Solving Challenging Design Constraints for Sacramento's Largest New Levee Project

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In response to flood concerns following Hurricane Katrina, the California Department of Water Resources (DWR) developed a long-term strategic plan for sustainable, integrated flood management within the California Central Valley. The Central Valley Flood Protection Plan (CVFPP) was adopted in 2012 and is updated every 5-years. The 2012 CVFPP and 2017 update is guiding California's participation in managing flood risk along the Sacramento River and San Joaquin River systems. The CVFPP in coordination with Regional Flood Management Plans (RFMPs) seeks to provide system-wide flood benefits through modifications to the flood system, while simultaneously implementing significant habitat conservation, water supply, and agricultural sustainability improvements. The first phase is aimed at enhancing flood system capacity and protecting high risk communities in the Sacramento Basin through the expansion of the Yolo Bypass and Sacramento Bypass. This project, the Lower Elkhorn Basin Levee Setback Project, was selected as the first system-wide CVFPP project to be implemented. The project involves constructing approximately 7 miles of setback levee and will improve public safety for over 700,000 people in the Lower Sacramento River Basin by reducing flood stages in the Sacramento River and the Yolo Bypass, while at the same time adding approximately 1,100 acres of inundated floodplain habitat and preserving agricultural land use. The setback levee design had to address multiple constraints, including compressible foundation soils; levee construction using highly plastic soils; high ground water levels; and redesigning internal drainages to allow continued agricultural use behind the new levee. This paper presents how these project challenges were addressed, including: the major geotechnical field investigation and laboratory testing program implemented for design; geotechnical criteria and approach used for design, and how the high plastic nature of available borrow materials drove the design.