Geosyntec consultants

Data Center Services:

Facility Siting and Water Risk Assessment
- Water Supply Security
- Water Quality Assessments
- Municipal Water Infrastructure Review

Water Rights
- Water Rights Acquisition & Transfer
- Water Rights Due Diligence
- Water Banking/Mitigation Support
- Water Replenishment, Including Recharge, Drywells & Offsite Solutions

Water Supply and Well Development
- Aquifer Storage & Recovery
- Instream Flow Mitigation
- Production Well Design, Installation & Rehabilitation
- Water Storage
- Wellhead Protection

Water Treatment and Use Optimization
- Water Chemistry Review
- Cooling Equipment Compatibility Assessments
- Treatment Options
- Feasibility Studies
- Design, Construction Support & Startup Services

Geotechnical and Site Civil
- Geohazard Evaluation
- Foundation Engineering
- Construction Dewatering
- Slope Stabilization
- Surface Water Impoundments
- Flood Control

Data
- Indoor Mapping
- Thermal Mapping
- Site Selection (Seismic, Water Source, Power & Land Use)

Environmental
- Due Diligence, Including Phase I & II Environmental Site Assessments (ESAs)
- Investigation & Remediation
- Vapor Intrusion Risk Assessments
- Air Permitting & Compliance

Stormwater and Industrial Wastewater
- Permitting
- Compliance Monitoring & Reporting
- Stormwater Pollution Prevention Plans & Spill, Prevention Control & Countermeasures
- Stormwater Treatment

Small Modular Reactors
- Siting Support
- Cooling Water Source Evaluations
- Water Treatment & Disposal

Ground Source Heat Pump
- Hydrologic & Thermal Modeling
- Geology/Hydrogeology Feasibility
- Design, Mechanical Contractor Coordination, Permitting & Construction Support

INDUSTRIAL WATER MANAGEMENT FOR DATA CENTERS

Data Center Water Management

Geosyntec data center practitioners have extensive water experience in data centers and other industries where facilities count on the availability and treatment of water and wastewater for mission-critical processes.

Our team's expertise in data centers includes cooling systems and associated water management operations, such as sidestream filtration, reverse osmosis, cooling water chemistry, grey water treatment, wastewater treatment, rainwater harvesting, and water reuse. We also specialize in integrating automation into these systems through advanced instrumentation, control strategies, and process data acquisition.

Our client-focused approach brings experience in process modeling and optimization, data collection, regulatory compliance, and water-process digitalization for cost-effective facility operations and environmental, social, and governance (ESG) metrics.

Clients turn to Geosyntec for comprehensive support, including the following:

- Support design of new or existing facilities
- Manage cooling water quality and recirculating/sidestream strategies to optimize water use, including increasing water reuse and decreasing discharge
- Conduct wastewater treatment, water treatment, reuse, and management
- Assess operational practices and recommend enhancements to data tracking, facility monitoring and control, and chemical management to reduce cost and improve reliability
- Evaluate sustainability enhancements such as alternative source evaluations

Innovative Technology and Custom Engineering

We design and implement tailored technologies such as:

Membrane filtration and reverse osmosis systems

Custom filtration media targeting specific pollutants

Brine management solutions

Water and Wastewater Solutions

Geosyntec's practitioners deliver best-value, practical solutions that address the demands and cost margins facing our clients, including:

- Troubleshooting system performance challenges
- Developing site-wide water balances to support client decisions and risk assessments
- Identifying water and cost reduction opportunities
- Optimizing existing water and wastewater treatment systems to allow for production increases and/or diversifying without major capital investment
- Evaluating potential environmental impacts from proposed changes in operating procedures, production levels, or product formulation
- Complying with changes in permitting requirements
- Planning for facility expansions, refurbishments, or greenfield developments

DATA CENTER PROJECT EXPERIENCE

Data Center Cooling Tower Water Management and Permitting

CLIENT: Confidential | LOCATION: California

A confidential client operating a data center engaged Geosyntec to address challenges with the water supply for their onsite cooling towers. The facility, designed to use both potable and recycled water, faced operational inefficiencies and potential equipment damage due to the quality of the district's recycled water. Geosyntec conducted a thorough technical and permit analysis, evaluating options that included continued use of recycled water, switching to potable water, or pretreating recycled water.

After a comprehensive cost-benefit review and sensitivity analysis regarding facility expansion and water rate increases, Geosyntec collaborated with the client to present their findings to the district. They demonstrated that the use of recycled water was not feasible without significant pretreatment or compromising system performance. As a result of effective negotiations, the district granted a waiver allowing the facility to use potable water as the primary supply, with recycled water as a backup source. This strategic outcome enabled the client to reduce annual operating costs. The district formally acknowledged the effort and diligence of both the client and Geosyntec, highlighting the success of their collaborative approach.

Data Center Cooling Tower Water Management Support

CLIENT: Confidential | LOCATION: Arizona

A data center client in Arizona wanted to address operational challenges with their onsite cooling towers and explore the feasibility of reconnecting the facilities to the city's reclaimed water network to increase sustainability and satisfy increased water demand from facility expansion. The client has requested that Geosyntec assess the technical and regulatory feasibility of connecting the site to the reclaimed water network. In addition, Geosyntec helped the facility evaluate the alternative approaches for online conductivity monitoring to improve operations, as well as supporting improvements to the current reverse osmosis system operations for the cooling water supply. Geosyntec is currently working with local city and state agencies to develop regulatory guidance for reclaimed water use in evaporative cooling systems, creating a legal pathway for reclaimed water use that is currently not permitted. Geosyntec has also drafted a design for water reuse from rooftop adiabatic cooling units with a planned construction date in 2026, projected to decrease facility water consumption by up to 6%.

Amazon Web Services Data Center Water and Wastewater Support

CLIENT: Amazon Web Services | LOCATION: Multiple Sites in Northwest

Geosyntec provides specialized water supply support to Amazon Web Services (AWS) for development of new and existing water sources managed by public water purveyors. Work includes water rights technical assistance to AWS to support the development of new potential data centers, verifying the extent and validity of water rights authority suggested by potential water purveyors. Our water resources engineers and hydrogeologists are currently working to make AWS's planned data centers will have a reliable water supply, with a consistent water quality profile for supply, treatment, and compliance with permitting provisions for land application. Our services also include collecting and synthesizing water-quality data and evaluating the local utility and proposed system capacity for physical water-supply reliability, as well as coordinating with the local utilities and any potential public agencies for permitting regulations.

Data Center Expansion Water Supply Support

CLIENT: Confidential | LOCATION: Washington

Geosyntec is completing a water right due diligence assessment and water right permitting strategy for an existing data center operation in Washington. Under this project, Geosyntec is providing an overview of the likely validity of the water rights portfolio and compare the water right authority to historical water use and future anticipated water demands. Where excess authority exists, Geosyntec is tasked with preparing a plan for protecting the water from relinquishment and monetization of the asset. Where water supply deficits exist compared to anticipated demands, Geosyntec supports identification and acquisition of additional water rights.

Build-To-Suite Data Center Developer Water and Wastewater Support

CLIENT: Confidential | LOCATION: Confidential

Geosyntec is providing hydrogeology and water right technical assistance to a confidential client to develop a water supply for a new data center in the northwest. Work included an assessment of existing site conditions, including wells, water rights, and hydrogeologic conditions, along with a review of legacy site contamination and cleanup. Geosyntec is now assisting with developing plans for a new water supply system including well siting and design, drilling and testing specifications, and regulatory planning and permitting. Our work includes coordinating the work with multiple project partners, including the local utility districts and other site stakeholders.