Wastewater Engineering:
Studies and Masterplans

- Comprehensive Facility Planning Studies (meeting NEPA & SRF requirements)
- I&I and Wet/Dry Weather Studies
- Modeling Analyses
- CIPs and CAPs
- Feasibility and Regionalization Studies
- Master Plans
- Sanitary Sewer Evaluation Survey (SSES) Activities

WEI has performed many types of wastewater studies and masterplans. From large development driven feasibility, capacity, and basin regionalization studies, to masterplans and wet and dry weather dynamic hydraulic models, up to comprehensive Facility Planning Studies meeting federal planning statutes. Some specific analyses include infiltration and inflow studies and sanitary sewer evaluation survey (SSES) activities that include flow monitoring, smoke and dye testing and field inventories to inspect and evaluate system conditions. WEI studies have included Capacity Assurance Plans incorporating existing and future capacity needs, identifying limitations, and developing operating, capital, and financing plans to satisfy those needs. O&M solutions and techniques for collections systems as well as rehabilitation solutions have been part of some of these studies. Project conditions included high ground water, aerial and buried river crossings, and existing and proposed lift stations. Evaluations encompassed conventional and various alternative sewage systems including flat grade sewers, grinder pressurized, septic tank effluent pumped (STEP), vacuum, and other systems.

Selected Projects

Preston-Franklin Masterplan, ID
Performed hydraulic modeling for Cities of Franklin and Preston, and a masterplan for wastewater regionalization for both cities and Franklin County.

Preston I&I Study, ID
Evaluated and identified I&I quantities using flow monitors, smoke & dye, and field investigations.

3rd West Area Study, Rexburg, ID
Establish university single student housing diurnal curves for weekdays and weekends, evaluate impacts of proposed developments on outfall, recommend improvements.

Fruitvale Water & Sanitation District Study, Grand Jct., CO
Televised and evaluated lines, monitored system flows, estimated system-wide build-out flows, determined Manning "n" values of sewers, and evaluated line capacity.

Combined Sewer Separation Master Plan, Grand Jct., CO
Analyzed 3.75 square miles of downtown Grand Jct. for separation of combined sewers and stormwater master plan. Project involved modeling and analysis of 10 subbasins with approx. 60,000 feet of pipeline and $12M of improvements. Masterplan req'd coordination with the City, railroad, utility companies, and several state and federal agencies.

Community Masterplan Update, Fruita, CO
Evaluated sewer system, made projections, identified systematic upgrades, and updated the sewer master plan for a community with population of 8000.

Rexburg Wastewater Facilities Plan, ID
Performed flow monitoring and calibration for city of 25,000, and prepared hydraulic model and masterplan for growth and possible regionalization.

North Delta Sewer Feasibility Study, Delta County, CO
Studied 3.5 square mile area, investigated conventional and various alternative sewage systems, including flat grade, grinder pressurized, septic effluent pumped (STEP), and vacuum sewer systems.

Country Club Park, Grand Jct. CO
Sewer feasibility study involved 65 lots, considering shallow and deep conventional sewers, septic effluent pumping (STEP) systems, and grinder pressure systems.

D Road Interceptor Feasibility & Cost Study, Clifton, CO
Study involved conceptual plan and detailed profile of 25,800 linear feet of 18 inch to 30 inch sewer line, with crossings of another district's sewerlines, storm drain and large water lines, and five major drainageways, and detailed costing.

Regional Sewage Pumping Study (D & 35-5/8 Road Area), Grand Junction, CO
Evaluated the feasibility of eliminating two limited capacity lift stations and providing a new centrally located regional lift station that would service considerably more area than the two existing lift stations.

Wastewater Engineering:
Sewer and Local Improvement Districts

- **Experienced with Improvement Districts**
- **Conventional and Alternative Systems**
- **Onlot Service Design**
- **Coordination with Homeowners**

WEI has performed the design for many sewer and local improvement districts. Projects included lift station design and abandonments and involvement with various state and federal agencies. Two projects alone, completed over an 8 month period by WEI, involved 57,529 feet of sewer line, 448 complete sewer service designs, with 10,000 feet of service trench, the abandonment of three lift stations and the design of two new lift stations, 4,402 feet of force main, 570 plan and profile sheets, a directional bore under a state highway, a bridge-suspended line, and extensive coordination with 435 property owners.

Selected Projects

Skyway Sewer Improvement District, Mesa County, CO
Design of 36,659 lineal feet of sewerline, 238 services and 5500 lineal feet of service trench, abandonment of two lift stations and design of a larger lift station, 320' directional bore, and related work to service an area that was on septic systems. The plan set included 297 plan and profile sheets, and extensive coordination with 225 property owners.

Redlands Village North Sewer Improvement District, Grand Jct., CO
Design 20,870 lineal feet of sewerline, 210 services with 4500 lineal feet of service trench, abandonment of one lift station and design of a larger lift station, 4402 LF force main, and related work to service an area that was on septic systems. The plan set included 273 plan and profile sheets, and extensive coordination with 210 property owners.

Northfield #2 Glen Caro Sewer Improvement District, Grand Jct., CO
Designed 10,351 lineal feet of gravity sewerline, 54 services with 2275 lineal feet of service trench, 42 manholes, and related work. The plan set included 72 plan and profile sheets, and extensive coordination with 55 property owners.

Columbine Sewer Improvement District, Mesa County, CO
Designed 9,729 lineal feet of gravity sewerline, with 66 services, 2572 lineal feet of service trench, 33 manholes, and related work. The plan set included 83 plan and profile sheets, and extensive coordination with 66 property owners.

Northfield Estates Trunkline Sewer and Improvement District, Grand Jct., CO
Designed sanitary sewer extension with services to provide centralized sewer service to property owners of a subdivision.

Dressel Drive & Country Club Park Sewer District, Grand Jct. CO
Designed 10,061' sanitary sewer extension with services and 11 effluent pump stations to provide centralized sewer service to property owners of two subdivisions.

Rosevale Area Sewer Improvement District, Mesa County, CO
Designed 16,434' sanitary sewer, 112 services to lots on septic, and a lift station. High groundwater, flowable sands, and soupy clay lenses were special design considerations.

Mays Subdivision Sewer District, Grand Junction, CO
Designed 3338' sanitary sewer extension with services to provide centralized sewer service to 44 property owners.

Wastewater Engineering:
Sanitary Sewer Extensions

- Large Dia. Sewers
- Aerial Sewerlines
- Open Cut River Crossings
- Directional & Jack Borings

WEI has designed many capital improvement sewer line extensions. Projects have included large diameter sewers, aerial lines over drainageways and rivers, open trench river crossings, both directional bore and jack and bore lines under highways, interstates, canals, rivers, congested utility corridors, and along trees and structures as protection. Designs include lift station design and abandonment, environmentally sensitive areas, and coordination and approval from state and federal agencies.

Selected Projects

Greenway Business Park Sewer Extension, Fruita CO
Designed 4323 LF of 8” to 18” gravity sewer and 7362 LF of force main, a directional bore under a wash, preliminary evaluation and design of 5 lift stations and final design of 2 lift stations, a recessed wet well mounted andr a dry pit with wet well, both with VFDs and web-based SCADA ethernet radio monitoring system and back-up power systems.

Cives Steel, Ucon, ID
Designed 3100' sewerline extension to Cives Steel.

Appleton Sewerline Extension, Mesa County, CO
Designed 2270 feet of sewerline in I-70 ROW and a 189 foot 30” diameter bore.

26 Road Area Sewer Improvement District, Grand Junction, CO
Designed 8,051’ sanitary sewer and 23 services to lots on septic. Crossed three canals and designed for soft soupy clay subgrade.

Hwy 6 & 50 Sewer Extension, Grand Junction, CO
Designed sewerline extension along highway and designed a small package lift station.

New Sweden Sewer Interceptor, Bingham & Bonneville County, ID
Designed 20,113 feet of 12” to 21” sanitary sewer line including a 570’ aerial force main river crossing, one bore under I-15 and one under the I-15 access road, and two bores under canals.

Limekiln Gulch Sewer Line Extension, Mesa County, CO
Design of 2900 lineal feet of 8 inch sewer line, 500 lineal feet of 24” storm drain, and 500 lineal feet of roadway down a steep and narrow draw. Project also included abandonment of one lift station and the design of new lift station, all in an environmentally sensitive area.

North Delta Sewer Phase 1, Delta Cnty, CO
Performed design of Phase I of the project, consisting of over a mile of 12” line, a crossing of a highway and the Colorado River, and a lift station.

Val Vista Lakes, Gilbert, AZ
This involved the design of sewer facilities for an 800-acre development involving over 19 miles of sewer.

Wastewater Engineering:
Sewerline Replacements and Rehabilitation

- Congested Utility Corridors
- Pipe Bursting
- Cured-in-Place Liners For Pipes and MH's
- Line Smoking & Dye

WEI has designed many capital improvement sewer line replacements and rehabilitation. Projects have included replacement in old streets very congested with utilities, very soft subgrades, emergency replacement design for a 24 interceptor along a washed out riverbank, and trenchless technology such as pipe bursting and cured-in-place liners. Sewerline smoking and use of dye in services for tracking has also been used on several projects. Jobs have also included manhole rehabilitation.

Selected Projects

South Avenue Reconstruction, Grand Junction, CO

Roadway contained 24", 21", and 15" parallel combined sewers. Designed for combined sewer separation using existing lines and some new sanitary sewerline. Smoked lines and flushed dye down toilets to determine all active services from what sources going to which lines. Special challenges were other utilities in the same street - two active waterlines, a medium pressure 10" gas line, 12" high pressure gas line, two banks of underground electric, overhead high voltage lines, irrigation pipeline, underground telephone, and a new 48" storm drain, all in 80' of R.O.W.

1996 Sewerline Rehabilitation, Grand Junction, CO

Design rehabilitation of 3672 feet of 15" to 30" sewerline and manholes in city streets and across private properties in easements, dealing with public, traffic, and utility issues.

Poudre River Interceptor Sewer, Fort Collins, CO

Designed 3,000 feet of 24" emergency replacement sanitary sewer line because the riverbank had washed out. Design included two (2) river crossings.

Peach Street Reconstruction: Phase II, Fruita, CO

As part of designing road reconstruction, designed 2182' of sewer in very soft subgrade and replaced 35 services. Replacement parallel sewer had to cross old town intersections with substantial utility conflicts, plus provide improved service designs for several businesses. Also provided construction oversight.

1998 Sewerline Replacement, Grand Junction, CO

Designed replacement of 6,292 feet of sewerline in seven locations in city streets, dealing with public, traffic, and utility issues.

1997 Sewerline Replacement, Grand Junction, CO

Designed replacement of 2,538 feet of sewerline in several locations in city streets, dealing with public, traffic, and utility issues.

1996 Sewerline Replacement, Grand Junction, CO

Design replacement of 6,833 feet of sewerline and 111 services in city streets, dealing with public, traffic, and utility issues.

Wastewater Engineering:
Sewer Lift Stations

- Site Applications
- Multiple Lift Station Design Types
- VFD's and Harmonic Distortion Suppressor
- Radio & Telemetry SCADA Systems
- Backup Power
- Force Main Design

WEI has designed many sewer lift stations, including submersible, surface and recessed wet well mounted lift stations, and flooded suction wet well and dry well stations. Designs include variable frequency drives and harmonic distortion suppressors, sewage aeration, well and chamber ventilation, and web-based SCADA ethernet radio and telemetry monitoring, SCADA, and warning systems, and manual and automatic power transfer backup systems. WEI is very experienced in force main design, evaluating flow velocities over a full range of operation to balance self-cleaning velocities with pressure head. WEI provides innovative cleanouts on force mains for easier maintenance.

Selected Projects

Ucon Outfall Lift Station, Ucon, ID
The City has a 26,000 linear foot force main that discharges into the Idaho Fall's wastewater system. In order to increase capacity and service area, a new lift station mid-way was desired. Project involves preliminary investigations regarding location, service area, and hydraulics, and design of the lift station.

15-1/2 Rd. & I-70 LS's, Fruita, CO
Preliminary evaluation and design of 5 lift stations and final design and state health dept. approval of 2 lift stations, one a 583 gpm recessed wet well mounted station, the other a 994 gpm dry pit with wet well. Both stations have variable frequency drives and web-based SCADA ethernet radio monitoring system and back-up power systems. A special design consideration was the potential future reverse flow direction to a new WWTF. The 994 gpm station could pump the opposite direction in the force main designed for the 583 gpm station. Both the station and force main were designed for the two flow direction conditions.

Limekiln Gulch Lift Station, Grand Junction, CO
Abandonment of one lift station and the design of a new 388 gpm surface wet well mounted lift station.

Redlands Village North Lift Station, Grand Junction, CO
Abandonment of one lift station and design of a larger 273 gpm surface wet well mounted lift station.

New Sweden Hwy Outfall Sewer, Bonneville County, ID
Performed siting investigation and coordinated with the property owner and power company for lift station to pump over the Snake River.

Country Club Park Lift Stations, Grand Junction, CO
Designed 11 individual lot effluent pump stations to provide centralized sewer to property owners of 2 subdivisions.

Connected Lakes Lift Station, Grand Junction, CO
Abandonment design of two lift stations and design of a larger 288 gpm recessed wet well mounted station lift station.

Rosevale Lift Station, Grand Jct. CO
Designed a 313 gpm recessed wet well mounted station.

North Delta Lift Station, Delta, CO
Designed a two-phase lift station, with a submersible grinder for Phase I and a 229 gpm recessed wet well mounted for Phase II.

Miscellaneous Lift Stations in Fruita and Grand Junction, CO
Designed lift stations for each of the following: Adobe Creek regional area; Spyglass Subdivision; and the Iron Wheel Subdivision.

Hwy 6 & 50 RV Park Lift Station, Grand Junction, CO
Designed a small package lift station for approximately 50 residences.

Wastewater Engineering:
Onsite Sewer Systems

- Site & Soil Suitability Evaluations
- Groundwater Monitoring
- Residential and Commercial Systems
- Conventional and Alternative Systems
- Feasibility Studies

WEI has performed the design for onsite and decentralized wastewater collection, treatment, and disposal systems. Evaluations encompassed site suitability, soil suitability, and groundwater depth and monitoring. Designs range from individual residential lots to various residential lot subdivisions to small commercial applications. Projects included low pressure collection design, packed bed media filter, conventional and pressure distribution, and mound systems. WEI has training, certifications, and design experience in conventional and alternative systems. Feasibility evaluations encompassed conventional and various alternative collection, treatment, and disposal systems including flat grade sewers, pressurized collection and disposal, septic tank effluent pumped (STEP), vacuum, single pass and recirculating packed bed media, gravelless drainfields, and bed drainfields. Designs have been performed to reduce effluent pollutants to or below 4 mg/l (parts per million) nitrates and 1 mg/l phosphorus.

Selected Projects

Ashton ARSR on Sawtell Peak, Island Park, ID
Design of commercial onsite wastewater system for FAA radar station employees. Performed site and soil suitability evaluation in addition to analysis of existing system. Designed intrench sand filter with redundant trench and use of existing seepage pit as backup system.

Henry's Lake Ranch Subdivision, Island Park, ID
Large scale development study that included feasibility and costs of wastewater options. Evaluated onsite collection with gravity and pressure systems for both offsite and onsite treatment. Analyzed capacity and capability of collection and treatment at existing municipal wastewater treatment plant. Evaluated onsite treatment (both onlot and decentralized), and disposal systems.

Olde Staley Springs Resort, Island Park, ID
Design of commercial low pressure collection system and community large soil absorption system. Performed site and soil suitability evaluation and percolation testing. Designed 17 cabin community. System involved grinder pressure collection, primary treatment septic system, secondary treatment recirculating aerobic system, partial tertiary treatment to < 4 mg/l nitrates and < 1 mg/l phosphorus, and final treatment using pressurized drainfield.

Misty Valley Subdivision, Hibbard, ID
Installed groundwater monitoring pipes and performed groundwater monitoring during high groundwater months.

Indian Springs Resort and RV, south of American Falls, ID
Designed replacement and upgrade septic system including new tank, pumps, and drainfield with 12 zones

Natural Gas Company, Fruita, CO
Designed mound system for commercial site that had shallow fractured shale.

Emery Residence, Island Park, ID
Designed a residential onsite wastewater system for an individual residence. Performed site and soil suitability evaluation with an intrench sand filter design

Bar C Meats, Riby, ID
Designed recirculating gravel filter system with special considerations for a meat processing and packaging plant.

Miscellaneous Onsite Septic System Designs, CO & ID
Designed over 100 septic systems for homes. Types included gravel and gravelless trenches and beds, intrench sand filters, recirculating gravel filters, sand mounds, and gravity and pressure systems. Regularly analyze and have designed various pre- and post-septic tank treatment systems and 27 different types of drainfield systems.