The Geo-Institute Technical Committees will be live streaming the Geoenvironmental Engineering Technical Committee Tuesday, December 8 at 11 AM EST. The topics include:

“Slurry Trench Cutoff Walls in Geoenvironmental Applications,” Dan Ruffing, PE, M.ASCE

The presentation will provide an overview of primary slurry trenching techniques utilized in geoenvironmental applications, organized by construction methodology. Design and construction considerations will be provided, including advantages and limitations of the various types. Finally, factors affecting cost and current budget cost information will be presented.

“Remediation Methods for Soils and Groundwater due to Wildfires: A Review,” Zahra Ghahremani, Pierrette Iرادعکندا, and Arvin Farid, PhD, PE, M.ASCE

Wildfires degrade soil ecosystems through leaching and soil erosion, resulting in a decrease in the soil and its nutrients. Other major effects include the loss of vegetation, soil and groundwater contamination, ash deposition, triggering landslides and mudslides, and rendering soil hydrophobic. The existing firefighting chemicals used to suppress wildfires can ultimately contaminate the soil and groundwater especially with per- and polyfluoroalkyl substances (PFAS). Various remediation methods have been proposed to replenish the burned soil and remediate contamination of soils and groundwater due to wildfires. This paper will review existing remediation methods, technologies, and strategies employed to cope with the soil and groundwater contamination during and post wildfires as well as their feasibility, viability, advantages and disadvantages.

“Evolution of Waste Structure in Landfills: influence of Compaction and Settlement,” Nazli Yesiller, PhD., A.M.ASCE, James L. Hanson, PhD, PE, and Jason T. Cox, PE, M.ASCE

This presentation provides a summary of laboratory and field testing; full-scale field implementation; and associated analysis conducted since 2005 to assess the variations in the structure of wastes disposed of in municipal solid waste (MSW) landfills. The investigation started with analysis of compaction characteristics of MSW. We determined that variation of dry unit weight with moisture content was similar to soils with inverted parabolic trends. The specific gravity (G_s) of waste solids increased with compactive effort resulting in steep degree of saturation curves and low change in w_opt between efforts. Moisture addition to wastes during compaction increased the workability, the unit weight, and the amount of incoming wastes disposed, and reduced the compaction time. At the optimum moisture conditions, nearly 70% more waste could be placed in the same landfill volume compared to the baseline conditions. A new unit weight termed operational unit weight has been introduced and determined by using solely the weight of incoming wastes without including the weight of added water. The traditional geotechnical engineering total and dry unit weights are applicable to engineering calculations, whereas the operational unit weight applies to landfill capacity and for practical economic calculations. The moisture addition method developed has been used at the study partner MSW landfill in California since mid-2010s. Variations of waste structure due to compaction were assessed using the influence of compaction moisture content (as-received vs. moisture addition) at the time of disposal in a landfill. Changing weight-volume relationships over time from compaction to primary compression and primary to secondary compression were assessed to understand settlement effects. Changes in waste solids G_s over time due to compression, exposure of occluded pores, and loss of organic solids (low specific gravity) are incorporated into the analysis. Degree
of degradation of the MSW is accounted for to identify mass loss with time. Waste structure underwent void enlargement, rearrangement, and collapse during progressive structure evolution with net rearrangement for constitutive waste volume analyses and collapse when wastes from surrounding areas entered the unit waste volume. The compaction, settlement, and waste structure analysis presented herein have direct implications for placement of MSW in landfills as well as representative assessment of engineering properties of a waste mass at different time scales.

“Sustainability Assessment of Various Remediation Alternatives for Contaminated Lake Sediments: Case Study”,

Krishna R. Reddy, PhD, PE, ENV SP, D.GE, F.ASCE

Various technologies have been developed for the remediation of environmentally contaminated sites. The prime goal of remediation technologies is to identify and reduce the contaminants to risk-based allowable concentrations. For a particular problem of contamination, multiple remediation technologies may be feasible. Choosing the most sustainable option among many available technologies is challenging. Generally, the selection of remediation technology is solely based on the effectiveness, cost, and time frame of the project. Hence, the broader environmental, economic and social impacts associated with the project are usually overlooked. In recent years, decision making has become more holistic with the introduction of triple bottom line sustainability assessment framework. It accounts for the environmental, economic and social impacts of the project. In this presentation, a case study will be described which involves quantitative triple bottom line sustainability assessment to obtain an overall sustainability index for the comparison of the different remediation alternatives and arrive at the most sustainable option. This study presents a brief overview of the quantitative life cycle sustainability assessment framework used and its application to select the most sustainable technology for remediation of contaminated sediments at a site.