



PROJECT DESCRIPTION SHEET



GEOTECHNICAL AND WATER RESOURCES ENGINEERING



KEY ENGINEERING ELEMENTS:

- Hydraulics/hydrology
- Dam hazard classification
- Geotechnical borings and field testing
- Stability/seepage analyses
- Construction drawings and specifications

CLIENT BENEFITS:

- Upgrade of an existing facility to meet current dam safety standards while incorporating features to satisfy adjoining property owners' aesthetic concerns
- Coordination with SEO
- Work closely with the City to prepare contract documents for construction by City personnel or by an outside contractor
- Complete the project in multiple phases to allow the City to spread the cost of the project over multiple fiscal years
- Innovative final design resulted in cost savings of 40 percent from conceptual design

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LAMBERSTON LAKES No. 3 DAM, ADAMS COUNTY, CO CITY OF THORNTON

Lambertson Lakes No. 3 Dam is a homogeneous earthen embankment, located in a residential and commercial area of the City of Thornton, Colorado. The dam is approximately 20 feet high and 450 feet long. The dam was presumably constructed during the 1930's for agricultural purposes although no records exist regarding design or construction. The City obtained ownership of the dam in 2002 during nearby residential development. At the time of acquisition, the City was not informed that the No. 3 Dam was a jurisdictional facility as defined by the State Engineer (SEO). In 2006, the SEO inspected the dam and identified several safety deficiencies. Identified deficiencies and concerns included uncontrolled embankment and foundation seepage, embankment stability, undersized spillway, lack of low-level outlet, and overgrowth of trees and shrubs.

The City retained RJH Consultants, Inc. (RJH) to evaluate the existing dam and develop a final rehabilitation design based on a preferred alternative concept developed previously by others. The rehabilitation concept involved completely replacing the existing dam with a new structure in the same location and designing the new dam in accordance with current requirements for a high-hazard dam. RJH developed a preliminary design to accomplish this, but recognized the extreme conservatism used in previous breach estimates that resulted in the dam just meeting the classification requirement of a High Hazard dam. By collecting geotechnical data, and by assuming a partial rehabilitation of the upper portions of the dam embankment, RJH re-evaluated the breach estimates and concluded that following rehabilitation, the dam would meet the requirements of a Low Hazard dam, thus reducing the design requirements of the SEO. This re-classification resulted in estimated cost savings of approximately \$0.8 million, or 40 percent of the "preferred" conceptual cost estimate.

The primary dam safety issues addressed by RJH included: overtopping potential, uncontrolled embankment seepage, erodible embankment soils, marginally-stable embankment slopes, large vegetation on dam and crest, lack of low-level outlet, lack of slope protection, and an undersized spillway. RJH also worked closely with landscape architects and nearby homeowners to incorporate aesthetic and landscape components into final design.

Construction of the rehabilitation for the dam was completed in June of 2009.

