## Assignment 2

## **Course: CONEN 441**

## Due Date November 24<sup>th</sup>, 2021

## Instructor: Dr. Ahmad Salah

Using the information provided in Figures 1, 2, 3 and 4 that illustrate the details of a small house. Estimate the:

- 1) Soil excavated volume,
- 2) time required for the excavator to excavate the soil assuming the productivity of excavator is 5m<sup>3</sup>/hr
- 3) Total number of trucks required if the excavated soil has a swelling factor 25% and the acquired soil has a compaction factor of 0.9.
- Calculate the time required for the compactor equipment assuming that the compaction productivity is 7.5 m<sup>3</sup>/hr
- 5) Volume of concrete for each of the following:
  - a. Continuous footing (F2) including the column neck
  - b. Isolated footing (F1) including the Wall neck
- 6) Calculate the fill volume
- 7) Total number of trucks required if the acquired soil has a compaction factor of 0.9.
- 8) Volume of concrete for each of the following:
  - a. Slab on Grade
  - b. External Concrete wall (W1), assuming the wall thickness is 200mm and it is located at 300 mm from the external side of the continuous footing (F2)
  - c. Columns
  - d. Concrete Slab
  - e. Total Volume of concrete including F1 and F2
- 9) Weight of steel reinforcement required for:
  - a. Continuous footing (F2)
  - b. Isolated footing (F1)
  - c. Slab on Grade assuming mesh reinforcement is used with 8mm bar @ 150mm in both directions
  - d. Concrete wall
  - e. Columns
  - f. Concrete Slab
  - g. Total Weight
- 10) Cost of
  - a. Materials
  - b. Labors
  - c. Equipment
  - d. Direct cost of the house

Assuming the following information:

- ✓ The cover is 2.5 cm
- ✓ The steel reinforcement overlap is  $40D_b$  (40 times the diameter of bar)
- $\checkmark$  The waste percentage is 5% for steel and concrete
- $\checkmark$  The maximum length of steel bar is 12 m
- ✓ The volumetric mass of the steel is  $7.85 \text{ t/m}^3$
- ✓ Cost of the excavator and compactor is 250SR/hr
- ✓ Cost of operators is 100 SR/hr
- ✓ Cost of truck per trip is 95SR/hr
- ✓ Cost of concrete is 200 SR/m<sup>3</sup>
- ✓ Cost of Steel reinforcement is 9230 SR/ton



**1 |** P a g e





