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Proper geo-environmental services are key to a successful project - by Frank Ricciardi

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Geotechnical and environmental (geo-environmental) engineering services are critical to successful construction of new buildings/structures, renovation of existing buildings/structures, or any project requiring earthwork. Project owners and managers are tasked with completing projects on budget and need to determine the disciplines/scopes of services where cost savings can be attained. I routinely have conversations with clients, other consultants, and project managers where the entire conversation is about “doing less.” In my opinion, geo-environmental services are not the primary areas to look for cost savings. Projects that do the bare minimum geo-environmental investigation routinely encounter contamination, undocumented fill, ledge/bedrock, perched groundwater, utilities and other conditions that result in delays, change orders, and geotechnical failures. In addition, unfavorable subsurface conditions can impact costs for other disciplines such as design of structural support/foundations, location of mechanical/electrical/plumbing (MEP) utilities, landscape architecture, and parking/paved surfaces. The design and construction modifications necessary to address these unanticipated subsurface conditions can result in enormous cost over-runs.

In contrast, a proper geo-environmental investigation can provide the required information to recognize cost savings for a project. Identification of impacted environmental media, unsuitable materials, ledge/bedrock, and existing utilities informs the proper placement/selection of foundation structures, soil management strategy to minimize costly off-site disposal, location of new utilities/parking areas/and landscape features and the design of vapor/moisture barriers for the structure. Also, conducting a proper subsurface geo-environmental investigation provides adequate information for the construction contractor to address any health and safety concerns on the projects. The discovery of impacted soil and groundwater or unstable materials during construction not only results in costly change orders for owners but more importantly puts construction trades at risk. Resolving these risks during construction is typically not enjoyable since contractors are upset about their staff working in dangerous conditions, owners are upset with their geo-environmental consultants for not identifying the conditions, and the geo-environmental consultant is upset because their original scope of work would have been appropriate but was reduced to recognize cost savings: a lose-lose-lose scenario.

A recent article from the Geoprofessional Business Association (GBA) poses the following question when considering reducing the geo-environmental scope of services: "Is what I'm going to save worth the additional risk I'll have to bear?" The article recommends a five-step process for successful integration of geotechnical services into your project (I also believe environmental services can be added into this process hence geo-environmental). These steps are summarized below:

Step 1: Select a geo-environmental professional based on their qualifications/merits of their staff and experience rather than cost.

Step 2: Work with project team representatives to mutually develop the scope of services that responds to known risks. Cutting geo-environmental services to reduce fee is the primary mechanism for increasing project risk.

Step 3: Review geo-environmental findings with other key project members/disciplines such as structural engineers, architects, MEP, and site civil/landscape architecture team members to coordinate design services.

Step 4: Recognize that the recommendations in the geotechnical report are provisional until the geotechnical engineer can actually observe the subsurface conditions during construction. These recommendations are based upon observation of less than 0.1% of the subsurface materials encountered during construction. Hence it is also imperative that the geotechnical engineer provide construction phase services.

Step 5: Reject the short-sighted advice to replace your geo-environmental engineer to perform on-site observation to save money during construction. The original firm's professionals cannot be found liable for problems they could have prevented by being present to complete their service.

If followed, the process above can significantly reduce project risk and costs. For example, should the geo-environmental professional be selected based on cost and not qualifications, the selection of a more costly foundation may be recommended simply because the geo-environmental professional did not conduct adequate investigation to select the less costly foundation. In this instance, hundreds if not millions of dollars in construction costs could have been saved over the minimal cost for hiring a qualified geo-environmental professional that would have recommended the additional investigation. Similarly, unnecessary costs for offsite disposal of contaminated material could be avoided by conducting sufficient investigation/lab testing and developing a proper soil management and exposure mitigation strategy.

Owners and owner's project management firms/representatives need to consider these risks prior to selecting a geo-environmental professional. Selecting a firm based on qualifications and developing a mutual scope of services are essential to eliminating typical geo-environmental risks on any project. Skimping on geo-environmental services during design can result in costly change orders that are orders of magnitude more than conducting a comprehensive geo-environmental

investigation.

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