

**Dry Creek Dam: From Debris Basin to Urban Recreation**

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The Dry Creek Dam, located in Utah County, Utah, is owned by the North Utah County Water Conservancy District (NUCWCD). Constructed between 1961 and 1962 by the Soil Conservation Service (now the Natural Resource Conservation Service, NRCS), the dam and reservoir were designed as a flood control and debris retention facility with a maximum height of 37 feet and crest length of approximately 721 feet. Planning to bring the dam into compliance with current state and federal standards, while converting the debris basin into a water storage reservoir and urban recreation facility, began around 2014. Seepage, seismic, and hydrologic design were identified as critical components of the plan to modify the normal use of the dam and reservoir. Geotechnical investigations determined that foundation treatment of the original dam did not adequately intercept a highly permeable zone within the left abutment. A plastic concrete wall was designed to cut off the high permeability zone. Dry Creek dam is located 3.7 miles west of the Wasatch Fault. Geologic studies determined the design earthquake for the project has a magnitude of 7.5 and a peak ground acceleration of 1.13g. Design of the project included mitigation of potentially liquefiable foundation materials, wide internal filter and drainage zones, and increased freeboard to accommodate seismic deformation. Based upon hydrologic evaluations performed using methods described in HMR-49, a 6-hr PMP event at the site would result in 9.4 inches of precipitation over the 38.9 mi<sup>2</sup> drainage area, producing a PMF peak reservoir inflow of 42,287 cfs and total reservoir inflow of 10,085 acre-feet. Using studies completed for the Utah Division of Water Resources between 1995 and 2003 for spillway design evaluations, a 24-hour rainfall event resulting in a peak reservoir inflow of 14,890 cfs and total reservoir inflow of 8,337 acre-feet was selected as the design Spillway Evaluation Flood (SEF) to meet NRCS design criteria. The design SEF according to Utah State Dam Safety requirements had a peak reservoir inflow of 8,661 cfs and total reservoir inflow of 11,631 acre-feet. Three-dimensional Computational Fluid Dynamics (CFD) analyses were used to design the reinforced concrete spillway structure, resulting in walls up to 39 feet high along the sides of the dissipation basin. The design was accepted by the owner and regulatory agencies in 2019, with construction scheduled for completion in the Spring of 2021.