn =	160	(100 years)
Mean Annual Temp ->	MAT =	51 °F	
Minimum Apron Width ->	Dg =	30.0 in	(Table A8)
Min Ground Cover ->	Gc =	10 in	(Over Insulation)
Design Apron Width ->	D_{design} =	30 in	
Minimum Required R Value ->	5.70	hr-ft^2-°F/Btu-in	(Table A8)
Minimum Thickness of Insulation ->	1.27	in	(Based on 4.5 R/in)
Actual Thickness of Insulation ->	1.50	in	

Table A8
MINIMUM THERMAL RESISTANCE, R_g OF GROUND INSULATION AND HORIZONTAL EXTENSION, D_g, FOR UNHEATED BUILDINGS

Mean Annual Temperature (°F):		32	36	38	40	≥ 41
F_n (°F-day):	D_g (inches):					
750 or less	30	5.7	5.7	5.7	5.7	5.7
1,500	49	13.1	9.7	8.5	8.0	6.8
2,250	63	19.4	15.9	13.6	11.4	10.2
3,000	79	25.0	21.0	18.2	15.3	14.2
3,750	91	31.2	26.1	22.7	--	--
4,500	108	37.5	31.8	--	--	--

*Design based on the "DESIGN GUIDE FOR FROST-PROTECTED SHALLOW FOUNDATIONS", June 1994, by the NAHB Research Center.