

A Case History of Construction Induced Sinkholes

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Abstract: This paper presents the case history of 77 sinkholes recorded during the Suncoast Parkway construction, in west-central Florida. These sinkholes occurred where limestone bedrock was excavated. The excavation revealed numerous preexisting solution pipe features in the limestone that were in-filled with clean fine sand. These features were pre-existing sinkholes and served as conduits to recharge the aquifer. The sinkholes that occurred during construction were re-openings of these pre-existing sinkholes. It is also believed that the bedrock excavation had altered the pathways of groundwater recharge at the overburden soil and bedrock interface. Specifically, the bedrock excavation directed larger volume of surface runoff into some pre-existing sinkholes, which previously did not experience large water recharge in recent geological history. The concentration of runoff destabilized the in-filled fine sand and caused the sinkholes to re-open during construction. Implemented remedial measures included hydraulic backfill, grouting, and installation of geotextile. The goal was to minimize potential sinkhole occurrence on the travel lanes of the new highway. Since the end of construction, maintenance records showed sinkholes had occurred only in retention ponds and swales during rainy seasons. They occurred frequently during the first three years after construction and have not been observed after; indicating that a new equilibrium has been reached and the remedial measures in the roadway area were successful.