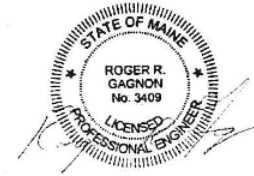


### GAGNON ENGINEERING, INC. GORHAM, MAINE

**Project:** CANAL LANDING BUILDINGS  
**Subject:** ALLOWABLE FOUNDATION GROUND PRESSURES  
**Item:** Design Calculations

**Roger R. Gagnon, PE**  
**REV Date:** Feb. 07, 2019



**Purpose:** Determine allowable ground pressures under footings  
a) top of Compact Gravel  
b) top of native ground

Reviewed for Code Compliance  
Permitting and Inspections Department  
Approved with Conditions

02/21/2019

**Conditions & Assumptions:**

Existing Soils & Proposed Backfills are described in Geotechnical Reports by S.W. Cole Engineering titled "Geotechnical Engineering Services, Proposed Buildings C & D" August 11, 2015 and "Explorations & Geotechnical Engineering Services, Proposed Portland Yacht Services Expansion" May 8, 2018.

Foundation Plan: GEI Plan entitled "Canal Landing Work Building Foundation" dated 012519

Existing Subgrade soil, below elevation 8.0' is granular with a friction angle of 28 degree or better, with density of at least 115 pcf.

Added fill is 34 degree 125 pcf gravel. Ground water is maintained at or below elevation 7.0'

Ground Pressures Dissipate Rapidly below elevation 7.0'

Reference: "Soils in Construction" by Schroeder et al 5th Ed. Table 11.2

General Equation: 
$$q_{allow} := \frac{0.4 \cdot \gamma \cdot B_f \cdot N_y + \gamma \cdot D_{34} \cdot N_q}{FS}$$
 Soils in Construction, Eq. 11-4,  
(Note: Variables are defined below)

Top of Compact Gravel Allowable Bearing:

$$\gamma_{34} := 0.125 \frac{\text{kip}}{\text{ft}^3} \quad B_f := 2 \text{ ft} \quad N_y := 36 \quad D_{34} := 3 \text{ ft} \quad N_q := 36 \quad FS := 2.5$$

$$q_{allow34} := \frac{0.4 \cdot \gamma_{34} \cdot B_f \cdot N_y + \gamma_{34} \cdot D_{34} \cdot N_q}{FS} = 6.84 \text{ ksf} > 4.0 \text{ ksf} \therefore \text{OK}$$

Top of Native Ground Allowable Bearing (Proof-Rolled):

$$\gamma_{28} := 0.115 \frac{\text{kip}}{\text{ft}^3} \quad B_f := 2 \text{ ft} \quad N_y := 15.7 \quad D_{28} := 4 \text{ ft} \quad N_q := 17.8 \quad FS := 2.5$$

$$q_{allow28} := \frac{0.4 \cdot \gamma_{28} \cdot B_f \cdot N_y + \gamma_{28} \cdot D_{28} \cdot N_q}{FS} = 3.85 \text{ ksf} > 2.0 \text{ ksf} \therefore \text{OK}$$