An Energy-Saving City Proud of Its Water

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Hillsboro Water Department, located approximately 15 miles west of Portland in the city of Hillsboro, Ore., serves approximately 80,000 customers. The city's service area includes customers residing in the city's municipal territory, more than 600 rural connections in Washington County and wholesale service to three water utilities. In order to meet its required in-town potable water storage of three average days' emergency demand, the city began construction of the 10-million-gal Will Crandall Reservoir and Pump Station Project. Now complete, Hillsboro's new reservoir has increased the city's total capacity to approximately 30.6 million gal.

Alternative Project Construction Method

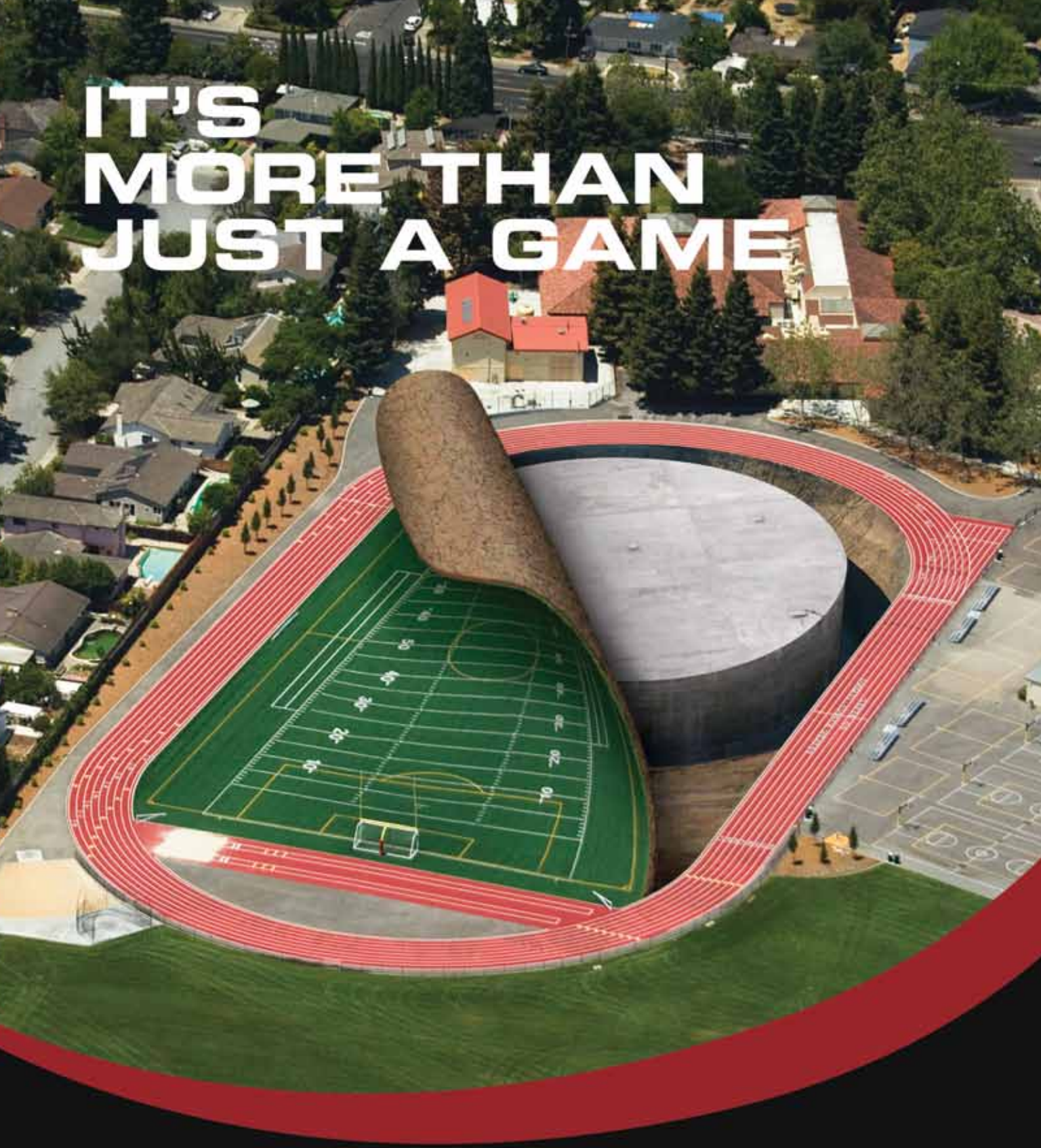
The Will Crandall Project included many challenges from which the city benefitted by working with an experienced design team. The city of Hillsboro selected CH2M Hill to provide engineering design and construction services. During the development of the project, CH2M Hill and the city opted for an alternative project construction method known as the construction management/general contractor (CM/GC) approach for project delivery. Using this approach was beneficial for a large, complex project such as this because it engages the construction contractor early, during the design phase.

The city selected Ward-Henshaw Construction for CM/GC services. The CM/GC approach brought Ward-Henshaw Construction into the project early in the design phase, which allowed it to assist in the development of the project, the scheduling and phasing of construction, the analysis of constructability issues, and providing cost estimates, all of which presented value engineering options.

Because the reservoir was classified by the building code as an essential facility, the ability of the reservoir and pump station to withstand a seismic event was of utmost importance. Geotechnical studies of the project site indicated that a probable earthquake could cause liquefaction of the soils at the project site. Therefore, strengthening of the ground under the project was the first challenge to overcome. The project team determined that the soil improvement option with the lowest impact to the community was cement deep soil mixing. Raito Inc. was selected as the subcontractor to perform the deep soil mixing to inject and mix cement into the existing soils in a grid underlying the reservoir, pipeline and pump station. This process increased the stability and bearing capacity of the soils beneath the reservoir and reduced the potential of subsidence due to liquefaction.

To best address the concern for reservoir seismic performance, a prestressed concrete reservoir was selected and constructed by Ward-Henshaw Construction. Concrete offered a combination of the highest quality, most economical and lowest maintenance solution for the reservoir. The reservoir included specialized seismic connections at the wall base and wall top, allowing for a free connection and ductility of the structure during a seismic event. Additionally, the reservoir walls were compressed both vertically and circumferentially to keep the concrete in its most efficient state, which will give the structure strength and durability over its service life. The specialized prestressing was performed by DN Tanks through use of a strandwrapping machine that tensioned galvanized 7-wire strand to 14,950 lb. Through the wrapping process, the prestressing was recorded continuously and monitored electronically, which ensured that a tight tolerance of the applied force was maintained. The prestressed reservoir ensured an economical project and a structure with the highest level of strength and durability to undergo horizontal and vertical ground accelerations due to a seismic event.

With the combined efforts of the design and construction team the city of Hillsboro selected, the Will Crandall Reservoir and Pump Station Project will meet current water quality and design standards and will continue to offer safe and reliable potable water to the city's water customers. W&WD



Any coach will tell you... it's what's inside that counts.
DN Tanks prestressed concrete tanks can be adapted to a variety of sites - above ground, partially buried or completely buried (as shown) to provide aesthetically pleasing, multi-use facilities. And that's one goal we take to heart.

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