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GEOTECHNICAL LECTURE SERIES

Geotechnical Characterization of a Cinder Cone for Design and Construction of the Forest Park Low Tank

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ABSTRACT: The Portland West Hills consists of a complex mix of Miocene Columbia River Basalt and Plio-Pleistocene Boring Lava overlain by Pleistocene Loess. The City of Portland's Water Bureau planned a new 1.3 million gallon water tank within the crest of the West Hills. The Forest Park Low Tank was proposed to be buried at the hillside location between a major street and nearby residences, and which has been affected by landslides. Major design considerations included support of the tank and appurtenant structures, overall site stability, and excavation and shoring requirements. The general area of the Low Tank site is mapped as Boring Lava blanketed by the Pleistocene Loess. Volcanic vents are mapped sporadically in the area, but not at the Low Tank site, and a preliminary geologic report interpreted the area to be underlain by hard volcanic Columbia River Basalt. Once explorations were undertaken for design of the tank, however, they found the site to be blanketed by Pleistocene Silt as expected, but underlain by a deep deposit of volcanic scoria. The tank was now to be sited on a large buried cinder cone, an unmapped volcanic vent of the Boring Lava. This presentation describes the geologic conditions encountered at the site and the findings of supplemental explorations completed due to the presence of the deep scoria. The laboratory testing program completed and the material properties of the scoria determined from the testing are summarized. The effects of the scoria on geotechnical design are reviewed, and the field performance of the scoria, including the results of load tests from soil nails for the shoring wall, are provided.

BIOGRAPHY: Tim is a Principal of Hart Crowser, Inc., a 115 person firm that provides geotechnical engineering, environmental and natural resources consulting services to private and public clients. Hart Crowser is headquartered in Seattle, WA, but Tim works primarily out of the Beaverton, Oregon office and is the principal-in-charge of the new Honolulu, Hawaii office. Before joining Hart Crowser, Tim was the founder and president of Pacific Geotechnical, which was acquired by Hart Crowser in 2011. Tim holds a BS in Geology and an MS in civil engineering from Portland State University, and has been a consultant for over 22 years, working primarily in the Pacific Northwest and Pacific Islands. Although working across diverse urban and rural project types, Tim has focused his career at the nexus of geology and engineering, principally related to natural hazards (landslides and rockfall) and the interaction of unusual geologic conditions with anthropogenic development. Tim has provided extensive consulting to forest product companies in OR, WA, and Northern CA related to timber harvest and road building; has completed rockfall hazard assessments and mitigation for public and private entities; and has worked on numerous urban landslide stabilization projects. In addition to his consulting work, Tim was an adjunct professor at Portland State University for undergraduate Geotechnical Design for 2 years, has presented case histories to Portland State University's engineering geology case histories class for several years, and has presented on slope stability and geologic hazards at multiple conferences and has authored/co-authored papers on such subjects. Tim is registered as a professional engineer (OR, WA, HI), geotechnical engineer (OR) and engineering geologist (OR, WA).