Irrigation Engineering:
Studies and Expert Witness

- Studies
- Hydraulic Modeling
- Operation & Maint. Considerations
- New & Retrofit
- Expert Witness

WEI has frequently been hired as a subconsultant specialist in evaluating, modeling, and schematically designing irrigation systems for subdivisions and multi-property systems. Using water system network modeling software, WEI models a system and identifies a cost-effective and functional design for capacity, operation, and maintenance. Scour velocities to keep lines clean of sediment when dirty surface waters are used, along with adequate provisions for flushing and draining, are evaluated. Systems include all types of water sources, surface and closed systems, with and without pump stations, and with multiple pressure zones.

Selected Projects

Ruby Canyon Estates North & South, Mack, CO
Hydraulically modeled and designed an irrigation system consisting of two pressures zones, 83 lots, and a pump station. Source, storage, and quality of irrigation water were considered, along with required and potential irrigation usage rates. Consideration was also given to the desired sprinkler systems and required pressures therefor, and also to looping and redundancy, preferred minimum flow velocities, headloss considerations, and flushing systems. Designs addressed irrigation system management and maintenance issues.

Falcon Ridge, Bonneville County, ID
Evaluated water supply with respect to domestic pressure irrigation system needs for a 28 2-acre lot subdivision, prepared computer model, and identified design needs.

5 Acre Homesite, Castle Valley, UT
Was hired as an expert witness to evaluate existing irrigation system and testify in court regarding design deficiencies and impracticality of retrofitting the system. Based on our testimony and supporting documents, homeowner was fully refunded for all costs of the inadequate and unsuitable system.

Ruby Canyon Estates, Mack, CO
Hydraulically modeled and designed for 38 lots with pump station. Quality of irrigation water were considered, along with required and potential irrigation usage rates. Consideration was also given to the desired sprinkler systems and required pressures therefor, and also to looping and redundancy, preferred minimum flow velocities, headloss considerations, and flushing systems.

Blackhawk Subdivision, Bonneville Cnty, ID
Evaluated water, irrigation, and fire flow needs for 3500 acre foothills community, modeled and designed water distribution system, and wells with 14000 gpm pumping capacity, 8000 gpm booster station, and upper and mid-level storage tanks. System included nine pressure zones and 42 PRVs. System build-out peak irrigation flow is approximately 16,000 gpm.

Hacienda Heights, Loma, CO
Evaluated, hydraulically modeled, and schematically designed an irrigation system for a 35 acre subdivision having considerable elevation difference under three scenarios of supply water: from a reservoir pond that straddled the property boundary; from a low-pressure 10 inch line that passed through the property; and from an offsite high-pressure irrigation lateral. Evaluations considered irrigation system management and maintenance, irrigation supply and reliability, and water quality.

Benson Estates, Fruita, CO
Evaluated, hydraulically modeled, and schematically designed an irrigation system for an 8 acre 12 lot subdivision, considering irrigation system management and maintenance, irrigation supply and reliability, and water quality.

Country Club Estates, Grand Jct, CO
Evaluated an existing irrigation system and alternatives for retrofit. Evaluated the challenge of removing sediment from dirty Colorado River supply water, hydraulically modeled and evaluated the system for better function and for expansion for a new phase of the subdivision.

Irrigation Engineering:
System Design

- Reservoirs & Intakes
- Supply & Distribution
- Pump Stations
- Multiple Pressure Zone Systems
- Flush Systems

WEI has considerable experience designing irrigation systems and hydraulic components therefor, including open channel flow facilities for conveyance, erosion control, and maintenance (storm and irrigation water), closed or piped systems for similar and scour velocity concerns (domestic, wastewater, and irrigation lines), and pump station design of various types for various conditions (storm, domestic, and irrigation water pump stations). Pump stations can be simple or elaborate with variable frequency drives, harmonic filters, and power factor correction, with single and multi-stage (vertical turbine) types, and with site and remote monitoring and control.

Selected Projects

Ruby Canyon Estates North & South, Mack, CO
Designed a pump station having two 40 horsepower five stage vertical turbine pumps and one 10 horsepower four stage vertical turbine pump. The pump motors had variable frequency drives with harmonic filters and power factor correction with controls for constant pressure conditions. The pump station had check valves, butterfly valves, bladder pressure tanks, an air release valve, and magnetic flow meters. The design included a low maintenance intake facility.

Blackhawk Subdivision, Bonneville Cnty, ID
Designed booster station with 14,000 gpm capacity, and wells and well house for Well Site #1 with with 4 wells and 3500 gpm capacity. VFDs, harmonic filtering, and remote monitoring with limited control were involved. System build-out peak irrigation flow is approximatly 16,000 gpm.

Ruby Canyon Estates, Mack, CO
Designed a pump station having two 20 horsepower four stage vertical turbine pumps and one 10 horsepower four stage vertical turbine pump. The pump motors had variable frequency drives with harmonic filters and power factor correction with controls for constant pressure conditions. The pump station had check valves, butterfly valves, bladder pressure tanks, air release valves, and magnetic flow meters. The design included a low maintenance intake facility.

South Avenue Reconstruction, Grand Junction, CO
As part of a 4 block street reconstruction project, designed landscaping irrigation main system on both sides of the street.

Falcon Ridge, Bonneville, CO
Evaluated water supply with respect to domestic pressure irrigation system needs for a 28 2-acre lot subdivision, prepared computer model, and identified design needs. Designed a self-cleaning intake from the canal, pump, VFD, diaphram pressure tank, and limited SCADA.

Private 5 Acre Homesite Irrigation System, Castle Valley, UT
Evaluated existing irrigation system and alternatives for retrofit. Finding no practical solution to resolving problems with the newly installed irrigation system, was hired as an expert witness to testify in court regarding existing design deficiencies and impracticality of retrofitting the system. Based on our testimony and supporting documents, homeowner was fully refunded for all costs of the inadequate and unsuitable system.

32-1/2 Road, Mesa County, CO
Design of a 1/4 mile long concrete ditch replacement with a pipe irrigation system and related appurtenances for irrigation laterals and turnouts along the way.

Hacienda Heights, Loma, CO
Designed irrigation distribution system for a 35 acre subdivision and a pump station. Both distribution system and pump station were provided with easy to use flush drains. The pump station was design with a low-maintenance intake from an irrigation reservoir. Alternatively, if necessary easements could be obtained, a design without a pump station was prepared for a new high-pressure line from the irrigation company lateral per their requirements.

Benson Estates, Fruita, CO
Designed irrigation distribution system and pump station for a 12 lot subdivision.