Memorandum

Date:	November 23, 2015
To:	Shawna Purvines, Principal Planner El Dorado County Long Range Planning Division
Cc:	David Defanti, Assistant Director
From:	Antero Rivasplata, AICP Technical Director
Subject:	**Groundwater Management in Fractured Rock Aquifers**

This memo examines the assertion that a groundwater management plan (GWMP) is a common and feasible means of regulating groundwater use in fractured rock aquifers.

Groundwater Management Planning Law

GWMPs have been enacted in numerous counties. These have been prepared pursuant to Assembly Bill (AB) 3030 provisions (Chapter 947, Statutes of 1992). This legislation, as subsequently modified by Senate Bill 1938 (Chapter 603, Statutes of 2002), encouraged local agencies with alluvial groundwater basins to:

> … work cooperatively to manage groundwater resources within their jurisdictions. The preparation of certain basin management objectives will assist local agencies in optimizing local resources while protecting groundwater and surface water resources. The preparation of basin management objectives also will facilitate an understanding of the basin or subbasin, thereby allowing local agencies, individually and cooperatively, to meet local, regional, and state water needs through conjunctive management, while ensuring that no particular water supply is jeopardized.

This legislation has resulted in numerous GWMPs being adopted throughout northern California. These plans typically identify a particular alluvial groundwater basin or sub basins, examine its hydrogeological characteristics, identify concerns regarding groundwater supply, and suggest a number of policies for the orderly management of the groundwater from that basin or sub basins. These are voluntary, unenforceable plans.

AB 3030 has been largely superseded by the Sustainable Groundwater Management Act legislation signed into law in 2014. The Sustainable Groundwater Management Act requires local agencies with

underlying alluvial groundwater basins to form regional groundwater sustainability agencies. These agencies will be responsible for preparing a Groundwater Sustainability Plan for the region that will manage the long-term sustainability of the basin or basins. Few if any AB 3030 GWMPs are expected to be adopted now that the Sustainable Groundwater Management Act is in effect. The Sustainable Groundwater Management Act applies to alluvial groundwater basins that are ranked in priority by the Department of Water Resources. With the exception of South Lake Tahoe'a alluvial basin, the Act does not apply to El Dorado County.

Groundwater Management Plans in Practice

Western El Dorado County, which is underlain by fractured rock aquifers, is distinguishable from areas for which GWMPs have been adopted. We have looked at a number of GWMPs (Butte County GWMP [2004], Calaveras County Water District GWMP [2007], Colusa County GWMP [2008], Lassen County GWMP [2007], and Sutter County GWMP [2012]) and contacted a consulting firm that specializes in these plans. We have not found any that manage aquifers in fractured rock. All of them address alluvial groundwater basins. The difference between fractured rock and alluvial groundwater systems is complexity. In comparison to most alluvial systems, fractured rock aquifers are small and irregular in location. As a result, depth to groundwater and sustainable yield do not operate on a gradient as is common in alluvial systems. Depth to groundwater and sustainable yield may vary substantially over a small area, dependent upon the characteristics of the underlying rock strata and the size and character of the natural recharge area.

As provided in AB 3030, GMWPs are advisory plans without regulatory authority. They consist of substantial data collected about the characteristics of the groundwater basins they cover. They identify potential problems related to groundwater availability and including recommended best management practices for water users. None of the GMMPs we reviewed regulate the installation of wells or the removal of groundwater by overlying land owners.

We also looked at the Monterey Peninsula Water Management District's "Fractured Rock Aquifer Sustainability" report prepared for the District's Water Demand Committee in February 2012. This report describes a detailed methodology for utilizing the District's extensive database and annual private well reporting program (each well owner must report their annual water use) to evaluate the sustainability of the aquifers along and south of the Carmel River. This is a report on the progress of the ongoing study and is neither a GWMP nor a set of regulatory requirements limiting groundwater use.

Preparing a Groundwater Management Plan in El Dorado County

ICF hydrologist Alexa La Plante has prepared the attached model scope and cost estimate for preparation of a GWMP for El Dorado County's fractured rock aquifer. The GWMP would be the documentary basis for a groundwater management ordinance establishing new regulations for

future development. It anticipates the need for extensive, multi-year monitoring of groundwater wells within the rock aquifers to develop the database necessary to support a groundwater model. Public outreach and hearings are also included. The cost of the GWMP, model development, and ordinance is estimated to be approximately $2.6 million.

This is not a proposal by ICF to undertake this work. It is presented as an example of the effort involved in providing neighborhood level modeling of fractured rock aquifers within the County, development of a GWMP, and the associated regulations.

Attachments:

GWMP Scope

GWMP Cost Estimate

Alexis La Plante Resume

El Dorado County TGPA/ZOU EIR
Groundwater Management Program and Plan

ICF will assist the County of El Dorado in developing a comprehensive groundwater monitoring and assessment program and prepare a Groundwater Management Plan (GWMP) to address potential impacts of the El Dorado County's Environmental Impact Report (EIR) for a Targeted General Plan Amendment & Zoning Ordinance Update (TGPA-ZOU) (Project).

Task 1: Groundwater Monitoring and Assessment Program

ICF will assist the County in developing a groundwater monitoring and assessment program comprising a groundwater well monitoring network and geotechnical surveys within community aquifer systems, and development and maintenance of a comprehensive groundwater and soils database. Details are provided below.

Task 1a: Develop Plan and Implement Baseline Well Monitoring Program

ICF will develop a plan for an extensive groundwater well monitoring program to assess existing groundwater supply levels for each community aquifer system within the County. The program will include key elements, such as the identification of wells for monitoring, frequency of monitoring, and monitoring equipment. Groundwater levels will be recorded in the County's groundwater database and summarized on a monthly basis. This task includes 1 year of monitoring to establish accurate baseline groundwater levels within each community aquifer system.

Assumptions:

- A total of 100 wells will be identified for baseline monitoring throughout the County. The number of wells per community aquifer system will be a percentage based on the size (and number of wells within) of the community.
- The wells will be monitored on a bi-monthly basis (every two weeks) for one year. Each well would take 2 hours to monitor on average including set-up and travel time.
- Monitoring equipment will be rented by a local company.

Task 1b: Develop a Plan and Implement Long-Term Well Tracking Program

ICF will develop a plan and implement mid- to long-term data gathering to establish a reasonable evaluation of fluctuations in supply levels for each community aquifer system. The program will be implemented on a monthly basis for a minimum of 5 years and continue throughout General Plan buildout (2035), and potentially beyond. This tracking program would help to accurately assess the variable nature of the fractured rock system within each community.

Assumptions:

- This scope assumes monthly monitoring will occur at 100 wells for a 5-year period. Each well would take 2 hours to monitor on average including set-up and travel time.

Task 1c: Develop Plan and Implement Baseline Geotechnical Surveys

ICF will develop a plan and implement baseline geotechnical surveys to identify for each community aquifer system the underlying water bearing strata. This model would help the County to accurately estimate the thresholds at which groundwater withdrawals may exceed the ability for sufficient recharge to support existing land uses or planned uses proposed under the provisions of the ZOU.

Assumptions:

- This task assumes monthly monitoring will occur at 10 communities for a one time survey. Each survey would take a full day to complete.
- A summary report would be prepared for each survey.

Task 1d: Develop and Maintain a Groundwater Management Database

ICF will develop and plan for maintenance of a database to compile and track groundwater supply levels and related information for each community aquifer system. The database will include spreadsheets with data collected overtime, GIS layers, and any other information collected as part of the Groundwater Monitoring and Assessment Program. In addition, the database will includes notes from community members regarding well observation of supply levels per well.

Assumptions:

- This task assumes development of a database in a County preferred program, such as Microsoft Excel or Access.
- This task includes one training session to County Staff and development of a database user manual.

Task 1d: Develop a Groundwater Management Model and Report

ICF will develop a model based on collected data to assess groundwater levels and ability for long-term sustainability for each community aquifer system. The model will assess both recharge characteristics and future demand at different period scenarios, such as to full buildout and beyond buildout. Even with this information, groundwater supplies are expected to vary from place to place, depending upon the underlying geology, size and accessibility of the aquifer, and its source of recharge. This model would help the County to accurately estimate the thresholds at which groundwater withdrawals may exceed the ability for sufficient recharge to support existing land uses or planned uses proposed under the provisions of the ZOU.

This task includes the preparation of a report summarizing the results from the model and identifying key groundwater issues.

Assumptions:

- This task assumes development of a groundwater model based on the latest and most accurate groundwater supply modeling software. The model would have to easily incorporate data from the groundwater management database.

Task 2: Prepare a Groundwater Management Plan

ICF will prepare a draft and final Groundwater Management Plan (GWMP) for El Dorado County Board approval. Details are provided below.

Task 2a: Draft Groundwater Management Plan

ICF will prepare a GWMP based on the data obtained from the Groundwater Monitoring and Assessment Program and other relevant information for the County aquifer system. The GWMP would quantify available groundwater supplies within the many small aquifers not served by water districts (community aquifers) within the County and prescribe County regulations that would avoid short- or long-term overdraft at any time. The GWMP would include implementable groundwater management measures imposed on property owners by the County.

The draft GWMP will be provided to the County and released to the public for review and comment.

Assumptions:

- This task assumes a draft will be provided to the County first for review and comment, and then be released the public for a 30-day public comment period.

Task 2b: Final Groundwater Management Plan

ICF will incorporate comments provided by the County and public and finalize the GWMP. The GWMP would be presented to the County Board of Supervisors for approval.

Task 3: Develop a Groundwater Management Ordinance

ICF will prepare a draft groundwater management ordinance that would allow the County to regulate groundwater use through issuance of building permits (Title 15, Building & Construction). The groundwater management ordinance would be drafted based on the County's ordinance code format and level of detail.

Assumptions:

- This task assumes ICF would provide a draft ordinance to the County for review and comment. The final ordinance will incorporate revisions based on comments from the County and be prepared for adoption at a County Board hearing.

Task 4: Provide Community Outreach Support

The GWMP would likely involve extensive public involvement of communities within the County. ICF will provide community outreach during development of the GMWP. It is estimated that approximately 30 workshops will be conducted during the preparation of the GWMP, four (4) planning commission hearings, and two (2) Board hearings at the end.

Assumptions:

- This task assumes ICF would provide support at 15 workshops and four (4) planning commission hearings, and two (2) Board hearings.
- ICF would assist in the preparation of meeting materials, take notes, and provide meeting summaries to the public.

Table 1. Cost Estimate for El Dorado County Groundwater Management Plan and Ordinance

	Consulting Staff							Subcontractor		Production Staff							
Employee Name	Rivasplata Ant	La Plante Ale	Sukola Kat	Belby Bre	Huber Ann	Parker Wil											
Project Role	Project Director	Project Manager	Technical Specialist	GW Modeler	Data Analyst	GIS Specialist											
Task *Labor Classification*	Tech Dir	Sr Consult II	Assoc Consult II	Sr Consult III	Sr Consult II	Sr Consult I	Subtotal	Geotechnical Firm	Subtotal	Editor	Support Editor	Pub Spec	Invoicing	Admin Tech	Subtotal	Labor Total	Direct Expenses	Total Price
Task 1: Groundwater Monitoring and Assessment Program							$0		$0						$0	$0		
Task 1a: Develop Plan and Implement Baseline Well Monitoring Prograı	5	40	4,800		15	15	$660,850		$0	10		10			$1,900	$662,750		
Task 1b: Develop a Plan and Implement Long-Term Well Tracking Prog	5	40	12,000		40	20	$1,637,875		$0	10		10			$1,900	$1,639,775		
Task 1c: Develop Plan and Implement Baseline Geotechnical Surveys	5	20					$4,575	$150,000	$150,000						$0	$154,575		
Task 1d: Develop and Maintain a Groundwater Management Database	5	60			100	15	$30,700		$0						$0	$30,700		
Task 1d: Develop a Groundwater Management Model and Report	5	40		200	50	20	$58,575		$0	10		15			$2,375	$60,950		
Task 2: Prepare a Groundwater Management Plan							$0		$0						$0	$0		
Task 2a: Draft Groundwater Management Plan	15	80	100		20	15	$36,350		$0	30		30			$5,700	$42,050		
Task 2b: Final Groundwater Management Plan	10	60	80			10	$24,900		$0			15			$1,425	$26,325		
Task 3: Develop a Groundwater Management Ordinance	10	40	60				$17,250		$0			15			$1,425	$18,675		
Task 3: Provide Community Outreach Support	40	80				20	$26,100		$0			40		40	$6,600	$32,700		
Total hours	100	460	17,040	200	225	115				60	0	135	0	40				
ICF E&P 2015 Billing Rates	$235	$170	$135	$195	$170	$155				$95	$95	$95	$70	$70				
Subtotals	$23,500	$78,200	$2,300,400	$39,000	$38,250	$17,825	$2,497,175	$150,000	$150,000	$5,700	$0	$12,825	$0	$2,800	$21,325	$2,668,500		
Direct Expenses																		
523.02 Reproductions																	$500	
523.03 Equipment Rental																	$5,000	
523.04 Postage and Delivery																	$200	
523.05 Travel, Auto, incld. Mileage at current IRS rate (.575/mile)																	$1,500	
529.00 Other Reimbursable Expenses																	$1,000	
Mark up on all non-labor costs and subcontractors:	10%																$15,820	
Direct expense subtotal																	$24,020	
Total price																		$2,692,520

ALEXA LA PLANTE

Water Quality, Water Supply

Alexa La Plante has experience in federal and state water quality permitting compliance, regulatory agency coordination, water quality technical reports and monitoring studies, water resources planning, watershed management plans, flood management, stormwater management, natural resources, and climate change projects. She is thoroughly familiar with water resources issues, as well as water quality regulatory compliance and related technical studies, in California. Alexa authors CEQA/NEPA sections on hydrology and water quality, and develops Water Quality Assessment Reports, stormwater pollution prevention plans (SWPPPs), water quality and hydrology technical reports. Alexa also performs water quality and hydrological sampling and data analyses. Types of analyses include: water use and water demand analyses, watershed flow and temperature analyses, and water quality data analyses in freshwater lakes, reservoirs and streams. She also performs operation and maintenance of several field water quality instruments. Alexa collected water quality and flow data and conducted an analysis on the transport of contaminants from the Tahoe Keys Marina into Lake Tahoe for her Master's Degree Thesis at UC Davis. Alexa was on the Board of Directors for the Water Education Foundation in Sacramento, California, and she is a member of the State Water Board Industrial General Permit Training Team (IGPTT) to assist in training development for the new Industrial General Permit. She also teaches an annual UC Davis Extension course on Water Quality Regulations and Permitting.

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Key Skills

Hydrological and Water Quality Technical Writing. Alexa writes CEQA/NEPA sections on hydrology and water quality; develops water quality assessment reports, water quality and hydrology technical reports.

Hydrological and Water Quality Data Analysis. Alexa performs water quality and hydrological data analyses using Excel and/or Matlab applications. Types of analyses include: water use and water demand analyses, watershed flow and temperature analyses, water quality data analyses in freshwater lakes, reservoirs and streams.

Years of Experience

- Professional start date: 06/2001
- ICF start date: 07/2010

Education

- MS, Civil and Environmental Engineering, University of California, Davis, 2008
- BA, Environmental Studies, University of California, Santa Cruz, 2001
- University of Costa Rica (University of California Education Abroad Program)
- University of Michoacan (University of California Education Abroad Program)

Professional Memberships

- Society of Women Engineers
- California Stormwater Quality Association (CASQA)
- American Water Works Association (AWWA)

Training

- California Professional in Stormwater Quality (CPSWQ) Course, 2012
- ATV Safety Course, 2010
- Small Water Craft Operation Certification, 2007
- OHSA HAZWOPER Certification, 2003
- California Environmental Protection Agency NPDES Permit Writers Course, 2002

Languages

- Spanish, written and verbal fluency

Hydrodynamic and Water Quality Sampling and Monitoring. Alexa performs water quality sampling and field filtration for lab analysis of parameters, such as metals, nutrients, bacteria, and oil and grease. Operation and maintenance of field water quality instruments, such as YSI multi-parameter sondes, Onset Hobo water loggers and temperature pendants, YSI Sontek and Teledyne RDI Acoustic Doppler Profilers, Marsh-McBerny flow meters.

Project Management and Coordination. Alexa's project management responsibilities include client communication, development of scope of work, project budgets, project set-up, and contracting and billing. She also possesses project coordination responsibilities in the development of a project or project task, such as coordination with the team, from editors and document production to technical authors and senior reviewers.

Stakeholder Relations. Alexa has conducted the stakeholder process for NPDES reissuance for the San Francisco Bay RWQCB and served as technical lead for the climate change and Upper San Joaquin region work group stakeholder efforts for the Central Valley Flood Management Program with DWR.

Project Experience

Transportation—Transit

National Cooperative Highway Research Program Environmental Performance Measures for State Departments of Transportation— United States

Water Quality Specialist. Assisting the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and state departments of transportation (DOTs) with developing a performance measurement approach that gauges the extent of DOTs' efforts to minimize, mitigate and avoid water quality effects through use and effectiveness of Best Management Practices, rather than direct measurement of water quality or ecosystem health conditions.

Anaheim Rapid Connection (ARC) Fixed-Guideway Project—Orange County, California

Served as water quality specialist. Developed the hydrology and water quality technical report for the Project as well as the associated EIR section. The purpose of the proposed project is to increase transit ridership to, from, and within the 5 square-mile study area, which contains the Anaheim Regional Transportation Intermodal Center (ARTIC), the mixed-use Platinum Triangle development area, and The Anaheim Resort®.

East San Fernando Valley Transit Corridor Project Water Quality Technical Report and EIR/EIS—The Los Angeles County Metropolitan Transit Authority (Metro), Los Angeles, California

Water quality specialist. Developed the hydrology and water quality technical report for the Project as well as the associated EIR section. The Project proposes several different build alternatives involving improvements to the bus, vehicle, and bicycle improvements improve public transportation services in the East San Fernando Valley Transit Corridor.

Transportation—Roads, Bridges, and Highways

City of Fontana Interstate 15/Duncan Canyon Road Interchange Project—Caltrans and the City of Fontana, California

Served as Water Quality Regulatory Coordinator. Assisted the City of Fontana with obtaining information regarding their annual permit fee for the Construction General Permit (WDID# 8 362936001) with the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board). Coordinated with the Santa Ana Water Board contact, Mark Adelson, and reconciled billing inquires.

Willits Bypass Project Surface Water Quality Monitoring Quality Assurance Plan—Caltrans, Mendocino County, California

Serves as project coordinator, surface water quality monitoring field activities coordinator, and water quality specialist. Supported Caltrans in complying with the project's 401 Certification issued by the North Coast Regional Water Board. Assisted in the preparation of the Surface Water Quality Monitoring Quality Assurance Project Plan (QAPP), and implemented and managed the water quality baseline monitoring team efforts, which includes monthly field safety and activity meetings. Conducted monthly and storm event-based field water quality and stream flow monitoring at 21 site locations. Trained field team on calibrating and performing quality analysis on water quality instruments, which is performed each month. Analyzed monthly laboratory data.

Doherty Drive, Bon Air Road, and Alexander Avenue Bridges Regulatory Compliance—City of Larkspur/PB Americas, Larkspur, California

Served as water quality specialist. Developed a Water Quality Assessment Report (WQAR) for the structurally deficient bridge structures over Corte Madera Creek that runs along Bon Air Road, Doherty Drive in Corte Madera, and on Alexander Avenue in Healdsburg. Developing a WQAR for a new bridge project to Woodward Island in the San Joaquin River Delta The reports include a project description, description of affected environment, determination of Risk Levels for SWPPP requirements, regulatory setting, environmental consequences, and proposed minimization measures. The results of this WQAR will be incorporated into the Project EIR.

Capital Southeast Connector Programmatic EIR—Capital Southeast Connector Joint Powers Authority, Sacramento County, California

Served as water quality specialist. Authored hydrology and water quality section for the CEQA Program EIR for the proposed Southeast Connector project. The proposed project is a 35-mile roadway that will link communities in El Dorado and Sacramento Counties and the cities of Folsom, Rancho Cordova and Elk Grove.

Water

San Francisquito Creek Flood Protection, Ecosystem Restoration and Recreation Capital Project- Hwy 101 to El Camino Real—San Francisquito Creek Joint Powers Authority (SFCJPA), San Mateo and Palo Alto Counties, California

Serving as deputy project manager and water quality technical lead. Currently assisting with all project management tasks and the water quality/hydrological evaluation for this project. The SFCJPA is a coalition of the affected cities of East Palo Alto, Palo Alto, and Menlo Park,

regional flood control districts, Stanford University, and other parties with a vested interest in flood management and environmental preservation of San Francisquito Creek. This project involves environmental analyses and development of an EIR for the segment of the creek located between Hwy 101 to El Camino Real.

San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project San Francisco Bay to Highway 101—SFCJPA, California

Served as water quality specialist. ICF was retained by the SFCJPA to complete environmental compliance and permitting in support of the project. This project involves environmental analyses and development of an EIR for the segment of the creek located between the San Francisco Bay to Hwy 101. Authored the Hydrology and Water Quality Section of the EIR/EIS.

Bay Delta Conservation Plan—California Department of Water Resources, California

Serving as climate change author. Authoring the Climate Change Chapter of the Bay Delta Conservation Plan (BDCP) CEQA/NEPA EIR/EIS. The project is a comprehensive conservation strategy to advance the coequal planning goals of restoring ecological functions of the Delta and improving water supply reliability to large portions of the state of California. The Climate Change chapter includes project impacts of climate change on project components, such as water resources management, surface water and groundwater quality, and flooding/drainage impacts.

2010 Urban Water Management Plan Update—City of Brentwood, California

Served as project manager and author. Prepared the City of Brentwood's (City's) 2010 Urban Water Management Plan (UWMP) for submittal to the California Department of Water Resources (DWR) as required by the UWMP Act. The 2010 required extensive updates from the 2005 UWMP, including a new template, information, and data analyses. Conducted a water use and water demand analysis on the City of Brentwood's water treatment system, Presented the 2010 UWMP at the City's Board Meeting for approval and prepared the final report for an on-time submittal. Conducted all project management and coordination activities for the development of the 2010 UWMP.

Battle Creek Environmental Implementation Plan—Reclamation, Manton, California

Served as project manager, SWPPP author, and deputy QSD/QSP (QSD/Qualified SWPPP Practictioner). Led the development of a revised Storm Water Pollution Prevention Plan (SWPPP) for the Wildcat Diversion Dam Removal Project. The Project is a component of the larger Battle Creek Salmon and Steelhead Restoration Project, which involves the reestablishment of approximately 42 miles of prime salmon and steelhead habitat on Battle Creek, plus an additional 6 miles on its tributaries. The revision was prompted by a need to update the SWPPP from Risk Level 1 to Risk Level 2 status, based on requirements of the State Water Board's new Construction General Permit (2009-0009-DWQ). The revised SWPPP consisted of a complete replacement of the existing SWPPP and several new components, such as SWPPP template, new project description, data, Best Management Practices, and conceptual designs for erosion control, improved drainage, and stormwate runoff measures. The SWPPP was reviewed and approved by a Qualified SWPPP Developer. The revised SWPPP was developed on-time under a strict deadline to allow for project commencement on the construction start date.

Hinkley Groundwater Remediation Subsequent EIR—PG&E, San Bernardino County, California

Serving as deputy project manager and water quality specialist. Providing agency coordination with the Lahontan RWQCB and managing the development of the Hinkley CEQA Subsequent Environmental Impact Report (SEIR) for the Groundwater Cleanup Strategy for Historical Chromium Discharges from PG&E's Hinkley Compressor Station. The SEIR is based on Lahontan RWQCB's upcoming revision of PG&E's General Site-Wide Permit (or waste discharge requirements) for final site cleanup of the contaminated groundwater plume from the PG&E Hinkley Compressor Station. Assisting in authoring the hydrology and water quality section, as well as several other sections of the SEIR.

San Joaquin River Flow and Southern Delta Salinity Objectives and TMDL—California State Board, Central Valley, California

Served as assistant project manager. The project will assist the State Water Board with the scientific information and tools needed to consider potential changes to the San Joaquin River flow and southern Delta salinity objectives included in the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Bay-Delta Plan), and a program of implementation to achieve these objectives.

Evaluation of San Joaquin River Flow and Southern Delta Water Quality Objectives Substitute Environmental Document—State Water Resources Control Board, California

Serving as assistant project manager and water quality specialist. Assisting in coordination and development of the project CEQA EIR The project will assist the State Water Board with the scientific information and tools needed to consider potential changes to the San Joaquin River flow and southern Delta salinity objectives included in the 2006 Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (2006 Bay-Delta Plan), and a program of implementation to achieve these objectives. Authoring the utilities and groundwater chapters of the EIR, which involve analysis of impacts to wastewater dischargers and water suppliers with water rights in the project area.

Sutter-Basin Feasibility Study Draft Environmental Without Project Conditions Report and EIS/EIR—Sutter Butte Flood Control Agency, Sutter and Butte Counties, California

Served as water quality specialist. Authored the Water Quality and Hydrology Section for the CEQA/NEPA EIR/EIS on the proposed flood management, ecosystem restoration, and recreation-related project in the Sutter Basin study area. Conducted hydrological and water quality analyses from existing data to describe existing conditions in the study area. ICF assisted the U.S. Army Corps of Engineers (USACE), in partnership with the State of California Central Valley Flood Protection Board (CVFPB) and the Sutter Butte Flood Control Agency (SBFCA) in preparing a General Investigation Feasibility Study for the project.

Don Edwards San Francisco Bay National Wildlife Refuge Restoration Project SWPPP and NPDES Construction General Permit Compliance—McMillen, LLC, Santa Clara County, California

Served as project manager, SWPPP author, and deputy QSD (Qualified SWPPP Developer). Leading the development of a Risk Level 2 SWPPP and assisting McMillen with the preparation and submittal of an application for a required NPDES Construction Stormwater Permit (CGP) on

the SWRCB's Stormwater Multi-Application Reporting and Tracking System (SMARTS) database. The SWPPP and application was successfully submitted to the San Francisco Bay RWQCB. This project involves the construction of two restoration ponds (A-16 and A-17) in the United States Fish and Wildlife Service Don Edwards San Francisco Bay National Wildlife Refuge. This project is part of the greater South Bay Salt Pond (SBSP) Restoration Project. The SWPPP consisted of a several components, such as determination of Risk Level, evaluation and recommendations of Best Management Practices, and conceptual designs for erosion control, improved drainage, and stormwate runoff measures. Currently assisting McMillen with Construction Stormwater Permit compliance and Qualified SWPPP Practitioner (QSP) Services, including storm event monitoring and reporting, submittal of annual reports on SMARTS, and stormwater sampling training.

San Francisco Regional Water Quality Control Board—Oakland, California

Served as environmental scientist II in the National Pollutant Discharge Elimination System (NPDES) Division and Watershed Division. With the NPDES Division, managed all Individual NPDES permits for San Mateo and San Francisco counties (SFPUC), as well as Individual NPDES permits for Pittsburg Power Plant in Contra Costa, and Potrero and Hunters Point Power Plants in San Francisco to minimize the discharge of contaminants and impacts on aquatic habitat into the San Francisco Bay. In the Watershed Division, managed the region-wide Industrial and Construction Storm Water Programs in 5,000 sites. Approved Construction and Industrial Stormwater Permit applications, reviewed annual reports, and conducted site inspections. Coordinated Municipal Stormwater Programs in Napa, Sonoma, Marin, San Francisco, and San Mateo counties. Led Storm Water workshops and educated several industry groups and local agencies on BMP measure effectiveness.

Port Projects

San Diego Convention Center Expansion and Expansion Hotel Environmental Impact Report (EIR)—Port of San Diego, San Diego, California

Water Quality Specialist. Alexa authored the Hydrology and Water Quality Section of the San Diego Convention Center Phase III Expansion and Expansion Hotel Project & Port Master Plan Amendment (Project) EIR. The Project covered two main components: (1) the Phase III Expansion and (2) the Expansion Hotel on a 21-acre site that borders the San Diego Bayfront. Existing conditions and potential impacts of the Project on surface hydrology, water quality, groundwater and flooding were analyzed.

Transportation—Rail

California High-Speed Train (HST) San Jose-to-Merced Section, California—California High-Speed Rail Authority

Serves as water quality specialist. Assisting the California High-Speed Rail Authority in authoring the hydrology and water quality section for the CEQA/NEPA EIR/EIS and the Hydrology/Water Quality Technical Report for the San Jose to Merced Section HST study corridor, which extends approximately 125 miles, and lies within the jurisdiction of the Central Valley, San Francisco Bay and Central Coast RWQCBs.

Downtown San Bernardino Passenger Rail Project Draft EA/EIR—San Bernardino Associated Governments, San Bernardino County, California

Served as peer reviewer and water quality specialist. Provided peer review and assisted in the development of the Hydrology, Floodplains and Groundwater Resources Chapter of the project CEQA Environmental Assessment/Environmental Impact Report (EA/EIR). The project involves the extension of the Metrolink regional passenger rail service approximately 1 mile east from its current terminus at the existing San Bernardino Metrolink Station/Santa Fe Depot in the City of San Bernardino.

Energy

Tehachapi Renewable Transmission Project—Southern California Edison; Kern, Los Angeles, and San Bernardino Counties, California

Serving as project manager and permit writer. Preparing 401 Certifications and Waste Discharge Requirements on behalf of the State Water Resources Control Board (State Water Board) for several transmission line segments as part of the TRTP. The lines transmit energy from renewable sources, such as wind and solar power, and cross through water bodies in mountainous, urban and desert areas in southern California. The permits include stormwater requirements and compliance with NPDES permits. Also assists the State Water Board with permit compliance tasks, such as approval of documents, deadline extensions, and field visits.

Hydrology and Water Quality Technical Reports for the Champagne Avenue, Chapparal Solar Project, Tierra Bonita, and Quail Lake Solar Projects—Iberdrola Renewables, Kern and Los Angeles Counties, California

Served as task manager and peer reviewer. Coordinated the development of a hydrology and water quality technical report for a 40-megawatt solar project in Kern County. The report included an environmental and regulatory setting, discussion of potential project impacts on hydrology, groundwater, flooding, and water quality, and recommendations for mitigation measures. A Technical Drainage Study was also conducted using the Rational Method, HEC-HMS and HEC_RAS, in compliance with County requirements.

Champagne Avenue Solar Photovoltaic Project Hydrology and Water Quality Technical Report—Iberdrola Renewables, Kern County, California

Served as task leader and peer reviewer. Coordinating the development of a hydrology and water quality technical report for a 40MW solar project. The report includes an environmental and regulatory setting, discussion of potential project impacts on hydrology, flooding, and water quality, and recommendations for mitigation measures. A drainage study was also conducted using the rational method in compliance with Kern County requirements, as well as HEC-HMS.

Development Projects

Baker Ranch Residential Project IS/MND, City of Lake Forest, Orange County, California

Water quality specialist. Authored the hydrology and water quality section for the IS/MND for the Baker Ranch Residential Project. The project involves development of up to 250 single- and multi-family attached and detached residential units on an approximately 30-acre project site located at 28201 Rancho Parkway in the City of Lake Forest.

City of Fontana Walmart North and South EIS/EIRs—City of Fontana, California

Served as Water Quality Specialist. Alexa authored the Hydrology and Water Quality Section for the North and South City of Fontana Walmart EIR/EIS documents. The projects included construction of a Walmart Store, as well as parcels for the future development of retail, fast food and fueling stations. The project is located within the jurisdiction of the Santa Ana Water Board.

West Valley Logistics Center Specific Plan EIR—City of Fontana, San Bernardino County, California

Served as water resources specialist. Authored the hydrology and water quality section for the EIR to develop an approximately 289-acre site with industrial business park, public facility, and open space land uses within the southeastern portion of the City of Fontana, San Bernardino County, California.

Commonwealth Corporate Center EIR—Sobrato Organization, Menlo Park, California

Served as water quality specialist. Authored the hydrology and water quality section for the EIR the Commonwealth Corporate Center Project. The project involves redevelopment of a corporate campus in the City of Menlo Park for office, biotech, and/or research and development (R&D) space with a capacity of approximately 1,300 employees.

Schools

Glen Mor Student Housing Project—University of California Riverside Campus, California

Water Quality Specialist. Authored hydrology and water quality section for the EIR for the ten acre development project located at the east end of the campus. The project involves five, five-story buildings, a resident services office building, resident community services (computer lab, meeting rooms, fitness room, swimming pool and outdoor recreation spaces), a food emporium, a conference center, and a three-level parking structure.

Publications

La Plante, Alexa. M.S. Thesis. Exchange flow between the Tahoe Keys and Lake Tahoe: The implications for spread of invasive species and pollutants. University of California, Davis. Davis, California. 2008.

Environmental Training and Lecturing

La Plante, Alexa. Water Leader in the 2011 Water Education Foundation Water Leaders Course. Water Education Foundation. Sacramento, California. 2011.

La Plante, Alexa. Instructor for the Water Quality Regulations and Permitting Course. University of California, Davis, Extension Program. Sacramento, California. 2010 and 2011.

La Plante, Alexa. Presented on Exchange flow between the Tahoe Keys and Lake Tahoe: The implications for spread of invasive species and pollutants. 5th Biennial Tahoe Basin Science Conference: Measuring the Success of Ecosystem Restoration in the Lake Tahoe Basin. Incline Village, Nevada. 2010.

Chair of the Sacramento Water For People Organization. Sacramento, California. 2008-2011.

La Plante, Alexa. Graduate Student Peer Leader for the University of California, Davis, Leadership Learning Program. Davis, California. 2005-2006.

La Plante, Alexa. Attended and obtained a certification in the California Environmental Protection Agency NPDES Permit Writers Course. Riverside, California. 2002.

Employment History

ICF International. Water Quality, Water Supply. San Francisco, California. 07/2010–Present.

MWH Americas, Inc. Associate Water Resources Engineer. Sacramento, California. 10/2007–06/2010.

University of California, Davis, Department of Civil and Environmental Engineering. Graduate Student Researcher. Davis, California. 09/2005–09/2008.

San Francisco RWQCB. Environmental Scientist II. Oakland, California. 06/2001–01/2006.

Central America Water Tribunal. Environmental Coordinator. San Jose, Costa Rica. 10/1999–06/2000.