

Cathrene Diane Glick
Chief Hydrogeologist / Basin Hydrologist / Engineering Geologist

EDUCATION

B.S. Engineering Geology, San Diego State University

PROFESSIONAL REGISTRATIONS

State of California, Professional Geologist, No. 4139 (Issued 4/86)
State of California, Certified Engineering Geologist, No. 1338 (Issued 2/87)
State of California, Certified Hydrogeologist No. 32 (Issued 7/95)

PROFESSIONAL INVOLVEMENT

Forensic Expert Witness Association
National Ground Water Association
Groundwater Resource Association of California
American Water Resource Association
American Geophysical Union
North American Lake Management Association

RELEVANT EXPERIENCE

Ms. Glick has over 30 years of experience in engineering geology, groundwater hydrology, watershed basin hydrology, environmental management, discharge permitting and regulatory compliance, earthquake engineering, geotechnical engineering, and construction technology in private industry and with the federal government.

Managed and performed detailed assessments for the development and sustainable use of groundwater resources including: private and public water well design and construction oversight; well field and basin expansion assessments for Federal properties; and watershed basin hydrology for runoff assessments. Provided basin hydrology assessments for mitigation of flood hazards due to wildfire depletion of hillside vegetation and supported geotechnical engineering design of rigid and flexible debris retention structures.

Managed and performed preliminary and detailed assessments for the development and management of groundwater resources, for groundwater seepage and hillside drainage controls, for assessment of leaking surface and underground storage tanks, for electroplating surface impoundment closures, and for landfill closure investigations. Specific projects have included: ground water basin hydrogeologic modeling for extended development purposes (commercial, residential, and military use), subsurface characterization investigations, ground water characterization studies, determining soil and hydraulic characteristics of aquifer materials, contaminant migration assessments, sensitive receptor risk assessments, professional oversight during tank closures, and remedial feasibility studies. Ms. Glick has also been responsible for design, installation, and maintenance of in-situ remedial systems including: nutrient injection biodegradation, passive bioventing, ground water extraction, vapor extraction, air-sparging/vapor extraction, and ORC injection.

Was the Community Co-Chair for the Moffett Federal Airfield Restoration Advisory Board from 1998-2001 and was actively involved in the coordination of public/regulatory agency reviews and evaluations of site characterization investigations and remedial design alternatives proposed by the Navy. Acted as a facilitator for dialogue between: the Navy; NASA; State, Federal, and Local

Regulatory Agencies; Local Governments; Community Interest Groups; Environmental Interest Groups; League of Women Voters; Commercial and Industrial Firms; and private citizens within the RAB and in public forums.

During her career, Ms. Glick has undertaken the following relevant projects:

REPRESENTATIVE PROJECTS

Reviewing Geologist, City of Brea, CA: Provided geologic and geotechnical engineering project plan review services of subdivision and commercial projects within the City.

Reviewing Geologist, City of Moreno Valley, CA: Provided geologic and geotechnical engineering project plan review services of subdivision projects within the City.

Reviewing Geologist, City of Palm Springs, CA: Provided geologic project plan review services of subdivision projects within the City.

City of Rolling Hills Estates, Peter Weber Equestrian Center Modernization, Rolling Hills Estates, CA: Provided geotechnical engineering and geo-environmental investigations for modernization of an existing equestrian center located adjacent to and above former landfill complex.

Watershed Runoff and Flood Hazard Analysis, Sunnymead Ranch Homeowner Association, Moreno Valley, CA: Provided hydrologic assessment for watershed runoff and flooding associated with the December, 2010 rainfall events.

Hydrology Assessment – New Construction Support for Corydon Industrial Phase 2, Lake Elsinore, CA: Performed watershed hydrologic runoff assessment in 2009 to support new commercial/manufacturing development adjacent to Lake Elsinore.

Burned Watershed Debris Runoff Hazard Mitigation Plan, Catalina, CA: Provided hydrologic, geologic, hydrogeologic, and geotechnical engineering services for the runoff analysis and design/construction of debris basins and debris deflection walls to protect public and private property from erosion and flooding as a result of the 4,700 acre fire on Catalina Island in 2007.

Surface Water Drainage Alteration and Groundwater Seepage Claim – Litigation Support, Private Property, Palm Springs, CA: Providing hydrologic and hydrogeologic assessment and litigation support to evaluate claim of surface water runoff alteration and initiation of groundwater seepage for residential lot development.

Watershed Runoff and Flood Hazard Analysis – Litigation Support, Plaza Mini Storage, Loma Linda, CA: Performed hydrologic assessment and providing litigation support for watershed runoff and flooding associated with the December, 2010 rainfall events. Preparing engineering plans for remedial drainage control.

Watershed Runoff and Flood Hazard Analysis – Litigation Support, Plant Warehouse, Castaic, CA: Provided hydrologic assessment and litigation support for watershed runoff and flooding associated with the 2005 rainfall events.

Uncontrolled Surface Water Discharge and Slope Failure – Litigation Support, Private Property, La Habra Heights, CA: Provided hydrologic assessment and litigation support for surface water runoff and slope failure associated with the 2005 rainfall events.

Common Driveway Surface Drainage Assessment, Townhome Development, Santa Ana, CA: Provided hydrologic support to assess uncontrolled surface water flow into residential units from common driveway and preparation of remedial regarding and drainage plan.

Subsurface Discharge and Seepage Analysis – Litigation Support, Private Residential Property, Encinitas, CA: Provided hydrogeologic and hydrologic litigation support for uncontrolled groundwater seepage from hillside.

Subsurface Seepage Analysis and Remedial Design, Townhome Residence, Newport Beach, CA: Provided hydrogeologic support to determine cause of subsurface water intrusion into residential units and development of subdrain designs to abate situations. Provided construction support for depth and grade control of drains and waterproofing of foundation exterior walls.

Subsurface Discharge and Seepage Analysis – Litigation Support, Townhome Residence, Marina Del Rey, CA: Providing hydrogeologic and hydrologic litigation support for uncontrolled groundwater seepage from over irrigation and leaking water lines in residential community.

Subsurface Seepage Analysis – Litigation Support, San Clemente, CA: Provided hydrogeologic and hydrologic litigation support for uncontrolled groundwater seepage from leaking City water lines in residential community.

Dewatering and Subsurface Seepage Analysis – Construction Claim Support, Santee, CA: Provided hydrogeologic support for uncontrolled groundwater seepage construction dewatering activities for a new medical facility structure.

Subsurface Discharge and Seepage Analysis, Portola Valley, CA: Provided hydrogeologic and hydrologic analysis and mitigation design for uncontrolled groundwater seepage from hillside for a single-family home site.

Santa Clara Valley Water District, San Jose, CA: Conducted a hydrogeologic analysis and to develop a detailed stratigraphic analysis of the Church Ponds Percolation Basin and to develop and validate a 3-dimensional stratigraphic and ground water flow model to define the hydraulic properties of the aquifer system for development of a Basin Management Plan and for subsequent contaminant plume migration risk assessment.

Proposed Family Housing Project, Marine Corps Mountain Warfare Center, Bridgeport, CA: Project included preliminary hydrogeologic investigation of proposed new family housing development and included geophysical investigations, geologic mapping, hydraulic modeling of ground water resources, installation of test wells, pump testing, and validation of hydrogeologic model. Project proceeded to construction design and specifications, contractor bidding and selection, and field inspection/construction support during production well construction.

Hydrogeologic Investigation, Well Design and Construction Support, Presidential Residence Santa Barbara County, CA: Ms. Glick was involved in performing geologic reconnaissance mapping, hydrogeologic assessment, and ground water basin modeling for expansion of domestic water supply wells for Presidential Residence in Santa Barbara County.

Ground Water Basin Management, Marine Corps Base Twentynine Palms, CA: Various projects related to primary and secondary ground water basin expansion to support merger of Marine Corps Base Tustin and El Toro to Marine Corps Base Twenty Nine Palms which included detailed numeric modeling of aquifers and water budget balancing. Investigations proceeded to preparation of construction design and specifications, contractor bidding and selection, and supplemental investigations for consideration of tertiary waste water treatment systems and percolation basins to support water balance.

Preliminary Hydrogeologic Assessment, Jack Nicholas Golf Course & Residential Community Ruby Hills Development, Livermore, CA: Project included geologic mapping, hydrogeologic investigations, and water budget estimates and basin balance modeling to support development of a new golf course and residential community. Proposed irrigation requirements exceeded 2-million gallons of water per day composed of municipal water supply, on-site ground water production, and use of reclaimed water from pre-packaged tertiary wastewater treatment systems and percolation basins to support water balance.

Hindcast Wave Runup Analysis, Button Shell Cove, Santa Catalina Island, CA: Performed hydrologic and numerical analysis to evaluate storm surge, storm wave runup and tsunami wave runup for tenant facilities located at Camp Fox on the leeward side of Catalina Island.

Open Channel Realignment, Naval Radio Station, Jim Creek, WA: Provided design support for re-alignment and stabilization of 2.5 miles of un-lined river including hydraulic modeling, scour analysis, rip-rap design, shot-crete rock stabilization, and re-vegetation of environment. Provided construction support including rock quality control for rip-rap, excavation observation and approval, concrete and fill placement observation.

Breakwater and Seawall Repairs, Naval Station, Adak, AK: Provided design support for reconstruction of breakwater and seawall including hydraulic modeling, wave design calculations, scour and over-topping analysis, and rip-rap design. Provided construction support including quarry management, rock quality control for infill soils and rip-rap, excavation observation and approval, fill and rip-rap placement observation

Lake Condition and Circulation Assessment, Village Park Pond, Lake Forest, CA: Performed a lake condition and circulation assessment to improve water quality and wildlife habitat.

Lake Condition Survey, The Lakes Country Club, Palm Desert, CA: Performed a lake condition survey for 23 lakes situated within a combined residential and country club development. Project included visual survey of lake perimeters and liners to assess integrity and continued serviceable life, water budget assessment, circulation assessment, pump evaluations, and water quality assessment for sustainable aquatic habitat.

Lake Sediment Survey, Moreno Valley Ranch Lake, Moreno Valley, CA: Performed a lake sediment survey to assess vertical and lateral extent of sediment deposition and sources of sediment from erosion and storm drain discharge.

Flood Hazard and Lake Rehabilitation Assessment, Village Lakes Homeowner Association, Highland, CA: Performed lake condition assessment and prepared remedial options for community lakes which were inundated with sediment and debris from uncontrolled watershed runoff and flooding associated with the December, 2010 rainfall events.

Lake Condition Survey and Bulkhead Wall Distress Assessment, Sunnymead Lake and Dam, Moreno Valley, CA: Performed a lake condition survey for flood control reservoir (lake) situated in a residential development. Project included visual survey of lake perimeter bulkhead wall and clay liner to assess integrity and continued serviceable life, water budget assessment, circulation assessment, dam settlement survey, and water quality assessment for sustainable aquatic habitat.

Lake Bulkhead Wall Distress Investigation and Circulation Assessment, La Mirada Lake, La Mirada, CA: Performed a lake condition survey for distressed bulkhead walls around the perimeter of a municipal recreational lake. Project included visual survey of lake bulkhead wall and clay liner to assess integrity and continued serviceable life, subsurface investigation and engineering analysis, and preparation of repair plans to stabilize lake perimeter. Also performed lake circulation assessment to improve water quality and wildlife habitat.

Landslide Reconstruction, Metagenics Facility, San Clemente, CA: Performed geologic mapping and geotechnical investigation of a slope failure occurring within a previously stabilized landslide. Project included development of plans and specifications and construction oversight for remedial earthwork (including temporary utility service stabilization) and subdrains for stabilization and slope reconstruction.

Landslide Mitigation, Private Property Owner, Vineyard Heights, Fremont, CA: Provided professional consultation to home owner who's property was partially engulfed within the rapidly moving Mission Peak landslide mass which threatened the structure. In association with the project geotechnical engineer the building contractor was directed to excavate a "decoupling trench" in excess of 25-feet deep to reduce the lateral loads being exerted on the pile foundation and to stabilize/reduce the ongoing structural deformation while the residence and underlying ground continued to move with the slide mass. Structure, foundation and ground stabilized and residence occupied with limited exterior cosmetic repairs without evacuation.

Landslide Reconstruction/Stabilization, Private Developer, Hayward, CA: Performed geotechnical and geologic Investigations of residential property which failed due to slide activity. Investigation included slope stability analysis, hillside dewatering design, and structural pile and shear pin foundation system to support earthwork and redevelopment of the property.

Hillside Stabilization, Naval Radio Station, Jim Creek, WA: Performed geologic mapping and subsurface investigation of 3-square mile glacial till landslide masses which continually moved as debris flows and disrupted VLF transmission ground plane array. Installed extensive horizontal drain galleries to dewater hillsides and stabilize slide mass.

Engineered Fill Ground Movement Assessment – Litigation Support, Single Family Home Site, Anaheim, CA: Provided engineering geology litigation support to assess subsurface soil/geology characterization for assessment of single family home structural distress due to movement of the engineered fill soils and underlying geologic sediments.

U.S. Navy Enlisted Personnel Family Housing Project, United States Marine Corps Training Center, Twentynine Palms, CA: Performed geotechnical engineering and seismic hazard assessment investigations for design-build and competitive-bid construction contracts for new enlisted personnel family housing development. Provided construction oversight for earthwork, utilities, and foundation construction activities.

U.S. Navy Officer Family Housing Project, United States Marine Corps Training Center, Twentynine Palms, CA: Performed geotechnical engineering and seismic hazard assessment investigations for design-build and competitive-bid construction contracts for new officer family housing development. Provided construction oversight for earthwork, utilities, and foundation construction activities.

U.S. Navy Officer Family Housing Project, Moffett Field Naval Air Station, Sunnyvale, CA: Performed geotechnical engineering and seismic hazard assessment investigations for design-build and competitive-bid construction contracts for new officer family housing development. Provided construction oversight for earthwork, utilities, and foundation construction activities.

U.S. Navy Officer Family Housing Project, Concord Naval Weapons Center, Concord, CA: Performed geotechnical engineering and seismic hazard assessment investigations for design-build and competitive-bid construction contracts for new officer family housing development. Provided construction oversight for earthwork, utilities, and foundation construction activities.

Audie Murphy Residential Community Development, Menifee, CA: Performed geotechnical engineering construction oversight for mass-grading earthwork, utilities construction, and roadway construction activities.

Pedestrian and Vehicular Bridge, Discovery Science Center, Santa Ana, CA: Provided geologic and geotechnical engineering support for design and construction of a vehicular/pedestrian bridge abutting Highway 5 and within Caltrans right-of-way. Provided pile foundation analysis during construction and project management support for earthwork observation, materials testing, and deputy inspection services during bridge construction.

Realignment of Newport Road, Riverside County, CA: Provided geotechnical engineering design services for realignment of 7,000 linear feet of a major roadway extension; bridge, double arch culvert design; and retention basin design. Provided field observation/quality assurance, materials testing, and deputy inspection services during bridge construction.

Single Arch Culvert Bridge, Riverside County, CA: Provided geotechnical engineering design services for drainage crossing utilizing single arch culvert bridge structure. Provided field observation/quality assurance during rock blasting and rock anchor drilling/grouting and foundation soil earthwork, materials testing and deputy inspection services during bridge construction.

Goetz Road Bridge, Riverside County, CA: Provided geotechnical engineering design services for concrete bridge river crossing utilizing pre-cast concrete components. Provided geologic and geotechnical engineering oversight of foundation soil compaction grouting for liquefaction abatement and field observation/quality assurance during foundation earthwork construction.

Bridge Design, Discovery Science Center, Santa Ana, CA: Provided geologic and geotechnical engineering support for design and construction of a vehicular/pedestrian bridge abutting Highway 5 and within Caltrans right-of-way. Provided pile analysis during construction and project management support for earthwork observation, materials testing, and deputy inspection services.

Groundwater Replenishment System, Orange County, CA: Provided Orange County Water District with construction support during contractor tunneling and utility trench excavation portion of project. Project included twelve (12) tunnel excavations through various soil and water seepage conditions and under multiple highway right-of-ways with boring machine and steel sets/timber lagging techniques.

Elsinore Valley Municipal Water District Sewage Lift Station Expansion, Canyon Lakes, CA: Provided project management and professional consultation for observation of rock excavation (blasting, hydraulic expansion, hydrofracture, etc.) up to 65-feet deep within existing residential communities and tunneling (rock boring machine and jack/bore techniques) for connection to existing sewage lift stations. Projects also include ground vibration monitoring and air blast (over pressure) monitoring to assure contractor excavation techniques do not damage adjacent residential structures or cause injury to occupants.

Avenue 42 and Monroe Street Improvements Project, Indio, CA: Provided the City of Indio with project management and professional oversight of inspection, observation, and testing services during rough grading, utility construction, batch plant inspections, asphalt paving inspection and testing, and construction of curbs, gutters, sidewalks, and driveways.

Monroe Street Improvements, Avenue 49 to Avenue 52 Project, Indio, CA: Provided the City of Indio with project management and professional oversight of inspection, observation, and testing services during rough grading, utility construction, batch plant inspections, asphalt paving inspection and testing, and construction of curbs, gutters, sidewalks, and driveways.

Varner Road Realignment Phase I Project, Indio, CA: Provided the City of Indio with project management and professional oversight of inspection, observation, and testing services during earthwork, grading, batch plant inspections, concrete highway divide barriers, asphalt paving inspection and testing, and grouted riprap construction.

Cypress Avenue Sewer Replacement Project, City of Fontana, CA: Provided the City of Fontana with project management and professional oversight of inspection, observation, and testing services during utility trench excavation, sewer pipeline placement, excavation backfill, batch plant inspections, asphalt paving inspection and testing, and construction of curbs, gutters, sidewalks, and driveways. Project included observation and inspection of jack and bore tunneling techniques for pipe placement beneath Interstate 10.

Baseline Avenue Sewer and Stormdrain Replacement Project, City of Fontana, CA: Provided the City of Fontana with project management and professional oversight of inspection, observation, and testing services during utility trench excavation, sewer and stormdrain pipeline placement, excavation backfill, batch plant inspections, asphalt paving inspection and testing, and construction of curbs, gutters, sidewalks, and driveways.

Anaheim Unified High School District – Various School Modernization Projects: Provided project management and professional oversight of inspection, observation, and testing services during grading, utility construction, foundation construction, batch plant inspections, structural concrete placement and materials testing, oversight of shop steel fabrication and field welding inspection, bolt and rebar pull testing, roofing inspection, and asphalt paving inspection and testing.

Norwalk-La Mirada Unified School District – Various School Modernization Projects: Provided project management and professional oversight of inspection, observation, and testing services during grading, utility construction, foundation construction, batch plant inspections, structural concrete placement and materials testing, oversight of shop steel fabrication and field welding inspection, bolt and rebar pull testing, roofing inspection, and asphalt paving inspection and testing.

California State University Fullerton Pedestrian Mall, Fullerton, CA: Provided project management and professional oversight of inspection, observation, and testing services during grading, structural concrete placement and materials testing, and asphalt paving inspection and testing.

Multiple Source Plume, City of Burlingame, CA: Provided professional hydrogeologic consultation/oversight during implementation of Phase II Site Characterization Investigations which included definition of the on-site and off-site extent and commingling of multiple- responsible party hydrocarbon plumes (free product). Site investigations included developing detailed work plans, performing an historic property review (including aerial photograph review), installing soil vapor probes, installing additional ground water monitoring wells, installing vapor extraction and air sparging wells. The investigation also included performing vapor extraction and air sparging performance tests for validation of the proposed treatment system design. Provided professional and technical hydrogeology support for design and implementation of the remedial action plan for soil and ground water remediation.

Veterans Administration Hospital Boiler Plant, Menlo Park, CA: Performed a Phase II Site Characterization Investigation for evaluation of the impacts to the underlying soil resulting from releases associated with former underground diesel fuel storage tanks. The site investigation included developing a detailed work plan, advancing exploration borings inside the boiler building, and collecting soil samples for analytical testing to assess the presence and/or absence of fuel products in the soils and ground water at the site.

Mt. Diablo School District Corp Yard, Concord, CA: Prepared a Remedial Action Feasibility Study and implement a Remedial Action Plan to abate the existing “free-product” and associated ground water hydrocarbon plumes through a combined vapor and ground water extraction system. Performed subsequent Ground Water Well and Sensitive Receptor Survey Report and Plume Migration Assessment Reports to support closure.

East Bay Municipal Utility District Corporation Yard, Oakland, CA: Performed Phase II-III Site Characterization Investigations to assess the impact and extent of petroleum hydrocarbon compounds and chlorinated solvent compounds used/stored at the site (including releases from sumps and sanitary sewer lines) and to assess the potential impacts of previous site activities (prior to EBMUD ownership). The second aspect of this investigation was to assess the potential for regional soil and ground water contamination to be present. Information derived from the investigation was included in redevelopment bid documents to describe the site conditions and to identify the presence and/or absence of hazardous materials, which the contractor could encounter.

Prepared a Materials Management Plan to address specific contaminants of concern for construction activities, prepared a risk assessment for these compounds, and established “project wide” remedial goals to support remediation action and reduce construction delays. Supplemental site characterization investigations were performed to further delineate the soil and water contamination per construction phase, to prepare phase-specific remedial action plans, and to perform construction observation and soil/air monitoring to assure compliance with the management plan.