



Qualifications for Santa Clara Valley Urban Runoff Pollution Prevention Program for  
Professional Civil Engineers Registered in the State of California  
to Design, Review and/or Certify Storm Water Treatment  
Measures and Hydromodification Control Facilities

Due: August 16<sup>th</sup>, 2024, 5pm PST

Prepared by:  
**Herrera Environmental Consultants, Inc.**  
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August 16, 2024

Vishakha Atre  
Senior Scientist  
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Santa Clara Valley Urban Runoff Pollution Prevention Program's Qualified Consultants list offers the opportunity to review and evaluate Stormwater Management Plans, ensure compliance with regulations, design and review hydromodification flow control facilities, assess the accuracy of cost estimates for project components, and inspect installed treatment measures to verify adherence to approved plans. Herrera is a West Coast leader in stormwater planning and engineering, adept in generating models and flow duration curves, and reviewing the work of peer companies. Herrera engineers have been invited to act as advisors, trainers, and reviewers for numerous jurisdictions and state agencies. We conduct engineering reviews of land use and building permits, including compliance with all applicable codes and environmental requirements for public and private facilities. Herrera is pleased to have the opportunity to be a part of this program's Qualified Consultants list and assist with SCVURPPP's stormwater needs. Our team brings the following benefits:

**West Coast Leaders in Stormwater Management** – As a West-Coast leader in stormwater management, Herrera leads project research, planning, testing, maintenance, and design of distributed and regional stormwater facilities. In the past 5 years alone, Herrera has designed over a dozen regional scale stormwater retrofits managing runoff from a total of over 1,000 acres. We have also been actively engaged in providing conceptual design support and post construction troubleshooting of regional facilities designed by others from Seattle to San Diego. This experience allows our team to bring critical lessons learned to our designs. Our designers work hand in hand with our water quality scientists and stormwater researchers to ensure that our designs are based on the latest scientific understanding of how stormwater BMPs actually function (as well as how they fail), and how to make them work better with reduced maintenance effort.

**Experts in Stormwater Trainings** – Herrera staff are stormwater experts and have delivered trainings to over 7,000 business and municipal staff along the West Coast both in-person and virtually, and through multiple online formats (Blackboard Learn and videos). Some of these trainings have included Washington Statewide LID Training, Permeable pavement, Bioretention, Rainwater Collection & Green Roofs, LID Site Planning and Design training, Green Infrastructure Training, Pervious Pavement and Bioretention Training, and NPDES monitoring training. Herrera has developed the curriculum for many stormwater trainings on the West Coast.

**Experienced in Third Party Reviews** – Herrera provides third party reviews for various aspects of design projects, including wetland mitigation, bank stabilization, stormwater conveyance and treatment, site civil/utilities, wastewater conveyance, and solid waste facilities. Our engineering staff participates in conceptual design, develops PS&E, conducts life-cycle cost analyses, and performs construction management services.

Please contact me at [cbauer@herrerainc.com](mailto:cbauer@herrerainc.com) with any questions regarding the enclosed proposal, or to further discuss our services.

Sincerely,



Herrera Environmental Consultants, Inc.  
**Chris Bauer, PE**  
Project Manager

# Principals and Key Personnel

Our team of California stormwater experts has a wealth of knowledge and experience, and Herrera's Principals and Key Personnel have been working on stormwater projects for decades. Chris Bauer, Chris Webb, and Dylan Ahearn have created the curriculum and instructed trainings on LID, GSI, Permeable Pavement, and more in California and Washington.

## Chris Bauer, PE, PLS

**Key Personnel: Project Manager & Senior Green Infrastructure Design Engineer**



**Professional Engineer # 72537 in California, 2008**

### Relevant Trainings

**Instructor:** CA - WA Stormwater Permits 101  
Permeable Pavement

Chris is a professional civil engineer and professional land surveyor with over 20 years of experience in civil engineering, land development, water resources, environmental engineering, mining, project management, and construction management. Chris's experience spans work as a consulting engineer, as a public agency employee, and as an employee in industry. He is experienced in stormwater, potable water, and wastewater conveyance design, including gravity and pressure pipe design. Chris has participated on and managed multi-disciplinary teams for the preparation of design PS&E, construction management, and construction oversight for infrastructure projects. As a public agency employee, Chris reviewed numerous stormwater quality management plans, including hydromodification designs prepared by other engineering firms for private and public projects. Chris has a proven ability to lead and manage engineering staff and sub-consultants for successful completion of multiple concurrent projects.

## Chris Webb, PE, LEED Fellow

**Principal Engineer and Director of Design**



**Professional Engineer #85262 in California, 2016**

### Relevant Trainings

**Instructor:** Intermediate & Advanced Statewide LID Training Courses: Permeable pavement, Bioretention, Rainwater Collection & Green Roofs, and LID Site Planning and Design.  
**Instructor:** National Green Infrastructure Certificate Program (NGICP) Training Developer

Chris Webb, PE is a civil engineer and LEED Fellow whose technical expertise is focused on promoting and implementing technologies that support sustainable stormwater solutions. For over 20 years, Chris has been at the forefront of sustainable development projects, working with local and state governments, private and public entities, utilities, and nonprofit groups. His career encompasses many firsts in the realm of permeable pavement, bioretention, living machines & net zero toilet systems, rainwater capture, and water reuse. At Herrera he works as part of design teams across a spectrum of diverse project types from site development civil engineering, to planning, high performance sustainable water system design, and complex stormwater retrofits. Chris is a frequent speaker on the technical aspects of low-impact development, stormwater management, and sustainable water resource management design at numerous professional development seminars, private workshops, national conferences, and university courses.

## Dylan Ahearn, PhD

Key Personnel: Principal Scientist



### Relevant Trainings

**Instructor:** NPDES monitoring training instructor to City of Tacoma, City of Seattle, Clark County, and Pierce County staff

**Instructor:** LID training instructor to over 200 students across 4 trainings

**Instructor:** Rain garden monitoring training instructor to King County staff

**Instructor:** Northwest Environmental Training Center Instructor

Dylan has 25 years of experience studying the environmental ramifications of human alteration to aquatic systems. Dylan has designed studies, collected data, and conducted detailed pollutant loading assessments for over 100 stormwater treatment technologies (e.g., wet ponds, swales, filter strips, green roofs, pervious pavement, and proprietary systems). He has extensive hands-on knowledge of green infrastructure and, having designed and implemented the monitoring network at the Washington State University Low Impact Development Research Center, is involved in cutting edge stormwater treatment research. Dylan is also a Geology and Environmental Studies adjunct professor at Edmonds College, WA and has taught numerous workshops on how to monitor and design BMPs. Whether it is teaching, programming dataloggers, conducting statistical analyses, or designing his next field experiment, Dylan approaches his work with an attention to detail and a passion for environmental stewardship.

## Stacy Luell, PE, QSD/QSP

Key Personnel: Senior Engineer



Professional Engineer #82919 in California, 2014

### Relevant Trainings

Qualified SWPPP Developer/ Practitioner, California, No. 26980

OSHA 40-Hour Hazardous Waste Operations Worker, No 31715

Stacy Luell, PE, QSD/QSP is a Professional Engineer in the state of California. She has 13 years of experience in MS4 Permit and water quality objective compliance, Construction General Permit compliance, Enhanced Watershed Management program support, hydrology, stormwater BMP inspections and performance evaluations, stormwater management, and surface water and BMP modeling. Her project experience also includes California Statewide Trash Provisions compliance, reasonable assurance analysis development, monitoring report development, dry and wet weather field sampling, BMP siting and monitoring plan development, BMP construction oversight, and stormwater quality and hydrology data analysis.

# Statements

Herrera is a West Coast leader in **urban stormwater management practices, issues, and requirements, including LID and hydromodification requirements**. Herrera has shaped the field of stormwater management on the West Coast through urban stormwater study and the development and implementation of technical guidance and design manuals. Herrera has led training sessions and seminars to share our knowledge and support other agencies and individuals to learn to implement best management practices, especially in the advancing world of LID and green infrastructure. In Herrera's 40 years of stormwater work, our firm has been at the forefront of planning, design, and implementation of evolving stormwater requirements. Our staff are experts in stormwater management, hydromodification, and LID requirements and bring this expertise to all of our stormwater projects.

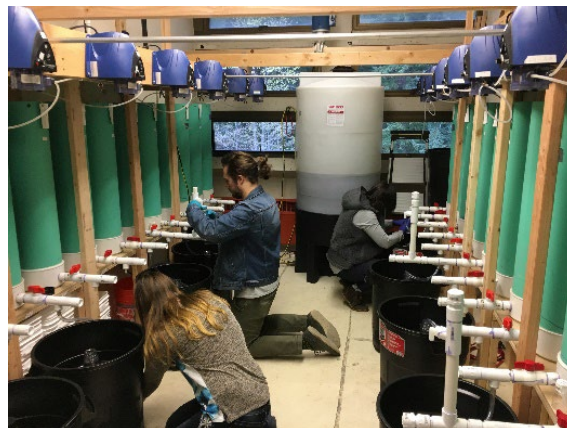
Herrera has a complete understanding of and deep experience with **continuous simulation hydrologic models, including BAHM 2023, and the analysis of output data for use in designing or reviewing hydromodification control measures**. BAHM is the Bay Area (location-specific) version of WWHM, which has been the predominant continuous simulation hydrologic model used in Washington State for decades. (Washington State was one of the first states to require continuous simulation models in stormwater designs). BAHM was based on and created by the same programmers as WWHM, and Herrera has spent decades using WWHM (and its many updated versions over the years) for stormwater analyses and designs, particularly with regards to LID modeling. In fact, at various stages of WWHM's development, Herrera worked with the model creators and the Washington State Department of Ecology to debug and refine the model performance and output. Similarly, our Project Manager, Chris Bauer has utilized the SDHM, yet another location-specific version of WWHM (and which shares many functional similarities with BAHM). Overall, our staff is highly capable of reviewing BAHM model output to identify whether a project's proposed hydromodification control measures are sufficient to meet permit requirements for stormwater discharge, as well as defensible and based in sound modeling and engineering analyses.

Herrera has participated in many **on-site third-party inspections of installed stormwater treatment and flow control measures** and fully understands the planning, design and construction acceptance process for stormwater BMP's. Herrera has installed stormwater treatment measures for TAPE, engineering inspections, O&M, and has hosted O&M trainings.

# Examples and References

## Park Place Water Quality Media Study and Stormwater Facility Design | City of Bellingham, WA

Herrera worked with the City of Bellingham, WA on this multi-phase research & development (R&D), performance monitoring, and regional stormwater treatment facility design project. The goals of the project were to develop a new stormwater treatment media capable of removing a high level of total phosphorus from stormwater runoff, monitor a pilot scale facility using the new media, and reconstruct a regional stormwater treatment facility using the new media. The initial R&D phase of this project (2018) evaluated various combinations and configurations of media components to create a non-proprietary stormwater treatment media with very high total phosphorus removal capabilities. After R&D, a pilot scale prototype filter (2019-2021) was built and monitored in the field in accordance with Technology Assessment Protocol – Ecology (TAPE), to achieve a General Use Level Designation (GULD) from the Washington State Department of Ecology. Following the pilot testing, Herrera designed and prepared bid-ready construction documents (PS&E) for a total reconstruction of the Park Place Stormwater Facility to increase its phosphorus removal performance for approximately 180 acres (35%) of the Lake Whatcom watershed within the City limits of Bellingham. The project was completed in 2022. This collaborative project between the City of Bellingham, Herrera, and the Washington State Department of Ecology was funded through a variety of sources including local funds, Grants of Regional and Statewide Significance (GROSS), and Stormwater Financial Assistance Program (SFAP).



**Project Reference:** Aric Smathers, **Firm:** City of Bellingham Public Works, **Email:** arsmathers@cob.org, **Phone:** 360.778.7942

## Typical Plans and Specifications for Green Infrastructure | San Francisco Public Utilities, CA

Herrera has worked with the San Francisco Public Utilities Commission (SFPUC) for over a decade to develop and continually refine a comprehensive set of typical plans and specifications for green infrastructure (GI) practices in the City and County of San Francisco, CA. The typical details and specifications are used by public and private sector design teams, working either on private land or in the public realm, to support development of construction-level designs for GI that reflect the latest in GI design and performance, and comply with stormwater regulatory requirements. With Herrera's support, the City rolled out Phase I of the GI details in September 2015, updated them in 2016, and issued the GI specifications in March 2016. In 2022, Herrera worked with SFPUC on an update to the details and specifications, released in 2023. Each round of updates to the plans and specifications reflect the absolute latest understanding in GI design, construction, and operation gleaned from cutting-edge work by Herrera over the past decade-plus of GI design and implementation nationwide.



**Project Reference:** Ken Kortkamp **Firm:** City of San Francisco, **Email:** kkortkamp@sfgwater.org, **Phone:** 415.554.1594

## City Hall Parking Lot LID Retrofit | City of Port Angeles, WA

The City of Port Angeles was awarded Ecology grant funding to design a stormwater retrofit to treat and manage runoff from the City Hall parking lot and adjacent roadways just upstream of Peabody Creek, which has several water quality impairments. Peabody Creek is a salmon-bearing stream, making heavy metals removal a focus of the project in addition to treating bacteria, hydrocarbons, TSS, and nutrients; reducing temperatures; and maximizing infiltration potential. Herrera worked with the City to develop design alternatives, prepare design and bid documents, and complete grant deliverables. Herrera consulted the City's Parks and operations and maintenance personnel to site and select stormwater BMPs for durability, ease of access, and low maintenance needs. Designed BMPs include bioretention, permeable pavement, large conifer trees, and rainwater harvesting, each serving as demonstration facilities for the public and development community when they visit City Hall. Herrera developed interpretive signage to highlight the stormwater BMPs and describe how they help improve water quality in Peabody Creek. The City of Port Angeles received a grant to design a stormwater retrofit for the City Hall parking lot and nearby roads to address water quality issues in Peabody Creek, focusing on removing heavy metals and other pollutants. Herrera is collaborating with the City to develop durable and low-maintenance stormwater management features, including bioretention and permeable pavement, and will also create educational signage to explain these improvements.



**Project Reference:** Vince McIntyre, **Firm:** City of Port Angeles, **Email:** [vmcintyre@cityofpa.us](mailto:vmcintyre@cityofpa.us), **Phone:** 360.417.4800

# Final Statement

Herrera aims to join SCVURPPP's list to help the association of 13 cities in Santa Clara Valley reach stormwater goals, improve designs, help communities plan for the future, and benefit from engineering innovations and lessons learned from both within California and nationwide. Herrera is a leader in stormwater, with experience in designing and evaluating treatment best management practices, design of flow control facilities to meet hydromodification requirements, continuous simulation hydraulic modeling, inspection of treatment and hydromodification facilities, and especially LID design. Herrera regularly provides peer review services for various aspects of design projects, including wetland mitigation, bank stabilization, stormwater conveyance and treatment, site civil/utilities, wastewater conveyance, and solid waste facilities. Our firm has a very strong history in the Pacific Northwest (a region with particularly complex regulations, environmental drivers, and a nationwide reputation for stormwater innovation), and we have been sharing lessons learned among our clients and partners up and down the coast, while slowly growing our presence in California.

Herrera's California-based engineers and scientists have the availability to support projects as they arise. Herrera is committed to supporting the Santa Clara Valley Urban Runoff Pollution Prevention Program and performing exceptional work.



*Herrera working at Washington State University LID Research Facility  
Database Development and Support*

# Staff Resumes



# CHRISTOPHER BAUER, PE, PLS

SENIOR GREEN INFRASTRUCTURE DESIGN ENGINEER

Chris is a professional civil engineer and professional land surveyor with over 20 years of experience in civil engineering, land development, water resources, environmental engineering, mining, project management, and construction management. Chris's experience spans work as a consulting engineer, as a public employee, and as an employee in industry. He is experienced in stormwater, potable water, and wastewater conveyance design, including gravity and pressure pipe design. Chris has participated on and managed multi-disciplinary teams for the preparation of design PS&E, construction management, and construction oversight for infrastructure projects. Chris has a proven ability to lead and manage engineering staff and sub-consultants for successful completion of multiple concurrent projects.

## CREDENTIALS & TRAININGS

- *BS in Civil Engineering, University of Kansas, 2003*
- *Professional Engineer #72537 in California, 2008*
- *Permeable Pavement Training*
- *Instructor: CA - WA Stormwater Permits 101*

## KEY PROJECT EXPERIENCE

### COUNTY OF SAN DIEGO COMMUNITY-FOCUSED STORMWATER PROJECT SERVICES, SPRING VALLEY, CA

The County of San Diego is investing in Community-Focused Stormwater Improvement Partnerships to build multi-benefit water quality improvement projects on private properties in unincorporated areas of San Diego County. The County identified the Spring Valley Special Drainage Area 1 as a priority area for green infrastructure (GI). At the heart of the project, a community-focused engagement process will gain input from stakeholders and the public regarding their priorities related to stormwater, flooding, and other co-benefits. Based on community input and technical analysis, the team will identify, prioritize, and design GI retrofit projects that best deliver stormwater and community benefits. Chris's role has been to coordinate with County staff, provide input on conceptual designs, and prepare the preliminary engineering report for the project.

### MERCED AVENUE GREENWAY PROJECT MONITORING, CITY OF SOUTH EL MONTE, CA

The City of South El Monte received Proposition 1 Storm Water Grant funding through the California Coastal Conservancy to prepare plans, designs, environmental analyses, and permit applications for creation of the Merced Avenue Greenway Project. The City received further funding from The State Water Board, the California Natural Resources Agency, and the Safe, Clean Water Program for project monitoring. Herrera is currently supporting the project monitoring program, including production of a Monitoring and Reporting Plan, and Quality Assurance Project Plan, as well as equipment installation, training, data management and analysis, and reporting per grant funding requirements. Chris's role on the project is the engineer of record, responsible for preparation of the engineering drawings and specifications for the stormwater monitoring station along Merced Avenue.

**OTAY RIVER BUSINESS PARK, CHULA VISTA, CA\***

The Otay River Business Park comprised approximately 53 acres of industrial land in the City of Chula Vista. The stormwater management system for this project included multiple biofiltration and infiltration basins, which were located directly adjacent to the floodway for the Otay River. Chris's role in the implementation of this project included the regulatory review of the technical studies, final map, grading plans, and improvement plans for the project.

**OTAY RANCH VILLAGE 8 WEST, CHULA VISTA, CA\***

The master planned development included 1,429 multi-family residential units, 621 single family residential units, 50,000sf of office space, 250,000sf of commercial use space, 28 acres of urban parks, 32 acres for schools and 78 acres of additional public space. The stormwater management system for this master planned development consisted of one large regional biofiltration basin, located adjacent to the Otay River, with flow through pretreatment. Chris's role in the implementation of this project included the regulatory review and approval of the drawings and technical studies associated with the final map, grading plans, and improvement plans of this master planned community.

**CHULA VISTA BAYFRONT, H-3 PARCEL, CHULA VISTA, CA\***

The Chula Vista Bayfront H-3 Parcel project is a development project consisting of a 1,600-unit hotel and convention center. The proposed public water distribution system serving this development consisted of approximately 3,300 linear feet of 12-inch and 1,200 linear feet of 16-inch cement mortar lined and coated welded steel pipe (CMLC). Chris was responsible for plan checking the improvement plans for compliance with Sweetwater Authority's Design Standards, and Standards for Construction of Water Facilities. Additionally, during the construction phase, Chris was responsible for construction inspection services for the public water facilities being installed for the project.

**SWEETWATER AUTHORITY FY 2022 PIPELINE MASTER PLAN IMPROVEMENTS, BONITA, CA\***

The Sweetwater Authority Master Plan Pipeline Program consisted of a new 3,392 L.F. 12-inch PVC water main in Sweetwater Road from Briarwood Road to Pray Street and 1,056 L.F. 12-inch PVC water main in Pray Street from Sweetwater Road to approximately 200 linear feet north of Pray Court. Chris's role was the engineer of record for the design of these improvements, and he was also responsible for the construction management and construction inspection services for the public water facilities being installed for this project.

**SWEETWATER AUTHORITY FY 2022 PIPELINE REPLACEMENT PROGRAM IMPROVEMENTS, NATIONAL CITY, CA\***

The FY 2022 Sweetwater Authority Pipeline Replacement Program consisted of 3,505 L.F. of new 8-inch PVC water main in Bucky Lane, from East 43rd Street to Sill Street, to replace 8-inch welded steel and 6-inch asbestos cement water mains installed in 1954-1960 time period, and 844 L.F. of new 12-inch PVC water main in East 24th Street and an Authority-owned easement, from Grove Street to Euclid Avenue to replace a 12-inch welded steel water main installed in 1952. Chris's role was the engineer of record for the design of these improvements, and he was also responsible for the construction management and construction inspection services for the public water facilities being installed for this project.

**OTAY RANCH VILLAGE 3 WEST, CHULA VISTA, CA\***

The master planned development of a 436-acre site which included 813 single family and 1,270 multi-family residential homes, mixed use, park sites, private open space, a school site, community purpose facilities, industrial/office, circulation roadways, 190 acres of open space, and preserve land. The stormwater management system for this master planned development consisted of three separate regional biofiltration basins, with flow through pretreatment. Chris's role in the implementation of this project included performing the regulatory review and approval of the drawings and technical studies for the final map, grading plans, improvement plans, and private improvement plans of this master planned community.

*\*Represents work prior to joining Herrera*



# CHRIS WEBB, PE, P.Eng., LEED Fellow

PRINCIPAL ENGINEER | DIRECTOR OF DESIGN

Chris Webb, PE is a civil engineer and LEED Fellow whose technical expertise is focused on promoting and implementing technologies that support sustainable stormwater solutions. For over 20 years, Chris has been at the forefront of sustainable development projects, working with local and state governments, private and public entities, utilities, and nonprofit groups. His career encompasses many firsts in the realm of permeable pavement, bioretention, living machines, & net zero toilet systems, rainwater capture, and water reuse. At Herrera he works as part of design teams across a spectrum of diverse project types from site development civil engineering, to planning, high performance sustainable water system design, and complex stormwater retrofits. Chris is a frequent speaker on the technical aspects of low impact development, stormwater management, and sustainable water resource management design at numerous professional development seminars, private workshops, national conferences, and university courses.

## CREDENTIALS & TRAININGS

- *BS in Civil Engineering, University of New Hampshire, 1993*
- *Professional Engineer #85262 in California, 2016*
- *LEED Fellow, 2011*
- *National Green Infrastructure Certificate Program (NGICP) Training Developer*
- *Instructor: Intermediate & Advanced WA Statewide LID Training Courses: Permeable pavement, Bioretention, Rainwater Collection & Green Roofs, and LID Site Planning and Design*
- *GreenBuild 2014 Conference, Washington, DC*
- *Living Future 2014 Conference, Seattle, WA*
- *LID Training for Landscapers and Nursery Professionals Webinar, 2013 (WA)*
- *Living Future Government Confluence, 2013 Seattle, WA*
- *Pervious Pavement and Bioretention Training, 2009, City of San Francisco, CA*
- *Puget Sound Low Impact Development Technical Workshops, 2008 (WA)*
- *LID and Green Building in Rural Areas, Washington St. Built Green Conf., 2008 Seattle, WA*
- *"Cisterns and Water Catchment", WSU King County Extension lecture series, 2007 King County, WA*
- *"Green Infrastructure," 30 days of Sustainability Lecture Series, 2006, Vancouver, BC*
- *"Creating the Infrastructure to Support Green Neighborhoods," 2005, Vancouver, BC*
- *GreenBuild 2004, Portland, OR*

## KEY PROJECT EXPERIENCE

### NATIONAL LID CURRICULUM DEVELOPMENT, NATIONWIDE

Chris worked with Passaro Engineering, the Water Environment Federation (WEF), and DC Water to support the development of curriculum and training content for the National Green Infrastructure Certificate Program (NGICP). The training program is focused on construction, inspection, and maintenance workers and includes 12 modules that address the following green infrastructure facilities: bioretention, permeable pavement, rainwater harvesting, rooftop practices (green roofs and blue roofs), dry wells, and stormwater wetlands. In addition to green infrastructure facilities, the training

modules also addressed safety, site management, and vegetation. Information on the certification program can be found on the [NGICP website](#).

### **TYPICAL PLANS AND SPECIFICATIONS FOR GI IN SAN FRANCISCO, SAN FRANCISCO, CA**

Since 2016, Herrera has worked with the San Francisco Public Utilities Commission (SFPUC) to develop typical green stormwater infrastructure (GI) plans and specifications for GI within the City and County of San Francisco, CA. Chris most recently managed work with SFPUC to update the plans and specs, released in early 2023. The typical plans and specifications include bioretention planters, permeable pavement facilities, swales, infiltration trenches, and dry wells. The typical plans and specifications help public and private sector design teams, working on private land or in the public realm, develop construction level designs for GI that assist designers to comply with stormwater regulatory requirements. Each round of updates to the plans and specifications reflects the latest understanding in GI design, construction, and operation gleaned from cutting-edge work by Herrera over the past decade-plus of GI design and implementation.

### **STATEWIDE LID TRAINING PROGRAM, WASHINGTON STATE**

Herrera led the Statewide Low Impact Development (LID) Training Program 2014-2015. Chris was a lead instructor and curriculum developer for the program. This project was funded by the Washington State Department of Ecology with funds dedicated through the Washington State Legislature and involved the development of 34 individual training modules on different topics related to LID that were delivered at approximately 64 training sessions over a 12-month period. The trainings, or modules, were organized by level of training (Introductory, Intermediate, and Advanced), subject matter, audience, and region (western and eastern Washington). The Introductory-level trainings were intended for all audiences and provided a broad overview of LID principles, new LID regulations encouraging LID, and the basic structures and functions of the primary LID practices including bioretention, permeable pavement, compost-amended soils, vegetated roofs, rainwater collection systems, newly planted and retained trees, and dispersion techniques.

### **CITY OF SAN FRANCISCO LOW IMPACT DEVELOPMENT TRAINING, SAN FRANCISCO, CA**

In January 2009, the City of San Francisco Public Utilities Commission contracted with Herrera to develop and deliver a 2-day LID training program to developers and stormwater professionals in the San Francisco Bay area. Mr. Webb provided instruction on bioretention and permeable pavement design and construction.

### **ALHAMBRA GREEN STREET FEASIBILITY STUDY, ALHAMBRA, CA**

Chris managed the civil engineering and landscape architecture design and life cycle cost estimate for a Green Street Demonstration Project on Main Street in the City of Alhambra. The project included a series of roadside bioretention cells totaling 15,000 square feet of BMP footprint area, as well as reconfigured parking and roadway striping, to provide water quality treatment and infiltration to 21 acres of contributing roadway area. The stormwater treatment design also included managing just over 16 acres of tributary area through a system of 7 drywells. The project will provide multiple benefits to the neighborhood and surrounding environment including beautifying the street, reducing stormwater runoff volumes and pollutant loads, enhanced open space, native plantings and habitat, as well as a demonstration to the public of the benefits of green infrastructure. Herrera also developed a project monitoring plan to evaluate and verify BMP performance. The project design was used as the foundation for an engineering feasibility study, which was successfully submitted for funding in 2022 under LA County's Safe Clean Water program.

### **CITY OF BELLINGHAM PARK PLACE STORMWATER FACILITY REDEVELOPMENT, BELLINGHAM, WA**

Chris was the project manager & Engineer of Record for this multi-phase phosphorous reduction project for Lake Whatcom. The project included research & development, pilot testing, performance monitoring, and regional stormwater treatment facility design phases. The goals of the project were to develop a new stormwater treatment media capable of removing 80-90% of total phosphorus from stormwater runoff, monitor a pilot scale facility using the new media, and reconstruct a regional stormwater treatment facility using the new media. The project won Gold at the 2023 Washington State ACEC Engineering Excellence Awards for Uniqueness and/or Innovative Application of New or Existing Techniques.



# DYLAN AHEARN, PhD

PRINCIPAL SCIENTIST

Dylan has 25 years of experience studying the environmental ramifications of human alteration to aquatic systems. Dylan has designed studies, collected data, and conducted detailed pollutant loading assessments for over 100 stormwater treatment technologies (e.g., wet ponds, swales, filter strips, green roofs, pervious pavement, and proprietary systems). He has extensive hands-on knowledge of LID and green infrastructure and, having designed and implemented the monitoring network at the Washington State University Low Impact Development Research Center, is involved in cutting edge stormwater treatment research. Dylan is also a Geology and Environmental Studies adjunct professor at Edmonds College and has taught numerous workshops on how to monitor and design BMPs. Whether it is teaching, programming dataloggers, conducting statistical analyses, or designing his next field experiment, Dylan approaches his work with an attention to detail and a passion for environmental stewardship.

## CREDENTIALS & TRAININGS

- *PhD in Hydrology, University of California, 2004*
- *BA in Geology, Guilford College, 1996*
- *NPDES monitoring training instructor to City of Tacoma, WA; City of Seattle, WA; Clark County, WA; and Pierce County, WA staff, since 2014*
- *Rain garden monitoring training instructor to King County, WA staff, 2011*
- *Northwest Environmental Training Center Instructor*
- *Edmonds College Geology Adjunct Professor LID training instructor to over 200 students across 4 trainings*

## KEY PROJECT EXPERIENCE

### STATEWIDE LID TRAINING PROGRAM, WASHINGTON STATE

Herrera helped lead the Statewide Low Impact Development (LID) Training Program in Washington State. Dylan was an instructor and curriculum developer for the program for components related to monitoring and bioretention design. This project was funded by the Washington State Department of Ecology with funds dedicated through the Washington State Legislature and involved the development of 34 individual training modules on different topics related to LID that were delivered at approximately 64 training sessions over a 12-month period. The trainings, or modules, were organized by level of training (Introductory, Intermediate, and Advanced), subject matter, audience, and region (western and eastern Washington). The Introductory-level trainings were intended for all audiences and provided a broad overview of LID principles, new LID regulations encouraging LID, and the basic structures and functions of the primary LID practices including bioretention, permeable pavement, compost-amended soils, vegetated roofs, rainwater collection systems, newly planted and retained trees, and dispersion techniques.

### **CITY OF BELLINGHAM PARK PLACE STORMWATER FACILITY, BELLINGHAM, WA**

Dylan was the Science lead for this multi-phase phosphorous reduction project in the Lake Whatcom watershed in Washington State. The project included research & development (R&D), pilot testing, performance monitoring, and regional stormwater treatment facility design phases. The goals of the project were to develop a new stormwater treatment media capable of removing 80-90% of total phosphorus from stormwater runoff, monitor a pilot scale facility using the new media, design and reconstruct a regional stormwater treatment facility using the new media, and then monitor the full-scale facility to assess total phosphorus load reduction to the Lake. The project has been built and full-scale monitoring will begin this fall.

### **CITY OF ANAHEIM POST DESIGN DETAILS, ANAHEIM, CA**

Dylan previously worked with the City of Bellingham, WA to develop a new TAPE-approved non-proprietary high flow rate biofilter referred to as "Phosphorus Optimized Stormwater Treatment" or POST. POST offers an affordable and flexible alternative to using proprietary high flow rate biofilters. The City of Anaheim, CA is now adapting POST for use in their jurisdiction. Herrera is creating a suite of standard construction details for the POST System to be integrated into the City of Anaheim's standard design details. The design details will result in constructible, functional, maintainable, and aesthetic facilities. Herrera is also producing supplemental written guidelines to incorporate the POST System into the existing City of Anaheim BMP Design Guidelines. Dylan is the project manager and stormwater treatment expert working with his team of engineers to deliver this new tool to the City.

### **SAN FRANCISCO BIORETENTION ANALYSIS, SAN FRANCISCO, CA**

The City of San Francisco, CA conducted a major initiative to implement Green Stormwater Infrastructure (GSI) across the City in order to reduce hydraulic loading to their combined sewer system. Eight pilot projects were implemented as a demonstration to test how cost effective the GSI approach would be for the City. Dylan assisted the City with developing an approach for monitoring the demonstration projects. He provided experimental design support, developed standard operating procedures, and helped the City clarify the objectives of their monitoring efforts. Finally, Dylan helped develop standard details for monitoring bioretention systems which the City uses to this day.

### **GENEVA BIORETENTION PILOT PROJECT, WHATCOM COUNTY, WA**

This project aims to improve the water quality of runoff flowing into Lake Whatcom, WA by reconstructing a series of underutilized roadside swales in Whatcom County's Geneva neighborhood using a novel flow distribution system and Ecology's new High-Performance Bioretention Soil Media (HPBSM) (previously developed by Herrera). This project is partially funded by an Ecology grant and will test whether the performance of HPBSM observed in Herrera's lab experiments can be replicated in a large-scale treatment facility using the same specifications. In addition, this project will function as a case study for implementation of the HPBSM specification and will document the HPBSM material costs, procurement, and the installation process. Construction was completed in November 2023 and current monitoring is indicating excellent pollutant removal performance. Dylan is the lead for media development and specification as well as the monitoring lead for this effort.

### **LID RESEARCH FACILITY TECHNICAL SUPPORT, PUYALLUP, WA**

The Washington State University (WSU) Low Impact Development Research Facility consists of 19 rain gardens, 20 bioretention mesocosms, and 15 pervious pavement cells each equipped with flow and water quality monitoring devices. In 2011, as project manager Dylan aided in the experimental design, drafting 3 separate Quality Assurance Project Plans (QAPPs) for each component of the facility. Dylan recommended monitoring equipment, programmed the datalogger network, and trained WSU staff. The datalogger network measures meteorological conditions, records stormwater flow data from 36 sensors, controls 30 automated samplers, and is tied together with radio and internet communications with alarming capabilities. The WSU LID research facility is the largest of its kind on the West Coast. Dylan is excited to be associated with the Center as data collection and experimentation continues through the coming years.



# STACY LUELL, PE, QSD/QSP

SENIOR ENGINEER

Stacy Luell, PE, QSD/QSP is a Professional Engineer in the state of California. She has 13 years of experience in MS4 Permit and water quality objective compliance, Construction General Permit compliance, Enhanced Watershed Management program support, hydrology, stormwater BMP inspections and performance evaluations, stormwater management, and surface water and BMP modeling. Her project experience also includes California Statewide Trash Provisions compliance, reasonable assurance analysis development, monitoring report development, dry and wet weather field sampling, BMP siting and monitoring plan development, BMP construction oversight, and stormwater quality and hydrology data analysis.

## CREDENTIALS & TRAININGS

- *MS in Biological and Agricultural Engineering, North Carolina State University, 2011*
- *BS in Biosystems Engineering, Clemson University, 2009*
- *Professional Engineer #82919, California, 2014*
- *Qualified SWPPP Developer/ Practitioner, California, No. 26980*
- *OSHA 40-Hour Hazardous Waste Operations Worker, No. 31715*

## KEY PROJECT EXPERIENCE

### SAN DIEGO COUNTY COMMUNITY FOCUSED STORMWATER PROJECTS, SAN DIEGO, CA

The County of San Diego is investing in Community-Focused Stormwater Improvement Partnerships to build multi-benefit water quality improvement projects on private properties in unincorporated areas of San Diego County. The County identified the Spring Valley Special Drainage Area 1 as a priority area for green stormwater infrastructure (GSI). At the heart of the project, a community-focused engagement process will gain input from stakeholders and the public regarding their priorities related to stormwater, flooding, and other co-benefits. Engagement will also focus on empowering the community through education, promoting inclusivity, and providing transparency. Based on community input and technical analysis, the team will identify, prioritize, and design GSI retrofit projects that best deliver stormwater and community benefits. Herrera is supporting a comprehensive spatial analysis to screen and prioritize candidate parcels that are most likely to support multiple benefits. Herrera is also leading the development of Preliminary Engineering Reports for design alternatives on three candidate parcels. Stacy is serving as assistant project manager in addition to supporting parcel prioritization process decisions.

### LAUSD DESIGNING FOR HEALTHY SCHOOLYARDS, LOS ANGELES, CA

To address the need for greener, more engaging educational spaces in disadvantaged communities within Los Angeles County, the Council for Watershed Health and Los Angeles Unified School District (LAUSD) have begun a green schoolyards design project funded by Cal Fire's Green Schoolyards Program. Herrera, working closely with community-based organizations as partners, is taking a lead role in this transformative endeavor and is responsible for designing green schoolyards for three of the eight selected LAUSD schools. The work involves comprehensive design leadership,

team coordination, and active engagement with the school communities. This project showcases Herrera's commitment to creating educational spaces that are both environmentally sustainable and reflective of the unique needs of each school community, laying the groundwork for additional, similar projects in the future. Stacy is serving as assistant project manager and is also supporting site survey, community engagement activities, and preliminary engineering tasks.

#### **JAKE KUREDJIAN PARK STORMWATER FEASIBILITY STUDY, STEVENSON RANCH, CA**

Herrera is leading the stormwater management design for a stormwater infiltration system within Jake Kuredjian Park, located in Stevenson Ranch, California in Unincorporated LA County. The project will help the County in achieving its stormwater capture goals while providing multiple benefits to the neighborhood and surrounding environment. The project is an opportunity to incorporate stormwater detention beneath the park that would capture and treat stormwater runoff that would otherwise enter and pollute the region's waterways. The project will help to address the County's municipal stormwater permit while also aligning with the goals of the Los Angeles County's Safe, Clean Water (SCW) Program. Herrera is also developing a project monitoring plan to evaluate and verify BMP performance and developed capital and life-cycle costs to build, operate, and maintain the facilities throughout their lifetime. Stacy is serving as assistant project manager, conducting desktop site analyses using available spatial data, leading development of conceptual design and conducting preliminary sizing the stormwater detention system.

#### **CITY OF ANAHEIM POST SYSTEM DESIGN STANDARDS, CITY OF ANAHEIM, CA**

Herrera is creating a suite of standard construction details for the Phosphorous Optimized Stormwater Treatment (POST) System to be integrated into the City of Anaheim's standard design details. The design details will result in constructible, functional, maintainable, and aesthetic facilities. Herrera is also producing supplemental written guidelines to incorporate the POST System into the existing City of Anaheim BMP Design Guidelines. Stacy is serving as assistant project manager while supporting the design team to meet client expectations.

#### **SOUTH BAY BEACH CITIES ENHANCED WATERSHED MANAGEMENT PROGRAM (EWMP), CITIES OF MANHATTAN BEACH, HERMOSA BEACH, REDONDO BEACH, TORRANCE, AND COUNTY OF LOS ANGELES, CA, BEACH CITIES WATERSHED MANAGEMENT GROUP**

An EWMP comprehensively evaluates opportunities for collaboration among Permittees and other partners on multi-benefit, regional stormwater projects that address water quality, water supply, and flood control benefits. Stacy was responsible for helping co-author and prepare the 2018 South Bay Beach Cities EWMP to meet requirements set forth in the Los Angeles Phase I MS4 Permit. Project work included data compilation and analysis to prioritize water body-pollutant combinations within the watershed; GIS spatial analyses; data preparation for water quality and quantity modeling using the Structural BMP Prioritization and Analysis Tool (SBPAT) in support of performing a reasonable assurance analysis for the identified water quality priorities; co-authoring and preparing the Reasonable Assurance Analysis technical memorandum; and project management tasks.

#### **FORESTAR CHATSWORTH DEERLAKE SWPPP SUPPORT, UNINCORPORATED LOS ANGELES COUNTY, FORESTAR CHATSWORTH\***

Third party consultant managing California Stormwater Pollution Prevention Plan compliance on large-scale construction project, which includes weekly site inspections, wet weather sampling, data submittal to the State Water Board, and SWPPP updates. Stacy served as the project's QSP and assistant project manager.

\*Represents work prior to joining Herrera