

## Homework #10 – Foundations

CVEN 4359: Dr. Lamanna

1. A square spread footing supports an 18 inch square column supporting a service dead load of 400 kips and a service live load of 270 kips. The column is built of 5,000 psi concrete and has eight No. 9 longitudinal bars with  $f_y = 60,000$  psi. Design a spread footing to be constructed by using 3,000 psi concrete and grade 60 bars. The top of the footing will be covered with 6 in. of fill with a density of  $120 \text{ lb/ft}^3$  and a 6 inch basement floor. The basement floor loading is 100 psf. The allowable bearing pressure on the soil is 6000 psf. Use the load and resistance factors from ACI 318-08.
2. Redesign the footing from Problem #1, assuming that the maximum width of the footing is limited to 9 ft.
3. A 12 inch thick concrete wall carries a service dead load of 10 kips per foot and a service live load of 12.5 kips per foot. The allowable soil pressure,  $q_{\text{all}}$ , is 5,000 psf at the level of the base of the footing, which is 5 ft below the final ground surface. Design a wall footing, using  $f'_c = 3,000$  psi and  $f_y = 60,000$  psi. The density of the soil is  $120 \text{ lb/ft}^3$ .