

**Department of Civil Engineering and Engineering Mechanics
Columbia University**

**Novel Geotechnical Challenges for Slope Stability Studies of a Large Landfill in
the New Jersey Meadowlands**

Mr. Michael Burlingame
NJ Department of Environmental Protection



October 1, 2013 (Tuesday)
Time: 2:30 pm - 3:30 pm
Location: 253 Engineering Terrace

A 100 foot thick, 95 acre landfill in the NJ Meadowlands is to be closed by means of a slurry wall, leachate collection system, and geomembrane cap. Initial slope stability studies found the proposed measures would lower the global factor of safety below acceptable levels. These studies used the limit equilibrium method, which is blind to low-strength vertical layers, such as a slurry wall. Numerical modeling was undertaken to overcome this and more accurately model the waste and soil properties. A second challenge was assigning a value for the waste's unit weight. This was important for the stability analysis, but was not measurable with standard sampling equipment. Sonic drilling was employed to obtain relatively undisturbed samples of waste and understand how its density varied in the landfill. Finally, large undisturbed samples of the underlying varved clay were split open and found to be folded from their natural, horizontal bedding. Folding was non-chaotic as the structures were found to follow Biot's Theory of Internal Buckling of Multilayered Structures. This affects the clay's stress-strain response, but is not reproducible in conventional laboratory tests.

Biography: Mike Burlingame is a Professional Engineer who has worked for 27 years as a project manager with the N.J. Department of Environmental Protection on the publicly-funded investigation and design of remedial measures for abandoned waste sites. Prior to this, he worked for the NJDOT's Bureau of Geotechnical Engineering, and for SITE Engineers (now TRC) on the foundation design of many large buildings in Philadelphia and Atlantic City. He obtained B.S. and M.S. degrees from Drexel University in Civil Engineering, as a geotechnical major, working under Dr. Robert Koerner.

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