

**Structural Calculations for Vertical and Lateral Design of Trash Enclosure Structure**

**PRCNC20260042**

**Project & Location:**

**Structural Calculations**  
**Bradley Heights Apartments**  
(Lat 47.1652, Long -122.2921)  
202 27<sup>th</sup> Avenue SE, Puyallup, WA

**Client:**

Timberlane Partners  
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**Professional Engineer:**

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(253) 314 - 9822



**Project Number:**

23.007

**Code / Location:**

2021 IBC

**Loads:**

1. Vertical Loads	Dead	Live
Roof	22 PSF	25 PSF (Snow)

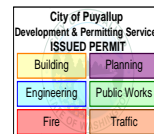
2. Lateral Loads  
Wind Criteria  
Basic Wind Speed = 97 MPH  
Exposure B  
I<sub>w</sub> = 1.0, K<sub>zt</sub> = 1.0

Seismic Criteria  
Seismic Design Category "D"  
Site Class C  
I<sub>E</sub> = 1.0, S<sub>s</sub> = 1.263, S<sub>1</sub> = 0.435  
SDS = 1.010, SD1 = 0.435

3. Soils Data (per GeoResources Inc. dated 02/10/2022)  
Bearing Capacity = 2,000 PSF

**City of Puyallup**  
**Building**  
**REVIEWED**  
**FOR**  
**COMPLIANCE**

SKinnear  
02/10/2026  
11:41:09 AM



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

# CMU ENCLOSURE WALLS

Project Bradley Heights  
 S4S Job# 23.007  
 Date 8/14/2024

## SOIL PROPERTIES

Wind Pressure (ASD)  $W = 10.0$  psf  
 Seismic Pressure (ASD)  $E = 23.8$  psf  
 Allowable Bearing  $ASBP = 2,000$  psf  
 Allowable 1/3 Increase **yes**  
 Seismic Sds **1.010**

## WALL DESIGN

Base Design Shear  $V_u = 0.32$  k  
 Shear Strength  $\phi V_m = 3.19$  k OK!  
 Base Design Moment  $M_u = 1.48$  kft  
 Bending Strength  $\phi M_n = 1.78$  kft **OK!**  
 Bar A # **5**  
 Spacing A  $s = 32$  in o.c.

## WALL & FOOTING DIMENSIONS

Concrete Strength  $f'_c = 2,500$  psi  
 Wall thickness  $t = 7.625$  in  
 Wall Height  $H = 9.33$  ft  
 Footing Width  $W_{ftg} = 2.83$  ft  
 Footing thickness  $T_{ftg} = 1.00$  ft

## FOOTING REINF

Longitudinal Bars **(3) #5** =  $0.93$  in<sup>2</sup>  
 Min Reinforcing =  $0.73$  in<sup>2</sup>

## STABILITY CHECKS

Wall wt  $W_w = 784$  lbs  
 Footing wt  $W_f = 425$  lbs  
 Total wt  $W = 1209$  lbs

Overturing M  $OTM = 1,256$  kft  
 Resisting M  $RM = 1,713$  lbft  
 $X = 0.38$  ft  
 $e = 1.04$  ft  $> L/6$   
 Soil Pressure  $SP = 2,135$  psf **OK!**

# CMU ENCLOSURE WALLS

Project Bradley Heights  
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## SOIL PROPERTIES

Wind Pressure (ASD)  $W = 10.0$  psf  
 Seismic Pressure (ASD)  $E = 23.8$  psf  
 Allowable Bearing  $ASBP = 2,000$  psf  
 Allowable 1/3 Increase **yes**  
 Seismic Sds **1.010**

## WALL DESIGN

Base Design Shear  $V_u = 0.25$  k  
 Shear Strength  $\phi V_m = 3.19$  k OK!  
 Base Design Moment  $M_u = 0.91$  kft  
 Bending Strength  $\phi M_n = 1.44$  kft **OK!**  
 Bar A # **5**  
 Spacing A  $s = 40$  in o.c.

## WALL & FOOTING DIMENSIONS

Concrete Strength  $f'_c = 2,500$  psi  
 Wall thickness  $t = 7.625$  in  
 Wall Height  $H = 7.33$  ft  
 Footing Width  $W_{ftg} = 2.33$  ft  
 Footing thickness  $T_{ftg} = 0.83$  ft

## FOOTING REINF

Longitudinal Bars **(3) #4** = 0.60 in<sup>2</sup>  
 Min Reinforcing = 0.50 in<sup>2</sup>

## STABILITY CHECKS

Wall wt	$W_w = 616$ lbs
Footing wt	$W_f = 292$ lbs
<b>Total wt</b>	<b><math>W = 908</math> lbs</b>

Overturning M	$OTM = 784$ kft
Resisting M	$RM = 1,059$ lbft
	$X = 0.30$ ft
	$e = 0.86$ ft > L/6
Soil Pressure	$SP = 1,998$ psf <b>OK!</b>

# CMU ENCLOSURE WALLS

Project Bradley Heights  
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 Date 8/14/2024

## SOIL PROPERTIES

Wind Pressure (ASD)  $W = 10.0$  psf  
 Seismic Pressure (ASD)  $E = 23.8$  psf  
 Allowable Bearing  $ASBP = 2,000$  psf  
 Allowable 1/3 Increase **yes**  
 Seismic Sds **1.010**

## WALL DESIGN

Base Design Shear  $V_u = 0.18$  k  
 Shear Strength  $\phi V_m = 3.19$  k OK!  
 Base Design Moment  $M_u = 0.48$  kft  
 Bending Strength  $\phi M_n = 1.18$  kft **OK!**  
 Bar A # **4**  
 Spacing A  $s = 32$  in o.c.

## WALL & FOOTING DIMENSIONS

Concrete Strength  $f'_c = 2,500$  psi  
 Wall thickness  $t = 7.625$  in  
 Wall Height  $H = 5.33$  ft  
 Footing Width  $W_{ftg} = 1.83$  ft  
 Footing thickness  $T_{ftg} = 0.83$  ft

FOOTING REINF  
 Longitudinal Bars **(2) #4** = 0.40 in<sup>2</sup>  
 Min Reinforcing = 0.40 in<sup>2</sup>

## STABILITY CHECKS

Wall wt  $W_w = 448$  lbs  
 Footing wt  $W_f = 229$  lbs  
 Total wt  $W = 677$  lbs

Overturning M  $OTM = 443$  kft  
 Resisting M  $RM = 621$  lbft  
 $X = 0.26$  ft  
 $e = 0.65$  ft  $> L/6$   
 Soil Pressure  $SP = 1,724$  psf **OK!**

JOB# 23.007DESIGNED MRO DATE 8-15-24PROJECT: BRADLEY HEIGHTS APTS

## CMU ENCLOSURE WALLS

EXAMPLE HT = 7'-4"

$$w_o = 0.4505 W$$

$$= 0.4 (1.010) (84)$$

$$= 33.9 \text{ PSF}$$

$$w_{ABD} = 0.7 w_o$$

$$= 0.7 (33.9)$$

$$= 23.8 \text{ PSF}$$

$$V_u = 0.0339 (7.33) = 0.25 \text{ K}$$

$$M_u = 0.25 (7.33) / 2 = 0.91 \text{ Kft}$$

$$\phi V_c = 0.80 (2.25) \sqrt{1500} (12) (3.81) = 3.19 \text{ K} \checkmark$$

$$A_{s \text{ dowels}} = V_u / \phi F_y = 0.25 / 0.9 \times 60 = 0.0046 \text{ in}^2 / \text{ft}$$

$$A_{s \text{ self}} = \#5 @ 40" - A_{s \text{ dowels}} = 0.0884 \text{ in}^2 / \text{ft}$$

$$a = \frac{0.0884 (60)}{0.8 (1.5) (12)} = 0.368 \text{ in}$$

$$\phi M_n = 0.9 (0.0884) (60) (3.81 - \frac{0.368}{2}) / 12 = 1.44 \text{ Kft} \checkmark$$

JOB# 23.007DESIGNED MRO DATE 8-15-24PROJECT: BRADLEY HEIGHTS APTS

$$HT = 7'-4'' \text{ cont.}$$

$$OTM = 23.8 (7.33) (7.33/2 + 0.833) = 785 \text{ lbft}$$

$$W_{\text{wall}} = 84 (7.33) = 616$$

$$W_{\text{FTG}} = 150 (2.33 \times 0.83) = \frac{292}{908 \text{ lbs}}$$

$$RM = 908 (2.33) / 2 = 1,059 \text{ lbft}$$

$$\bar{x} = \frac{RM - OTM}{\Sigma W} = \frac{1059 - 785}{908} = 0.30 \text{ ft}$$

$$e = 2.33/2 - 0.30 = 0.87 \text{ ft } (> l/6)$$

$$SP = \frac{2}{3} \frac{\Sigma W}{\bar{x}} = \frac{2}{3} \frac{908}{0.30} = 1,998 \text{ psf}$$