

Geotechnical Engineer Examination Sample Questions

Example No. 1

Which of the following is the most suitable test for obtaining in-situ shear strength measurements in very soft soil deposits?

- A. Vane shear
- B. Torvane shear
- C. Pressuremeter
- D. Cone penetration

Example No. 2

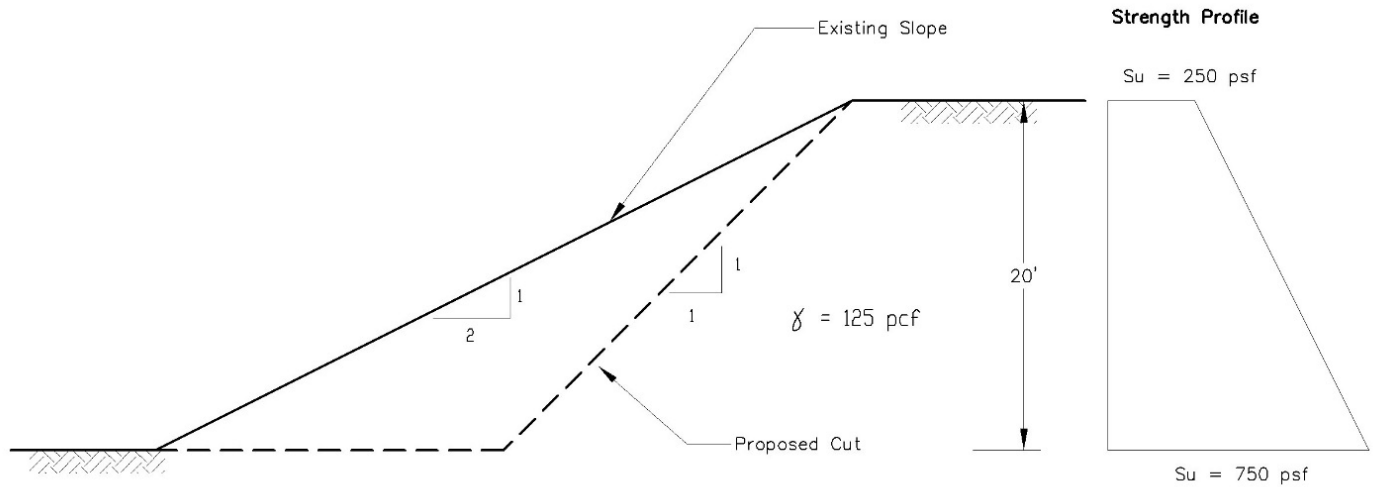
An existing construction access road will be converted to a paved driveway following construction. During grading, the contractor observes severe rutting and saturated soil conditions along the access road alignment. Trenches in this area reveal seasonal groundwater at 2 feet below the ground surface. The subsurface soil consists of soft clayey silt. Which mitigation option is the most appropriate?

- A. Increase proposed asphalt section from 2 inches to 4 inches.
- B. Scarify to a depth of 8 inches and recompact to 95% relative compaction.
- C. Overexcavate subgrade to a depth of 18 inches and replace with compacted, imported sandy soil.
- D. Overexcavate to a depth of 12 inches, place geotextile fabric and overlay with imported coarse gravel.

Example No. 3

Use the information and exhibit provided to answer the following question.

As shown on the exhibit, a 2:1 (H:V) slope is proposed to be reconfigured to a 1:1 (H:V) slope. The undrained shear strength of the clayey soil (S_u) varies as shown on the exhibit.

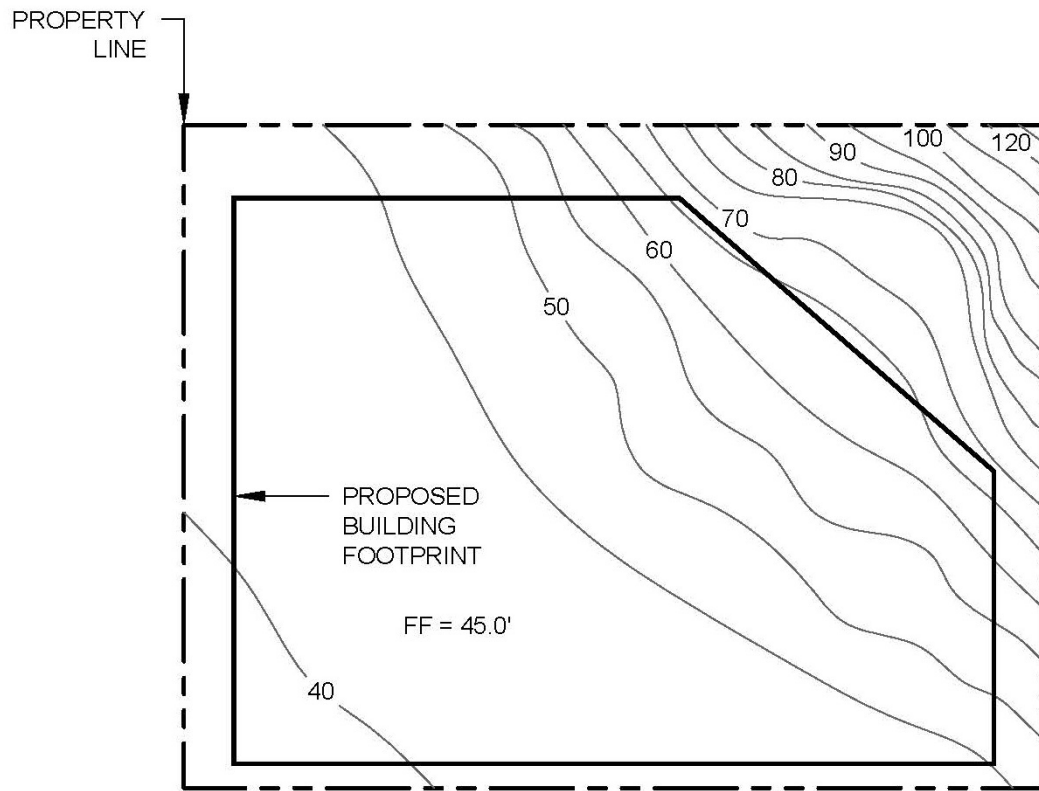


What is the factor of safety of the proposed cut?

- A. 0.6
- B. 0.8
- C. 1.3
- D. 1.7

Example No. 4

Use the exhibit provided to answer the following question.



A developer recently purchased a property and plans to build a warehouse building as shown. What is the most significant geotechnical issue to evaluate for proposed design and construction?

- A. Irregular Building Loads
- B. Cut/Fill Transition
- C. Dynamic Earth Pressures
- D. Cut Slope Stability

Example No. 5

The most likely R-value of a clayey soil with a Plasticity Index of 10 is:

- A. ≤ 10
- B. 10 to 40
- C. 40 to 60
- D. ≥ 60

Example No. 6

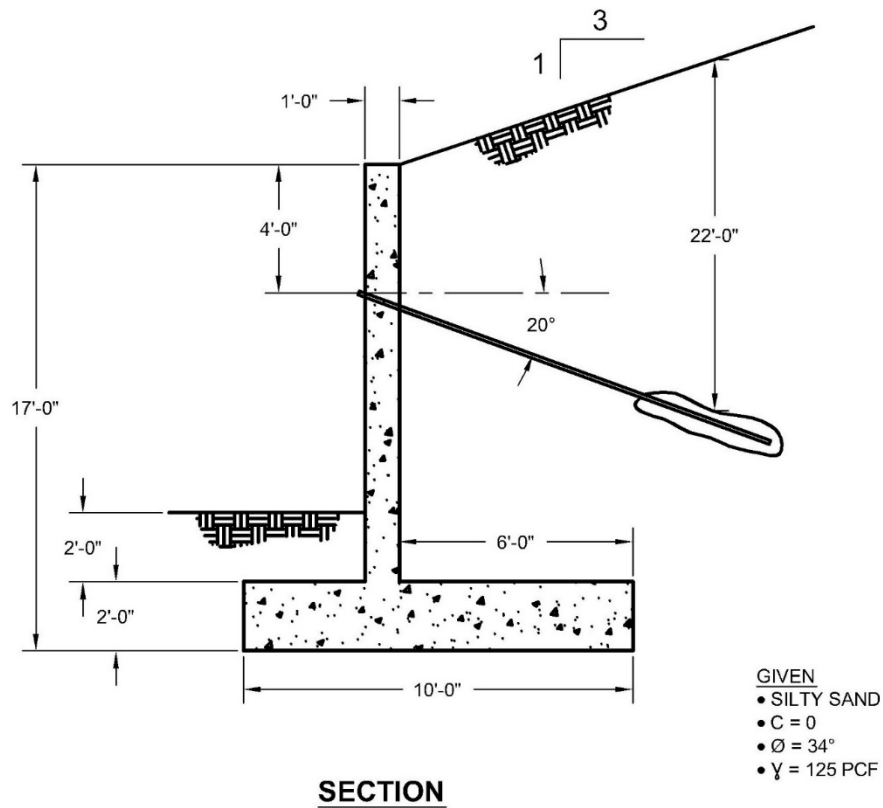
A proposed mechanical building in California is supported by a mat foundation. The mat is 20' x 20' and is embedded 2' below lowest adjacent grade. The subgrade consists of a stiff silty clay with $c = 1,000$ psf, $\phi = 10$ degrees, and a unit weight of 120 pcf. Determine the ultimate bearing capacity of the soil for this mat, using Terzaghi's approach. Assume $N_c = 9.6$, $N_q = 2.7$, $N_{\gamma} = 1.2$

- A. 11,250 psf
- B. 12,480 psf
- C. 14,130 psf
- D. 14,280 psf

Example No. 7

Use the information and exhibit provided to answer the following question.

To provide additional stability for the wall, a row of tie back anchors is proposed as shown. The total length of each anchor is 35 feet, including a bonded length of 15 feet. The diameter of the hole is 6-inches. Assume the soil load is at rest condition.

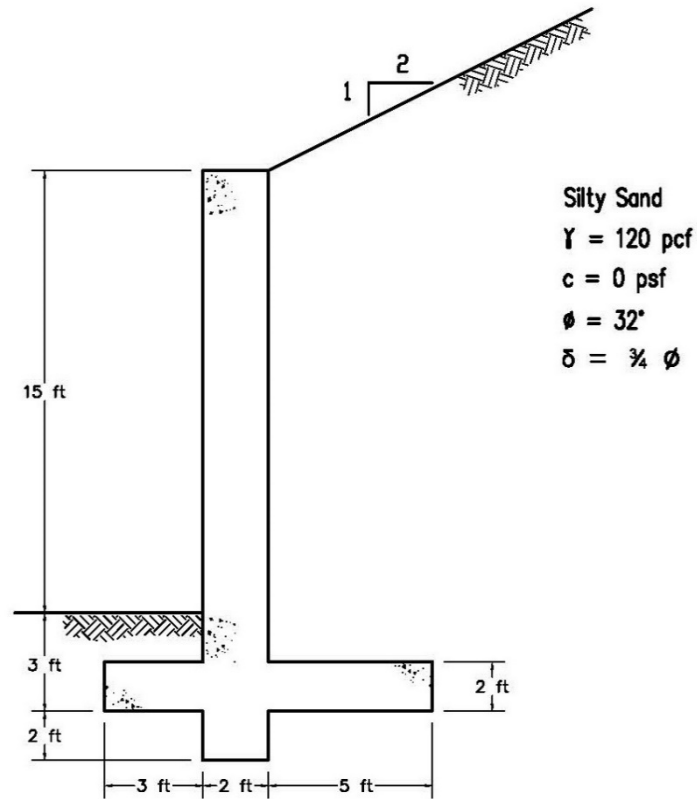


What is the allowable resistance offered by the tie back using a factor of safety 2?

- A. 6,100
- B. 8,200
- C. 9,600
- D. 12,800

Example No. 8

Use the exhibit provided to answer the following question.



What is the Rankine passive force per foot of wall length?

- A. 0.8 kips
- B. 1.8 kips
- C. 2.3 kips
- D. 4.9 kips

Example No. 9

A large commercial development requires import materials for fill. During grading, the contractor introduces materials with some rock that significantly exceeds six inches. The most important reason that the oversize rock should not be allowed in the compacted fill is:

- A. it will increase the settlement potential
- B. its effect on the compaction test results
- C. it will obstruct the utility trench excavations
- D. it is not in compliance with specifications

Example No. 10

Use the table provided to answer the following question.

The laboratory test results for Samples A, B, and C are as following.

	PI	Passing #200 sieve	Percentage less than 5 micrometers	El
Sample A	15	12	15	21
Sample B	10	14	18	18
Sample C	17	16	20	23

Which sample is considered expansive soil according to California Building Code?

- A. A
- B. C
- C. A and C
- D. B and C

Example No. 11

Use the information and table provided to answer the following question.

Consolidated-undrained tests with pore pressure measurements were performed on a soil sample with the following results:

Test Results		
Parameter	Test 1	Test 2
Cell Pressure	35 psi	69 psi
Deviatoric pressure at failure	50 psi	92 psi
Pore pressure at failure	16 psi	28 psi

When evaluating slope stability of an earth dam, which of the following issues are best analyzed using the total stress envelope as determined from the tests?

- A. End of construction stability
- B. Rapid drawdown stability
- C. Pseudo-static stability
- D. Long term stability