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Where has all the good land gone? A geotechnical engineer's role on the design team

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It seems not long ago that developments were located on preferable parcels of land. There seemed an abundant supply of corner lots at busy intersections and large flat parcels underlain by beautiful granular soil. Today's sites are those that no one would touch in the past. They all appear to have significant subsurface issues. Unless site development stops, there must be ways to cost effectively address today's challenging sites. The selection of a competent engineering team is critical to the project's success. We focus herein on the geotechnical engineer's role on the design team.

I have worked throughout New England, eastern N.Y. and Penn. during the last 24 years. The project location may change but the problems remain the same. It may be sensitive clay and bedrock in Maine, the Lake Hitchcock deposit in Conn., bedrock and liquefiable sands in N.H., Providence River silt in R.I., fill and organics along the Hudson River in N.Y., or Delaware River Mud in Penn. Also, let us not forget high groundwater everywhere!

Many cost overruns and schedule delays relate to unknown subsurface conditions encountered during site work and foundation portions of project construction. To minimize this risk it is important to identify subsurface issues during design, which allows cost effective solutions to be developed.

Given the challenging nature of today's sites it is important to compile a qualified and experienced team of design professionals. The geotechnical engineer's role on this team is critical because the cost associated with addressing today's subsurface issues can be significant.

Unfortunately, many projects poorly identify soil issues (or skip this step altogether), which may result in construction delays, cost overruns and potential litigation associated with differing site condition claims. I receive many calls after a project has gone "bad" at which time solutions usually cost a premium to implement. The lack of sufficient due diligence typically exposes a project to liability.

Another issue I've encountered is a conservative (i.e., expensive) recommended solution to problems identified. This may be to support a structure on piles and/or to remove and replace fill onsite. There are sites where this approach is warranted but there are also sites where ground improvement may be applicable, which could result in significant cost savings. This approach typically results when a consultant, under pressure to save money in design, doesn't perform sufficient borings and laboratory testing nor do they investigate adequate feasible alternatives. The owner may save a few bucks in design, but spends significantly more in unnecessary construction costs.

I was recently asked to review the geotechnical recommendations for a project in Maine. The building area was located partially on rock and partially on soft clay. The clay was also receiving significant fill to level the building pad. An experienced local geotechnical engineer recommended preloading the clay and placing the building on spread footings. The owner hired a large national

engineering firm to peer review the foundation recommendations and they recommended placing the building on piles. The peer review engineer is more of a testing agency that performs QA/QC for the owner during construction. The owner, after paying a premium to put the building on piles, is now addressing severe problems associated with differential settlement between the building and surrounding areas.

Successful projects have good communication and education in common. The owner should be clear about the project vision and expectations. The geotechnical engineer should educate the owner about the subsurface issues that exist at the site. This includes discussing feasible alternatives to address the site conditions and educating the owner about the risks associated with each alternative.

Although "good" sites may be gone you can still have a successful project. Start with the compilation of an experienced design team. Trust your instincts when choosing the team; talk to the actual engineers that will work on the project and don't be fooled by the glitz, glamour and fast talk of some firms. Also beware of persons that seem to have all the answers (no one is that smart). An experienced geotechnical engineer can develop cost effective solutions. Given open communication and a competent design team your project can be as successful as those from the good old days.

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