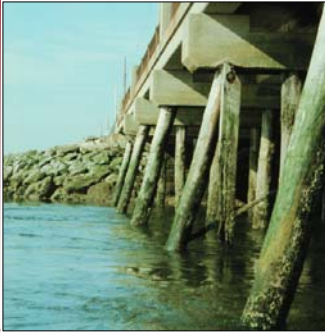


Case Study – Soft Clay Site Characterization



Location = Saugus, Massachusetts

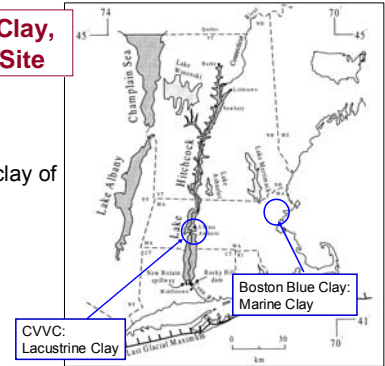
Deposit = thick deposit of Boston Blue Clay (BBC)

Design = replace existing bridge foundation → deep foundation



Boston Blue Clay, Saugus, MA Site

Saugus BBC:
Low PI marine clay of low to medium sensitivity



Site Characterization Program

Original Site Characterization Program:

1 In Situ Testing:

- Standard Penetration Test
- Field Vane Tests (FVT) in same borehole as SPT tests

2. Laboratory Testing on Thin walled Tube Samples

- Index (= Torvane) on ends of tubes
- Oedometer (Consolidation) tests
- Triaxial Tests

3. Design Requirements

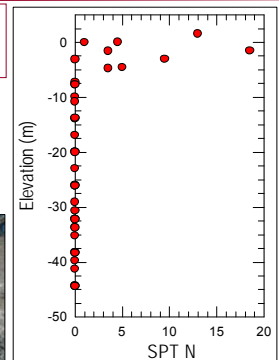
- Preconsolidation Stress, σ'_p
- Undrained Shear Strength, s_u



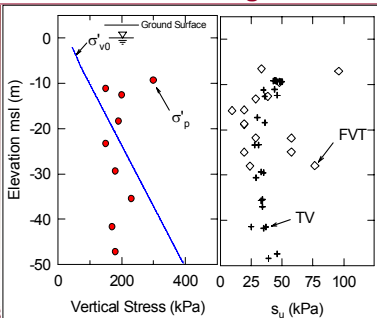
In Situ Testing Program = SPT

SPT Values highly variable near ground surface (= crust);

SPT = WOR below crust



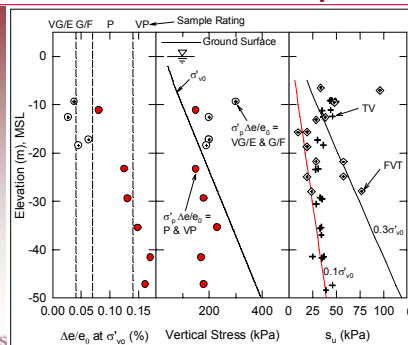
Preconsolidation Stress and Undrained Shear Strength Data



Note:
- Very low σ'_p values
- Highly scattered and low s_u values



Evaluation of Sample Quality



Inspect:

$\Delta e/e_0$ at σ'_{v0}
[Lunne et al. 1997]

Normalized undrained shear strength data [s_u/σ'_{v0}]

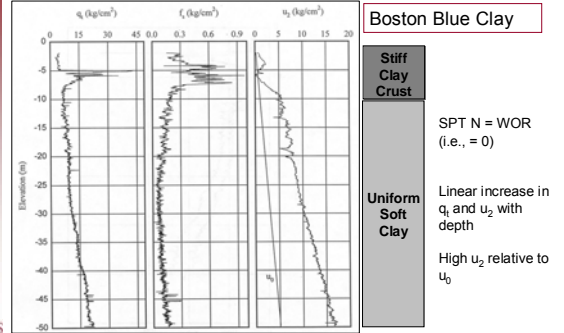


Recommended CPTU Testing



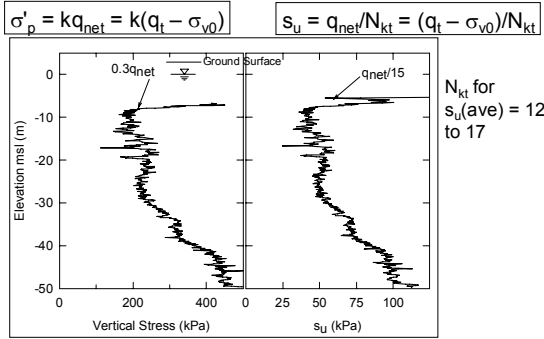
NGI
UMASS
AMHERST

CPTU Data – Boston Blue Clay, Saugus, MA



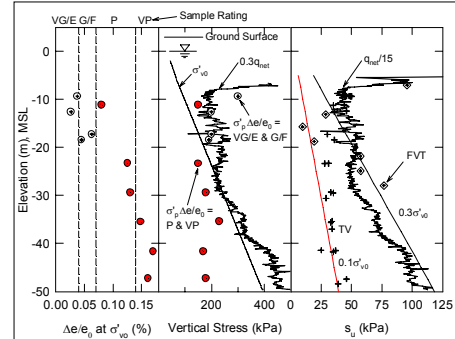
NGI
UMASS
AMHERST

Interpreted CPTU Data



NGI
UMASS
AMHERST

Final Composite Profiles



NGI
UMASS
AMHERST