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Prediction of Sanitary Sewer Overflow (SSO) Conditions and Mitigation Using a Remote Telemetry System Network

Abstract

Sanitary Sewer Overflows (SSOs) are caused by a variety of factors and may increase with sea level rise, extreme storms, and groundwater inundation, creating health risks and environmental hazards. Evidence of groundwater inundation and sea level rise is apparent from the Tamalpais Valley, (Mill Valley), California extremely high tides (commonly called “King Tides”). Shallow groundwater, sinking surface elevation, and complex subsurface hydrogeologic conditions in urban coastal environments have created similar conditions in dozens of communities built on fill material on former wetlands along San Francisco Bay. This research pilot project proposes using a network of surveyed piezometers with battery-powered data loggers having remote telemetry system (RTS) connections to provide real-time groundwater elevation, conductivity, and temperature data in preferential pathways, such as utility trench corridors, leaky sewer pipes, and buried stream channels. The data would be compared to measurements from background areas, as well as stilling wells in creek and adjacent bay locations to measure tidal fluctuations. RTS sewage elevation and flow instruments are proposed for sewer monitoring in manholes. RTS rain gauge data will provide precipitation measurements in real-time. The data from the piezometer network, sewer instruments, stilling wells, and rain gauges would be integrated for real-time notifications (at specific sewer and groundwater elevation thresholds) to alert decision makers and emergency workers by cell phones and computers at the start of conditions which can create SSOs. A secondary use of the data would be to identify the specific cause of the potential SSOs so emergency workers can implement a rapid mitigation strategy prior to overflow of sewage-containing waters above ground surface.

Speakers:



James A. Jacobs, P.G., C.H.G. is Principal Geologist with Clearwater. He is a Professional Geologist in California and eight other states as well as a California Certified Hydrogeologist. Since 2003, he has been on the Tamalpais Community Services District board and a Commissioner of the Sewerage Agency of Southern Marin where he is focused on wastewater issues and hydrogeologic research. He won four Fulbright grants for international teaching and has co-authored five technical books. He is a Fellow of the National Ground Water Association and Geological Society of London and a Virtual Fellow of the U.S. State Department.

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Olivia T.P. Jacobs, C.E.M. is President and Principal Environmental Manager of Clearwater Group. She is a Certified Environmental Manager in Nevada and has worked on sewer studies since 1983 in Los Angeles, and many northern California cities (CH2MHill projects). She has performed basic research on volatile contaminants in sewer systems and vapor intrusion into buildings and has presented numerous invited papers on the subject. She is a Watson Fellow, having studied waste use and biogas internationally.

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