

26 June 2008

Ms. Jill Bicknell
EOA, Incorporated
Assistant Program Manager
SCVURPPP
111 West Evelyn Avenue, Suite 110
Sunnyvale, CA 94086

Subject: Update to Qualifications for Design, Review, and Certification of BMPs

Dear Ms. Bicknell:

In accordance with your request, we have updated our previously submitted and accepted Statement of Qualifications to perform reviews of storm water treatment BMPs and hydromodification flow control facilities. Our 2008 update includes the addition of Lisa Austin, Chris Campbell, and Judd Goodman and the removal of Carol Forrest, Gary Palhegyi, Chris Dean, and Michael Gentile.

Our SOQ remains the same with the exception of these changes. Our firm name and address also remains unchanged, and I will continue as the SCVURPPP's point of contact. Thank you for inviting us to participate in this process.

Sincerely,



Peter Mangarella, Ph.D, P.E.
Associate

Enclosure: Two (2) copies of amended Statement of Qualifications.

2008 Update

Q U A L I F I C A T I O N S



Design, Review,
and/or Certify Storm
Water Treatment
Best Management
Practices and
Hydromodification
Flow Control
Facilities

June 2008



Prepared for
**Santa Clara Valley
Urban Runoff
Pollution Prevention Program**

Geosyntec
consultants

engineers | scientists | innovators

Qualifications for Design, Review and/or Certify Storm Water Treatment Best Management Practices and Hydromodification Flow Control Facilities

Introduction

Geosyntec Consultants is pleased to submit the qualification of its California- licensed professional civil engineers to design, review, and/or certify storm water treatment best management practices (BMPs) and Hydromodification Flow Control Facilities.

Geosyntec Consultants
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Primary contact: Peter Mangarella, PE, PhD
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Principals and Key Personnel

The following table lists Geosyntec Consultants staff qualified to be reviewers.

Geosyntec Qualified Personnel

Name/Geosyntec Title	Location	License	Certifications
Eric Strecker Principal	Portland, OR	PE (CA)	
Peter Mangarella Associate	Oakland, CA	PE (CA)	
Ken Susilo Senior Professional	Los Angeles, CA	PE (CA)	CPSWQ
Lisa Austin Senior Professional	Oakland, CA	PE (WA)	
Chris Campbell Senior Scientist	Oakland, CA	N/A	
Judd Goodman Project Engineer	Oakland, CA	EIT (CA)	
Kim Williams Senior Professional	San Diego, CA	PE (CA)	CPSWQ
Nathan Jacobsen Professional	San Diego, CA	PE (CA)	

Understanding of Urban Storm Water Management Practices, Issues, and Requirements

Geosyntec is active in the storm water management community, and is intimately familiar with issues affecting that community. We are actively participating at a variety of levels that help us understand and be involved in decisions and policies related to Urban Storm Water Management. For example, an important issue is the feasibility of setting numerical effluent limits, in which **Eric Strecker** is one of the experts on the State Water Resources Control Board's Expert Panel. **Peter Mangarella** currently is the Project Manager on a CASQA funded project to evaluate research needs, and related research being conducted by CASQA members and national research groups such as USEPA and WERF.

A major issue for storm water programs is the new development and significant redevelopment requirements that require developers to address water quality and hydromodification impacts, areas where Geosyntec has been involved, both on the public and private side. **Geosyntec** has been a leader in developing methodologies and designs to support hydromodification control. Lastly, TMDLs pose a major challenge to storm water management program, and **Peter Mangarella** and **Lisa Austin** are assisting the San Francisco Estuary Institute in evaluating control scenarios for Hg and PCB discharges into the Bay.

Understanding of Continuous Simulation Hydrologic Models and Analysis of Output Data

Geosyntec has extensive experience applying continuous hydrologic models to engineering and stormwater management projects. The staff at Geosyntec has long been advocates of continuous modeling since the early years of designing water quality BMPs.

Continuous hydrologic modeling more accurately predicts the *true* flow conditions as opposed to predictions using conservatively high flood control methods. Traditional flood control methods appropriately address the infrequent large storm events, conveyance, and public safety. Continuous hydrologic modeling is better when addressing the physical and ecological processes of a riparian system that are functions of the frequent hydrologic conditions (day-to-day, season-to-season), as well as, in some cases infrequent events. Research has shown that continuous hydrologic modeling and analysis of the distribution of runoff (opposed to analysis of discrete events) is the most appropriate approach to address the effects of hydromodification.

New permit requirements (in Provision C.3 of SCVURPPP's NPDES permit) for stormwater discharges from new development and redevelopment projects require dischargers to manage increases in runoff rates, volume and duration where increases from the pre-project condition can cause increased erosion of creek beds and banks. In 2005, SCVURPPP published a management plan (HMP) that identifies flow duration control as the preferred method to address the new permit requirements.

Flow duration control maintains the pre-project distribution of flows (typically hourly), which in turn, maintains the distribution of important geomorphically significant flows¹ in the receiving waters and promotes long-term stability. This approach is designed to maintain the existing erosion and sediment transport processes and not eliminate them and to protect the existing physical and ecological characteristics of the receiving waters.

Flow duration control was first been proposed by Derek Booth (1993), University of Washington. In applying this method, a time series of rainfall (typically 30 years or more of hourly data) is transformed to a time series of runoff using the continuous hydrologic model. The time series of runoff is then transformed to a frequency distribution (histogram) and compared between pre- and post-project land development scenarios. The comparison is best accomplished by comparing continuous frequency distribution curves, or flow duration curves. These curves, as well as the histograms, illustrate the changes in flow rates, volume, and duration between pre- and post-project scenarios.

Designing flow control facilities to match the post-project flow duration curve to the pre-project flow duration curve is the preferred management strategy to address the effects of hydromodification and meet the new provisions in the updated permit.

Overall Project Experience in Design of Stormwater Management Facilities

Geosyntec has extensive experience in the design and construction of storm water treatment BMPs, ranging from development of design guidance, municipal retrofitting, and design and construction of facilities for new development projects. For example, we are currently developing a Stormwater Best Management Practices Design and Maintenance Manual for the County of Los Angeles Department of Public Works, and have developed an Erosion and Sediment Control Manual for the Oregon Department of Environmental Quality. We were the lead firm in a Consultant Project Team for the Santa Barbara County, which involved the selection, design, and construction oversight as part of a \$2M state grant to retrofit BMPs within the county. The project also involved developing cost estimates, plans and specifications, and bid documents. Another exceptional example is the work we are doing in developing and implementing the Irvine Ranch Water District San Diego Creek Natural Treatment Master Plan that involved the development of the plan, and currently the design and construction of the wetland facilities, the first of which were installed in the fall of 2005.

Geosyntec was the lead firm in developing the SCVURPPP HMP and as part of that project, we developed the flow control methodology. As a result, we have designed and sized many flow control facilities using this approach including the San Jose Small Site example, the Alameda County Commercial example, and the Fairfield-Suisun Sizing Charts here in the Bay Area. We

¹ Geomorphically significant flows is a phrase that incorporates all important sediment transporting flows, erosive flows, and flows that influence the geomorphic character of the receiving water channel and riparian corridor.

have also sized several flow control facilities for large land developers in Southern California such as the Rancho Mission Viejo and Newhall Ranch. The project example we have chosen to describe is the Newhall Ranch project because it shows the application of the flow duration control method with several new features.

Project Examples

Newhall Ranch Water Quality Management Plan

Geosyntec is currently assisting the Newhall Land and Farming Company in preparing their Regional Water Quality Management Plan (WQMP), for a 12,000-acre development in Valencia, California. The Newhall Ranch Project is located within the Santa Clara River Watershed and contains ten tributary drainages; each of which must be addressed in terms of hydromodification. The WQMP is consistent with the Los Angeles County MS4 NPDES Permit and the Standard Urban Stormwater Mitigation Plan (SUSMP). Water quality management, including planning for the hydrologic and geomorphologic conditions of concern, is central to assuring the long-term viability of important habitat systems and species dependent upon those systems.

Geosyntec is providing hydrologic, hydraulic and sediment transport analysis, surface water and receiving water quality monitoring, and associated NPDES permit support services. Geosyntec applied the methodology developed for SCVURPPP, including continuous hydrologic modeling and Ep analysis. Using this approach, we compared development alternatives and analyzed the effects of increasing impervious surfaces separate and in combination with proposed flood control channel modifications. For the Project Team, Geosyntec is producing peak flow frequency distributions, flow duration curves, and work curves for multiple locations throughout each tributary. To aid in the application of the flow control requirements – especially in light of the ever changing land plans – Geosyntec developed normalized *Sizing Charts* that relate the volume and land area requirements for flow control facilities to the range of soil type and percent imperviousness expected for this project. These charts provide quick and easy sizing for future planning scenarios.

To help Newhall Ranch decide if flow control facilities or in-stream solutions are more economical, Geosyntec developed a relationship between the land requirements for flow control and the magnitude of in-stream structures required for a complete solution. This relationship allows the client to evaluate the economics of mixed flow control – in-stream solution alternatives. The application of this method to in-stream solutions allows us to identify the equilibrium longitudinal slopes and number of grade controls that maintain the pre-project erosion and sediment transport processes.

Corey Harpole, Director, Community Development
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Geosyntec Personnel: Eric Strecker, Ken Susilo, Lisa Austin, Judd Goodman

San Diego Creek Natural Treatment System (NTS) Master Plan and Design

The San Diego Creek Natural Treatment System (NTS) Master Plan is a comprehensive project addressing regional water quality and Total Maximum Daily Loads (TMDLs) in a 120 square mile, highly urbanized watershed in Orange County, California. Geosyntec assisted in developing the plan for the Irvine Ranch Water District. The overall concept is to create a network of 44 constructed wetlands to treat dry weather base flows and runoff from small storm events. This strategy builds on the local success with constructed wetlands for treatment of nutrients in base flows. Expansion into a network of 44 constructed wetlands is an ambitious and progressive undertaking that may be among the largest use of constructed wetlands in an ‘urban-retrofit’ setting in the United States. Many of the facilities will be located in existing or future flood control facilities without compromising flood control or maintenance of these facilities. The objective of the NTS Plan is to serve as a regional treatment component in the watershed-wide BMP program for compliance with loading restrictions (TMDLs) requiring discharge limits of sediments, nutrients, pathogen indicators, pesticides, toxic organic compounds, heavy metals, and selenium. The effectiveness of the NTS Plan was assessed with water quality models that accounted for the integrated effects of the planned 44 NTS facilities. The work has also included development of a selenium treatment wetland concept and pilot scale testing.

Cienega Filtration Project

As part of the IRWD Natural Treatment System Master Plan, there is a specific concern regarding treating selenium in the San Diego Creek watershed, where groundwater in certain locations has elevated levels of selenium.

The overall objective of this Irvine Ranch Water District (IRWD)/Irvine Unified School District (IUSD) Selenium Natural Treatment System Project (Cienega Filtration Project) is to reduce dry weather selenium concentrations in San Diego Creek. The Project involves the construction of a subsurface flow soil treatment system that reduces mobilized, bio-available forms of selenium to its insoluble, elemental form. In order to meet this objective, design criteria were developed based on initial studies and design concepts conducted by Geosyntec, with Pre-Design Optimization Studies, and a Field Mesocosm Tests to evaluate design alternatives under realistic site conditions and materials. The Pre-Design Optimization Studies illustrated the efficacy of a new technology that meets both selenium-related goals and results in substantial reduction of nitrates, without causing environmental concerns in highly sensitive areas. Based on this knowledge, Geosyntec is preparing final construction drawings and technical specifications.

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Geosyntec Personnel: Eric Strecker, Peter Mangarella, Ken Susilo, Nathan Jacobsen

County of Los Angeles Stormwater Best Management Practice Design and Maintenance Manual

On behalf of Newhall Ranch, Geosyntec is preparing a design and maintenance manual for the County of Los Angeles Department of Public Works to assist the county in the review and approval of stormwater treatment BMP designs and specifications during the plan review process, as well as to provide guidance on maintenance requirements for these BMPs. The manual addresses design specifications such as sizing and geometry, inlet and outlet structures, landscaping, geotechnical considerations, safety, and maintenance access.

The manual also addresses maintenance requirements for each type of BMP. Design and maintenance guidance is provided for dry extended detention basins, vegetated swales, filter strips, bioretention, planter boxes, infiltration trenches, wetponds and lakes, stormwater wetland basins, sand filters, and selected proprietary devices. Design schematics and details are provided that illustrate design specifications. Special considerations such as pretreatment, inline vs. offline design, and soils conditioning are also addressed. Appendices provide extensive information to facilitate implementation of the guidance, including sizing methodologies, inspection and maintenance checklists, and example access and maintenance agreements.

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Geosyntec Personnel: Eric Strecker, Ken Susilo, Lisa Austin

Statement of Commitment

Geosyntec is committed to supporting the SCVURPPP and is very interested in being included on the Qualified Consultant List. We believe that we can be of great benefit given our perspective that draws from both public service, and private sector/developer experience. We have sufficient number of staff to provide timely and responsive service to requests.

LISA AUSTIN, P.E.

**stormwater management
stormwater BMP selection, evaluation and design
NPDES permitting**

EDUCATION

Southern Illinois University at Carbondale: M.S., Civil Engineering, 1992

Southern Illinois University at Carbondale: B.S., Environmental Engineering, 1986

CAREER SUMMARY

Ms. Austin has 18 years of experience in the area of water quality and stormwater management. She has in-depth knowledge of both industrial and municipal National Pollutant Discharge Elimination System (NPDES) permitting; municipal stormwater program planning and operations; stormwater best management practice (BMP) selection, design, and maintenance; and construction erosion control.

Ms. Austin's previous positions have given her the unique perspective of being both the regulator (the State) and the permittee (the City). Through this experience, she has developed an understanding of the complex relationships between Clean Water Act regulatory programs such as the NPDES permitting program and Total Maximum Daily Loads (TMDLs), and other environmental regulatory programs such as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Endangered Species Act.

Ms. Austin has developed many skills through her years of water quality project work, including organizing and leading technical committees; conducting public information meetings and hearings; making technical presentations; writing detailed technical documents such as technical memos, reports, and manuals; contracting; and managing complex projects to meet a budget and schedule.

Stormwater Management

- ***Water Quality Technical Reports for Various New Development and Redevelopment Projects, Southern California.*** Prepared Water Quality Management Plans/Technical Reports for numerous major new development and redevelopment projects in Southern California. These reports identified regulatory issues, pollutants of concern and significance thresholds; identified selected treatment control and hydromodification control BMPs; modeled stormwater runoff volumes, flow rates, and water quality; developed and evaluated the effectiveness of conceptual BMP plans; and assessed the significance of potential water quality and hydromodification impacts (CEQA analysis). Clients include The Irvine Company and Rancho Mission Viejo in Orange County, and Newhall Land and Centennial Founders, LLC in Los Angeles County.

- ***Soledad Townhomes, Newhall Land, Santa Clarita, California.*** Prepared a Water Quality Technical Report (WQTR) in support of the conditional use permitting for the Soledad Townhomes Project, a mixed use project consisting of condominiums / townhomes and commercial floor space on 33.2 gross acres. Provided on-going water quality technical support related to the preparation of final designs for the water quality BMPs specified in the WQTR. Prepared a Project-level SUSMP Report in support of the fine grading/drainage/paving plan submittal to the City of Santa Clarita.
- ***Commerce Center 26363/Gateway 5, Newhall Land, Los Angeles County, California.*** Prepared the Commerce Center TPM 26363 Water Quality Technical Report in support of the conditional use permitting for the project. The 116 acre project site, of which Castaic Creek constitutes approximately 53 acres, is being subdivided into 11 light industrial lots and one open space parcel. Assisted in the preparation of preliminary designs for the water quality BMPs specified in the WQTR and prepared a project-level SUSMP submittal in support of the project's Water Quality Maintenance Map plan submittal to the Los Angeles County Department of Public Works (LACDPW). The SUSMP submittal provided detail to the County on the stormwater treatment BMPs sizes shown on the Water Quality Maintenance Map plan.
- ***RMV Planning Area 1 Water Quality Management Plans, RMV Community Development, LLC, San Juan Capistrano, California.*** The County of Orange has developed a five-level Water Quality Management Plan (WQMP) process, ranging from Level 1 (the Ranch Plan EIR Conceptual WQMP) to Level 5 (Project Specific WQMP). Ongoing water quality technical assistance to Rancho Mission Viejo, after successful completion of the Ranch Plan EIR Conceptual WQMP, includes preparation of a Master Area WQMP, five Subarea WQMPs, and two roadway Project-level WQMPs. These WQMPs comply with the requirements of the County of Orange Board of Supervisors Mitigation Monitoring and Reporting Program. The Master Area WQMP also supported the request for a Section 401 Certification from the San Diego Regional Water Quality Control Board associated with impacts to Waters of the United States and Report of Waste Discharge for impacts to "Isolated" Waters of the State for Planning Area 1. Each WQMP provides more specific information and detail concerning how the provisions of the Conceptual WQMP is being implemented within Planning Area 1.
- ***Amgen Central Campus Redevelopment Post Construction Stormwater Quality Management Program, Amgen Corporation, Thousand Oaks, California.*** Developed a Stormwater Quality Management Program for redevelopment projects on the Amgen Campus in Thousand Oaks, California, including gaining approval from the City of Thousand Oaks for provision of innovative stormwater treatment using cartridge filtration in underground vaults.

- ***Helix Campus Stormwater Pollution Prevention Plan, Amgen Corporation, Seattle, Washington.*** Developed a Stormwater Pollution Prevention Plan for the Amgen Helix Campus in Seattle, Washington. This Stormwater Pollution Prevention Plan focused on source control and operation and maintenance of stormwater treatment Best Management Practices.

Stormwater BMP Selection, Evaluation and Design

- ***LACDPW Stormwater BMP Design and Maintenance Manual, Newhall Land, Los Angeles, California.*** Served as Project Manager for the development of a design and maintenance manual for the County of Los Angeles Department of Public Works, at the request of Newhall Land, to assist the County in the review and approval of stormwater treatment BMP design and specifications during the plan review process, as well as to provide guidance on maintenance requirements for these BMPs. The manual addresses design specifications such as sizing and geometry, inlet and outlet structures, landscaping, geotechnical considerations, safety, and maintenance access. The manual also addresses maintenance requirements for each type of BMP.
- ***Ballona Creek Structural BMP Planning and Implementation Strategy Project, Santa Monica Bay Restoration Commission, Los Angeles, California.*** Served as Project Manager for this project, which developed a planning and implementation strategy that could be used by the various municipalities in the Ballona Creek Watershed to successfully plan, design, implement, and monitor structural retrofit BMPs for stormwater quality management on a subwatershed basis. A key element in the project was to select and design a BMP package that could be successfully implemented in a highly developed urban subwatershed and then to demonstrate, through water quality monitoring, the effectiveness in treating the suite of constituents identified on the 303(d) list for Ballona Creek.
- ***Rancho Mission Viejo Planning Area 1 Water Quality BMP Monitoring Plan, RMV Community Development, LLC, San Juan Capistrano, California.*** Acted as Project Manager for the preparation of a Planning Area 1 BMP Monitoring Plan submitted to the County of Orange as a part of the Planning Area 1 Runoff Management Plan (ROMP). Per the Project Design Features in the RMV Ranch Plan EIR and subsequent County of Orange Mitigation Monitoring and Reporting Program (MMRP), an adaptive management approach will be used to evaluate whether the ROMP and WQMP elements are functioning as intended and to implement corrective actions when needed. The Planning Area 1 Water Quality Monitoring Plan addressed constituents, sampling frequency, sampling locations, field and laboratory sampling methods, quality assurance, data management and analysis. The Plan also included a report template to be used for annual submittal of monitoring data to the County.

- ***Feasibility Assessment for Managing Stormwater Loads in San Francisco Bay, Clean Estuary Partnership, Oakland, California.*** Conducted a survey of municipal stormwater BMP implementation in the San Francisco Bay watershed to assess the current level of stormwater BMP implementation. The survey was designed to gather information on the level of site design, treatment control BMP, and maintenance practice implementation, including costs and design information where available. The primary objective of the survey was to obtain information that would help the Clean Estuary Partnership, a consortium of wastewater and stormwater agencies in the San Francisco Bay area, to better understand the costs, benefits, and feasibility of BMP implementation alternatives for urban runoff programs to comply with the San Francisco Bay mercury, PCB, and organo-chlorine pesticide TMDLs. The survey results were presented in a GIS format linked to a database containing information on catchment characteristics, design criteria, and capital and O&M costs.
- ***City Lagoon Treatment Capacity Evaluation Project, RMC, Inc., Milpitas, California.*** Participated in a reconnaissance-level study to assist the City of Milpitas in quantifying the degree that existing City stormwater lagoons may be used as regional stormwater treatment facilities for new development and redevelopment projects, as allowed under Provision C.3 of their NPDES Permit. Tasks included a regulatory analysis of permit provisions related to regional treatment, technical evaluation of the available treatment capacity in the existing lagoons, and analysis of the cost to a developer for incorporating a treatment BMP on a development project site.

NPDES Permitting

- ***Stakeholder Comments on the Draft California Construction General Permit (2007) and Related Technical Studies, California Building Industry Association, Sacramento, California.*** Assisted the California Building Industry Association (CBIA) in the development of technical comments on the Preliminary Draft Construction General Permit. Tasks involved detailed permit review, and coordination / review of special technical studies to support industry comments. Comments focused on developing a feasible, pro-active BMP approach to construction site compliance. Specific special studies included white papers on post-development hydromodification control and advanced treatment of construction site runoff, as well as developing a revised model for construction site sediment risk (based on site and receiving water characteristics) and recommended minimum BMP requirements associated with each site risk category.
- ***Stakeholder Comments on Draft MS4 Permits, Building Industry Association of Southern California, Diamond Bar, California.*** Assisted the Building Industry Association of Southern California (BIASC) in the preparation of technical comments on draft Municipal Separate Storm Sewer (MS4) Permits for Ventura County and South Orange County. Tasks included conducting detailed permit review of multiple permit

drafts and providing technical comments and assistance to the BIASC, the MS4 Permittees, and Regional Water Quality Control Board staff.

- ***NPDES Phase II Permit Technical Assistance, City of Bellevue, Bellevue, Washington.*** Provided technical assistance to the City of Bellevue and the Washington State Department of Ecology in support of the issuance of the NPDES Phase II Permit. Tasks included identifying special purpose districts for inclusion in the permit and developing a model Interlocal Agreement for use by Special Purpose Districts and the jurisdictions in which they are located; identifying waterbodies that are on the 303(d) list and TMDLs for those waterbodies that include wasteload allocations for municipal stormwater discharges; identifying approaches taken by other key states in regulating MS4 discharges to 303(d)-listed water bodies, TMDL implementation, and stormwater program effectiveness evaluation; and describing basic stormwater program effectiveness assessment concepts and approaches and recommending an approach for the Western Washington NPDES Phase II Permit.
- ***Antidegradation Water Quality Assessment, City of Gresham, Oregon.*** Provided technical support to the municipal stormwater permittees within the Portland Metropolitan Area in evaluating whether measurable future waste loads in MS4 discharges from the areas covered by the 2004 renewed Phase I NPDES permits would exceed allowed discharged loads under the 1995 Phase I NPDES permits.
- ***Fresno Metropolitan Flood Control District NPDES Permit Implementation Assistance, Fresno Metropolitan Flood Control District, Fresno, California.*** Assisted the Fresno Metropolitan Flood Control District in several NPDES Permit implementation tasks. Evaluated 2000 – 2005 Stormwater Quality Management Program effectiveness. Provided recommendations and examples of educational and informational tools used by stormwater programs in California and elsewhere in the U.S. to help contractors simplify implementation of BMPs at construction sites. Helped to develop a Stormwater Pollution Prevention Plan (SWPPP) for typical storm sewer installation projects that will be used a template for future projects and developed an informal SWPPP for stormwater infiltration basin maintenance projects. Developed stormwater management guidelines and provided training for parks and open space operation and maintenance personnel. Developed and provided a training program for Industrial General Permit non-filers. Prepared a technical memo on Best Management Practices that District personnel and contractors can use to control fugitive dust emissions and track-out during infiltration basin excavation and maintenance activities. Assisted with program effectiveness evaluation and NPDES permit reapplication.

LISA AUSTIN, P.E.



PROFESSIONAL EXPERIENCE

Geosyntec Consultants, Oakland, California, 2008 to present; Los Angeles, California, 2002 – 2008;

City of Bellevue Utilities Department, Bellevue, Washington, 2000 – 2002.

Washington State Department of Ecology, Bellevue Washington, 1990 – 2000.

CH2M Hill, Bellevue, Washington, 1988 – 1990.

CHRIS G. CAMPBELL

**stormwater monitoring and management
nonpoint source pollution
contaminant transport
vadose zone hydrology
water security**

EDUCATION

Ph.D., Environmental Science Policy and Management: Soil Physics, University of California, Berkeley, 2000

M.S., Range Management, University of California, Berkeley, 1997

B.S., Conservation and Resource Studies, University of California, Berkeley, 1995

CAREER SUMMARY

Dr. Campbell is a Senior Scientist with background and experience in near surface hydrology including: contaminant transport, infiltration, applied stormwater and monitoring and water quality management. He earned his doctorate from the University of California at Berkeley, studying hillslope runoff and nonpoint source pollution. Dr. Campbell's water quality experience includes managing industrial stormwater programs at a National Laboratory, investigating endocrine disrupting compounds in surface water and groundwater, examining heavy metal and suspended sediment transport, and assessing water security monitoring approaches for detecting intentional attacks on drinking water. He has provided monitoring and regulatory guidance on the Clean Water Act NPDES programs including: industrial and municipal stormwater programs and associated stormwater pollution prevention plans, spill response, and designation of jurisdictional waters. He also worked on the Yucca Mountain Nuclear Waste Repository on unsaturated zone and climate and infiltration issues. Dr. Campbell has co-authored more than 40 peer-reviewed scientific publications and reports on various water related topics. Highlights of his experience include the following assignments.

- *Industrial Stormwater Management.* Project Manager for the industrial stormwater monitoring programs at the Lawrence Livermore National Laboratory, including program management and annual reporting.
- *Yucca Mountain Project.* Led a team to prepare Key Technical Issue (KTI) summaries to the Nuclear Regulatory Commission in support of the licensing for the nuclear waste repository, including unsaturated zone transport, infiltration, and runoff issues. Chris was also the lead for the latest revision of the Climate and Infiltration Report for Yucca Mountain.

- *RCRA and CERCLA Closed Landfill Monitoring and Reporting.* Managing groundwater monitoring and reporting programs for two closed landfills at the Lawrence Livermore National Laboratory.
- *Supplemental Environmental Impact Statement for the Re-licensing of Fort Calhoun Station Nuclear Power Plant, Nebraska.* Served as subject matter expert for Water Use and Water Quality for United States Nuclear Regulatory Commission 2003.
- *Water Treatment Using Advanced Ultraviolet Light Sources.* Project Manager for this \$100,000 grant for FY 2007-08. The work is a collaboration with Russian Scientists and US industrial partner that is part of a 3-year project.
- *Transport and Sorption of Heavy Metals in the Soil: Application of Stochastic Transfer Functions For Describing the Movement of Cadmium and Lead.* Served as collaborator on this research project for the National Program for Environmental Sciences and Technologies (BTE2003-01949), Center for Environmental Sciences, Spanish National Research Council.
- *Study of Trihalomethane in Drinking Water in Qatar.* Worked as a collaborator: on the study for the Supreme Council for the Environment and Natural Reserves, Qatar developing preliminary findings on desalination and sources of THMs.
- *Spatial Distribution and Chemical Speciation of Toxic Elements in Contaminated Soils: Influence of Preferential Flow Paths.* Collaborator: on this 3-year study for the National Program for Environmental Sciences and Technologies (CTM2006-00884/TECNO). Center for Environmental Sciences, Spanish National Research Council.
- *Biosensors for Endocrine Disrupting Compounds in an Agricultural Watershed.* Served as a collaborator on this 3-year study investigating the fate and transport of these compounds in the environment and wastewater treatment plant discharges (See publications).
- *Environmental Transport and Fate of Endocrine Disruptors from Nonpotable Reuse of Municipal Wastewater.* Served as a collaborator on this study of water reuse and the potential for endocrine disruptors and pharmaceuticals to contaminant groundwater (See publications).
- *Novel Environmental Sensors for Real-time Monitoring of Contaminants in Water,* UCRL-PROP-147706. Served as Project manager for a collaboration with The

University of California at Irvine and Davis examining fiber optic sensors for suspended sediment and biological toxicity monitoring (See publications).

- *Fiber Optic Sensor for Real-time Suspended Sediment Measurement in Rapid Storm Water Runoff*. Served as a Principal Investigator for a project to create and test a novel fiber optic suspended sediment sensor (See publications).

PROFESSIONAL HISTORY

Geosyntec Consultants, Oakland, CA, Senior Scientist, April 2008 – Present

Lawrence Livermore National Laboratory, Environmental Protection Department, Livermore, CA, Environmental Scientist-Water Guidance and Monitoring Division, 2004 to April 2008; Environmental Scientist, Environmental Protection Department. Water Guidance and Monitoring Group, January 2001 to March 2003.

Lawrence Berkeley National Laboratory. Geological Scientist, Earth Sciences Division, Hydrogeology and Reservoir Dynamics, March 2003 to August 2004

HONORS & AWARDS

Outstanding Performance Award, Lawrence Berkeley National Laboratory, 2004

Sustainable Agriculture Graduate Research Award University of California, 1999.

Travel Fellowship for Young Scientists, Institute of Terrestrial Ecology, Zurich: Switzerland, 1999

Horton Graduate Research, Award America Geophysical Union, 1998

PUBLICATIONS AND PRESENTATIONS

Reports

1-07 Campbell, C.G., Duane W. Rueppel, Matt Cockrell, Karl Brunckhorst, and Crystal Foster. *Summary of Water and Sediments Monitoring in Lake Haussmann Following Treatment with Rotenone*. Lawrence Livermore National Laboratory. UCRL-AR-229232.

1-06 Campbell, C.G. and K. Brunckhorst. 2006. *Lawrence Livermore National Laboratory Livermore Site Annual Storm Water Report for Waste Discharge Requirements 95-174*. UCRL-AR-26783-06.

- 2-06 Campbell, C.G., and Sandra Mathews. *An Approach to Industrial Stormwater Benchmarks: Establishing and Using Site-Specific Threshold Criteria at Lawrence Livermore National Laboratory*, CASQA Stormwater 2006 Conference Sacramento, CA, September 25, 2006–September 27, 2006, UCRL-CONF-224278.
- 2-06 Rueppel, D., M.A. Abdel-Moati, C.G. Campbell, W.G. Hoppes, A. Grayson. Study of Trihalomethane in Drinking Water in Qatar. Preliminary Report. Prepared for Supreme Council for the Environment and Natural Reserves, Qatar, January 2006
- 3-06 Hudson, G.B., H. Beller, C. Moody Bartel, S. Kane, C. Campbell, A. Grayson, N. Liu, and S. Burastero. *Environmental Transport and Fate of Endocrine Disruptors from Non-Potable Reuse of Municipal Wastewater*. UCRL-TR-217159
- 1-05 Campbell, C.G. and K. Brunckhorst. 2005. *Lawrence Livermore National Laboratory Livermore Site Annual Storm Water Report for Waste Discharge Requirements 95-174*. UCRL-AR-26783-05.
- 2-05 Campbell, C.G., and D. MacQueen. 2005, 2006. *LLNL Experimental Test Site 300 Compliance Monitoring Program for RCRA-Closed Landfill Pits 1 and 7, Annual Report for 2004*, Lawrence Livermore National Laboratory, Livermore, CA (UCRL-AR-10191-04-4).
- 3-05 Campbell, C.G., and R.G. Blake. 2005, 2006. *LLNL Experimental Test Site 300 Compliance Monitoring Program for the CERCLA-Closed Pit 6 Landfill Annual Quarter 2004*, Livermore National Laboratory, Livermore, CA (UCRL-AR-132057-04-4).
- 1-04 BSC (Bechtel SAIC Company). 2004. *Future Climate Analysis*. ANL-NBS-GS-000008. Rev 01. Las Vegas Nevada: Bechtel SAIC Company.
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- 1-03 United States Nuclear Regulatory Commission 2003, *Supplemental Environmental Impact Statement for the Re-licensing of Fort Calhoun Station Nuclear Power Plant, Nebraska*.
- 1-03 Campbell, C.G., J. Richards, M. Zavarin, P. Stratton, J. Coty, D. Laycak. 2003. *Novel Application of Fiber Optic Sensor for Characterizing Real-Time Contaminant*

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- 1-00 Campbell, C.G., K Folks, E. Christofferson, R. Brown, S. Brigdon, Sandra Mathews. 2000, 2001, 2004, 2005, 2006. *Surface Water.* Ch. 7 in Biermann et al., 2001. *Environmental Report 2000.* Lawrence Livermore National Laboratory. Livermore CA. UCRL-50027-00. <http://www.llnl.gov/saer>

Scientific Papers

- 1-08 Garrido F., S. Serrano, C.G. Campbell, L. Barrios, and M.T. García-González. *Accepted.* Evidence of Physical and Chemical Nonequilibrium in Lead and Cadmium Transport and Sorption in Acid Soils. **Soil Science Society of America Journal.**
- 2-08 Campbell, C.G., and A.H. Love. Monitoring Water Resources for Threats to Water Security. Chapter 5 in: New Topics in Water Resources Research and Management. Nova Science Publishing. Hauppauge, NY. Pgs. 195-234.
- 1-07 Campbell, C.G., M. Mascetti, W. Hoppes, W.T. Stringfellow. Measurement Reproducibility of the Bioscan™ Flow-Through Respirometer Applied as a Toxicity-Based Early Warning System for Water Contamination. **Environmental Practice.** 9(1): 47-54.
- 1-06 Tran, N.T., C.G. Campbell, and F.G. Shi. Study of Particle Size Effects on An Optical Fiber Sensor Response Examined With Monte Carlo Simulation. **Applied Optics.** 45(9): 7557-7566.
- 2-06 Campbell, C.G., S.E. Borglin., F.B. Green, A. Grayson, E. Wozel, W.T. Stringfellow. Biologically-Directed Environmental Monitoring, Fate, and Transport of Estrogenic Endocrine Disrupting Compounds in Water: A Review. **Chemosphere.** 65(8): 1265–1280.

- 3-06 Campbell, C.G., F. Garrido, V. Illera, and M.T. García-González. Transport Of Cd, Cu, And Pb In An Acid Soil Amended With Phosphogypsum, Sugar Foam, And Phosphoric Rock. **Applied Geochemistry**. 21: 1030–1043.
- 4-06 Garrido, F., V. Illera, C.G. Campbell and M.T. García-González. Regulating Cd, Cu, And Pb Mobility In An Acid Soil Using Phosphogypsum, Sugar Foam, And Phosphoric Rock Amendments. **European Journal of Soil Science**. 57:95-105. LBNL- 54566.
- 1-05 Campbell, C.G., D.T. Laycak, W. Hoppes, N.T. Tran, and F.G. Shi. High Concentration Suspended Sediment Measurements Using A Continuous Fiber Optic In-Stream Transmissometer. **Journal of Hydrology**. 311: 244–253
- 2-05 Serrano, S., F. Garrido, C.G. Campbell, and M. T. García-González. Competitive Sorption of Cadmium and Lead in Acid Soils of Central Spain. **Geoderma**. 124: 91-104 LBNL-54510
- 3-05 Campbell, C.G., and F. Garrido. Spatial And Temporal Variability Of Soil Processes: Implications for Method Selection and Characterization, Chapter 2 in: Soil-water-solute process characterization: an integrated approach. J. Álvarez Benedí and R. Muñoz Carpena editors, **CRC Press**, NY, NY, LBNL-53569.
- 1-04 Campbell, C.G., M. Mascetti, R. Vellinger, W. Hoppes. Testing a Flow-Through Respirometer for Early Warning of Water Contamination. **Environmental Practice**. 6: 306-315. LLNL-UCRL JC-147044
- 2-04 Campbell, C.G., M. Ghodrati, and F. Garrido. Role of Leaf Litter in Initiating Tracer Transport Pathways in a Woodland Hillslope Soil. **Soil Science**. 169(2): 100-114. LBNL-52522
- 3-04 Campbell, C.G., K. Folks, S. Mathews, and R. Martinelli. Investigating Sources Of Toxicity In Stormwater: Algae Mortality In Runoff Upstream Of The Lawrence Livermore National Laboratory. **Environmental Practice** 6(1): 23-35. LLNL-UCRL-JC-147164
- 1-02 Campbell, C.G., M. Ghodrati, and F. Garrido. Using TDR to Characterize Shallow Solute Transport in an Oak Woodland Hillslope in Northern California, USA. **Hydrological Processes**. 16 (15): 2921-2940.
- 1-01 Campbell, C.G., M. Ghodrati, and F. Garrido. Temporal Consistency of Solute Transport in a Heterogeneous Field Plot. **Soil Science** 166 (8): 491-506.

- 2-01 Garrido, F. M. Ghodrati, C.G. Campbell, M. Chendorain. Detailed Characterization Of Solute Transport In A Heterogeneous Field Soil. **Journal of Environmental Quality**. 30(2): 573-583.
- 1-00 Campbell, C.G. 2000. In Situ Characterization Of Solute Transport Processes In Woodland Soils: Implications For Hillslope Hydrology. Doctoral thesis. University of California, Berkeley.
- 2-00 Garrido. F., M. Ghodrati, C.G. Campbell. A Method For *In Situ* Field Calibration of Fiber Optic Miniprobes. **Soil Science Society of America Journal**. 64(3): 836-843.
- 3-00 Ghodrati, M. F. Garrido, C.G. Campbell, M. Chendorain. A Multiplexed Fiber Optic Mini-Probe System For Measuring Convective Dispersive Solute Transport In Soil. **Journal of Environmental Quality**. 29(2): 540-550.
- 1-99 Garrido, F. M. Ghodrati, M. Chendorain, C.G. Campbell. Small-Scale Variability in Solute Transport Processes in a Homogeneous Clay Loam Soil. **Soil Science Society of America Journal**. 63(6): 1513-1522.
- 2-99 Campbell, C.G., M. Ghodrati, F. Garrido. Comparison of Time Domain Reflectometry, Fiber Optic Mini-Probes, and Solution Samplers for Real Time Measurement of Solute Transport in Soil. **Soil Science**. 164 (3):156-170.
- 1-98 Allen-Diaz, B, E. Hammerling, C. Campbell. Comparison of Standard Water Quality Sampling With Simpler Procedures. **Journal of Soil and Water Conservation**. 53(1): 42-45.
- 1-96 Campbell, C.G., and Barbara Allen-Diaz. 1996. Livestock Grazing and Riparian Habitat Water Quality: An Examination of Oak Woodland Springs in the Sierra Foothills of California. Proceedings from The Oak Symposium. **U.S. Forest Service Pacific Southwest Station**. PSW-GTR-160.

Selected Presentations

- 1-06 Campbell, C.G., Gallegos G.M., Environmental Monitoring by ORAD at Site 300. Presented to CERCLA RPMs, February 17. UCRL-PRES-219133
- 2-06 Campbell, C.G, S. Mathews. Pesticides to Radioactivity: Industrial Storm Water Monitoring at a National Laboratory. Presented at California Stormwater Quality Association, May 12. UCRL-PRES-221278.

- 3-06 Campbell, C.G, T. Saito. California Levees: Public Safety & Drinking Water Security, Presented to the Sacramento Petroleum Association May 17, 2006.
- 1-05 Campbell, C.G., S.E. Borglin, W.T. Stringfellow, F.B. Green, A. Grayson. Advances in Biologically-Based Sensors for Endocrine Disrupting Compounds in Water. Presentation at World Water & Environmental Resources Congress Anchorage, AK, United States May 16-19. UCRL-CONF-209562
- 1-02 Campbell, C.G., Sandra Mathews, and Lily Sanchez. Monitoring and Managing Three Distinct Mass Pulses in Urban Runoff. Presented at STCU Workshop Ecological and Health Threat Associated with Environmental Contamination'02 October 15-17, Kiev, Ukraine. UCRL-JC-149441-ABS
- 2-02 Mathews, S., W. Hoppes, M. Mascetti, C. G. Campbell. On-Line Microbial Whole Effluent Toxicity Monitoring for Industrial Wastewater. Submitted to the Ecological and Health Threat Associated with Environmental Contamination, Kyiv, Ukraine, October 15-17. UCRL-JC-149442.

JUDD A. GOODMAN

**water resources engineering
civil engineering**

EDUCATION

University of California at Berkeley: M.S., Environmental Engineering, 2007

University of California at Berkeley: B.S., Civil Engineering, 2003

PROFESSIONAL REGISTRATIONS/CERTIFICATIONS

Engineering in Training

CAREER SUMMARY

Mr. Goodman joined Geosyntec as a senior staff engineer in July 2007. He is currently responsible for supporting a number of water resources projects, including providing data analysis, field assistance, and technical writing. Current project assignments include the following.

Hydromodification

- ***Tejon Mountain Village, Kern County, California.*** Prepared a technical memorandum regarding Hydrologic Conditions of Concern for a planned development. Prioritized areas of concern based on future percent imperviousness and sediment supply reduction data. Identified damaged stream segments where in-stream restoration may be an appropriate remedy for hydromodification, based on a geomorphic field assessment.
- ***Newhall Ranch - Long Canyon Development, Santa Clarita, California.*** Performed preliminary sizing of a flow control basin and outlet structure, which reduces downstream sediment transport in order to compensate for decreased sediment supply due to development.
- ***California Building Industry Association.*** Co-wrote a report reviewing Section IX.K of the Preliminary Draft General Construction Permit. The objective of the permit requirements was to protect stream systems from excessive erosion caused by land development. Developed an example of a hydromodification project in San Jose, which met the Section IX.K criteria and compared its effectiveness with Geosyntec's standard flow duration control approach.

- *Alameda County Flood Control District, Vasco Road, Livermore, California.* Prepared maintenance memo for a flow control basin designed by Geosyntec. Implemented final modifications to design plans.
- *Laguna Creek Parkway Master Plan, Sacramento, California.* Determined spatial relationships for meander patterns within the Laguna Creek watershed based on channel width and drainage area. Used historical aerial photographs to determine belt width, wavelength, radius of curvature, and sinuosity for various reaches.

Hydrology/Hydraulics

- *Waimanalo Landfill Expansion, Honolulu, Hawaii.* Performed hydrologic and hydraulic analyses for the surface water management plan. Hydrologic analyses were based on the Rational Method as well as the SCS unit hydrograph method, for which the HEC-HMS software was used. Additionally, evaluated existing sedimentation basin and outlet structures to meet County standards for water quality and flood control.
- *Mesquite Creek Landfill, Comal County, Texas.* Updated an existing HEC-HMS model to estimate design flows for use in creating an inundation map along Mesquite Creek. Created stage-storage-discharge relationship for a downstream reservoir based on bathymetry data, outlet pipe, and spillway facilities.
- *Rainfall Characterization, Walnut Creek, California.* Summarized the magnitude of the December 31, 2005 storm for a site using NCDC, County, and private rain gage data.

Water Quality

- *Tejon Mountain Village, Kern County, California.* Prepared tables summarizing sampling results for seven locations within the project area. Calculated exceedance of water quality standards and concentration statistics based on the appropriate requirements and data provided by the client.
- *North Natomas Detention Basin No.4, Sacramento, California.* Assisted in the setup of water quality sampling stations at the inlet and outlet of a wet pond. Calculated volume increments at which samples are to be taken based on pump data provided by the client. Prepared training materials for sub-consultant on the operation and programming of the sampler equipment.

- ***Laguna Creek Watershed Management Plan, Sacramento, California.*** Prepared tables summarizing sampling results for six locations within the watershed for wet and dry weather conditions. Calculated exceedances of water quality standards and concentration statistics based on the appropriate requirements and data provided by the client.

PROFESSIONAL HISTORY

Geosyntec Consultants, Oakland, California; Senior Staff Engineer, July 2007 - Present
AKM Consulting Engineers, Irvine, California; Assistant Engineer, April 2004 - August 2006
University of California at Berkeley; Geomorphology Research Assistant, June - August 2003
Alan Kropp and Associates, Berkeley, California; Geotechnical Engineering Trainee,
June 2002 - December 2002
Siskiyou National Forest, Gold Beach, Oregon; Student Trainee, June 2000 - August 2000

AFFILIATIONS

American Society of Civil Engineers
Chi Epsilon

PUBLICATIONS

- 1-06 Judd Goodman, Kevin Lunde, and Theresa Zaro. "Baxter Creek Gateway Park: Assessment of an Urban Creek Restoration." University of California at Berkeley River Restoration Symposium, 2006.
- 1-03 Joel Bass, Judd Goodman, and Andrea Powell. "Decommissioning of the San Francisco Dry Dock: A Feasibility Study." University of California at Berkeley Civil and Environmental Engineering Competition, 2003.