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Project Title: Portland (ME) Retirement Residence
Engineer: DSG Project ID
Project Descr:

CITY OF PORTLAND, MAINE — RESURGAM
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 09/20/16



# Cantilevered Retaining Wall

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ENERCALC, INC. 1983-2016, Build:6.16.5.11, Ver:6.16.5.11
Lic. # : KW-06002943 Licensee : DAN GREEN ENGINEERING

Description : Screen wall

Calculations per ACI 318-11, ACI 530-11, IBC 2012, CBC 2013, ASCE 7-10

## Criteria

| | | |
|---|---|---|
| Retained Height | = | 3.33 ft |
| Wall height above soil | = | 8.00 ft |
| Slope Behind Wall | = | 0.00 : 1 |
| Height of Soil over Toe | = | 40.00 in |
| Water height over heel | = | 0.0 ft |

Vertical component of active
Lateral soil pressure options:
NOT USED for Soil Pressure.
NOT USED for Sliding Resistance.
NOT USED for Overturning Resistance.

## Soil Data

| | | |
|---|---|---|
| Allow Soil Bearing | = | 3,000.0 psf |
| Equivalent Fluid Pressure Method | | |
| Heel Active Pressure | = | 65.0 psf/ft |
| Toe Active Pressure | = | 65.0 psf/ft |
| Passive Pressure | = | 250.0 psf/ft |
| Soil Density, Heel | = | 130.00 pcf |
| Soil Density, Toe | = | 130.00 pcf |
| Friction Coeff btwn Ftg & Soil | = | 0.400 |
| Soil height to ignore for passive pressure | = | 53.00 in |

## Surcharge Loads

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

## Lateral Load Applied to Stem

| | | |
|---|---|---|
| Lateral Load | = | 0.0 plf |
| ...Height to Top | = | 0.00 ft |
| ...Height to Bottom | = | 0.00 ft |
| Wind on Exposed Stem | = | 16.9 psf |

## Adjacent Footing Load

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

## Axial Load Applied to Stem

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

## Design Summary

**Wall Stability Ratios**

| | | |
|---|---|---|
| Overturning | = | 1.81 OK |
| Sliding | = | 5.63 OK |
| Total Bearing Load | = | 1,887 lbs |
| ...resultant ecc. | = | 7.21 in |
| Soil Pressure @ Toe | = | 2,600 psf OK |
| Soil Pressure @ Heel | = | 0 psf OK |
| Allowable | = | 3,000 psf |
| Soil Pressure Less Than Allowable | | |
| ACI Factored @ Toe | = | 3,120 psf |
| ACI Factored @ Heel | = | 0 psf |
| Footing Shear @ Toe | = | 9.4 psi OK |
| Footing Shear @ Heel | = | 4.3 psi OK |
| Allowable | = | 82.2 psi |

**Sliding Calcs** (Vertical Component NOT Used)

| | | |
|---|---|---|
| Lateral Sliding Force | = | 134.0 lbs |
| less 100% Passive Force | = - | 0.0 lbs |
| less 100% Friction Force | = - | 756.0 lbs |
| Added Force Req'd | = | 0.0 lbs OK |
| ....for 1.5 : 1 Stability | = | 0.0 lbs OK |

**Load Factors**

| | |
|---|---|
| Dead Load | 1.200 |
| Live Load | 1.600 |
| Earth, H | 1.600 |
| Wind, W | 1.600 |
| Seismic, E | 1.000 |

## Stem Construction

| | | Top Stem | 2nd |
|---|---|---|---|
| | | Stem OK | Stem OK |
| **Design Height Above Ftg** | ft = | 2.00 | 0.00 |
| Wall Material Above "Ht" | = | Masonry | Masonry |
| Thickness | in = | 8.00 | 8.00 |
| Rebar Size | = | # 5 | # 5 |
| Rebar Spacing | in = | 24.00 | 24.00 |
| Rebar Placed at | = | Center | Center |
| **Design Data** | | | |
| fb/FB + fa/Fa | = | 0.727 | 0.999 |
| Total Force @ Section | lbs = | 134.7 | 134.2 |
| Moment....Actual | ft-l = | 719.1 | 988.1 |
| Moment.....Allowable | ft-l = | 988.8 | 988.8 |
| Shear.....Actual | psi = | 3.0 | 3.0 |
| Shear.....Allowable | psi = | 38.7 | 38.7 |
| Wall Weight | psf = | 78.0 | 78.0 |
| Rebar Depth 'd' | in = | 3.75 | 3.75 |
| Lap splice if above | in = | 30.00 | 45.00 |
| Lap splice if below | in = | 30.00 | 9.11 |
| Hook embed into footing | in = | 30.00 | 9.11 |
| **Masonry Data** | | | |
| f'm | psi = | 1,500 | 1,500 |
| Fs | psi = | 24,000 | 24,000 |
| Solid Grouting | = | Yes | Yes |
| | | | Yes |
| Modular Ratio 'n' | = | 21.48 | 21.48 |
| Short Term Factor | = | 1.000 | 1.000 |
| Equiv. Solid Thick. | in = | 7.60 | 7.60 |
| Masonry Block Type | = | 2 | |
| Masonry Design Method | = | ASD | |

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