

# CE394M: Advanced Analysis in Geotechnical Engineering

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- 1 Geotechnical modeling
  - Complexity in Geotechnical modeling

# Geotechnical modeling of the complex world



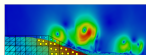
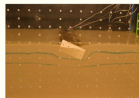
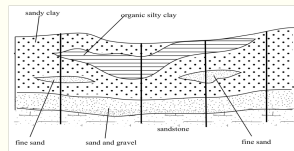
Fig. London Bridge Station, London, UK

# Geotechnical modeling of the complex world



Fig. London Victoria station upgrade, London, UK

# Geotechnical modeling



- nonhomogeneous,
- anisotropic,
- non-linear,
- initial stress conditions,
- stress history
- Geometry - very complex

**Soil Mechanics in practice - largely empirical**

# Geotechnical modeling

- Self weight effect of soils (This is why soil moves)
- Construction sequence (Complex geometry)
- Water movement (undrained, consolidation, drained)
- Insitu stresses (stiffness/strength depends on current stresses and stress history)
- Predict the ability of a design to withstand extreme loading conditions (you only have one chance)

