



Gray & Osborne, Inc.
CONSULTING ENGINEERS



northwest hydraulic consultants



HWA GEOSCIENCES INC.

Proposal

Clallam County

Design & Engineering
Services for the Lower
Dungeness River Floodplain
Restoration & Levee
Realignment Project





November 30, 2015

Ms. Cathy Lear
Project Manager
Clallam County
223 East Fourth Street, Suite 4, Room 150
Port Angeles, Washington 98362

SUBJECT: DESIGN AND ENGINEERING SERVICES FOR THE LOWER
DUNGENESS RIVER FLOODPLAIN RESTORATION AND LEVEE
REALIGNMENT PROJECT
CLALLAM COUNTY, WASHINGTON
G&O #20157.34

Dear Ms. Lear:

Thank you for the opportunity to present our team's proposal for assisting Clallam County with design services for the replacement of the Lower Dungeness River levee, to restore function to the expanded floodplain, and to improve riparian and aquatic habitat within the project reach. We have assembled a team of professionals who have the expertise and the depth and breadth of experience to evaluate existing conditions, model hydrodynamic riverine processes, and to design the infrastructure, structures, and channels required to re-establish floodplain function and enhance habitat connectivity. Our team includes our subconsultants Northwest Hydraulic Consultants (NHC), ICF International (ICF), and HWA GeoSciences, Inc. (HWA). Our team partners share our commitment to excellence and client service, and we have a history of successful partnership with each team member on current and prior projects.

Gray & Osborne has provided professional engineering services exclusively to public agencies throughout Washington State since 1935. We specialize in the planning, design, and construction management of water, sewer, transportation, and utility systems. Our staff of 140 experienced professionals operates out of our offices in Seattle, Yakima, Olympia, Arlington, Wenatchee, and Vancouver, and includes engineers in the following disciplines:

- | | |
|--------------|------------------|
| • Civil | • Transportation |
| • Electrical | • Hydraulic |
| • Structural | • Environmental |
| • Mechanical | • Chemical |



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In addition to our engineers, we also staff:

- Professional Land Surveyors
- Geographic Information Systems (GIS) Technicians
- Computer-Aided Designers and Drafters
- Environmental and Permitting Specialists
- Construction Managers/Resident Inspectors

We are familiar with neighbors to the project site, having provided engineering services to clients in the upper Olympic Peninsula including Clallam County, the Cities of Sequim and Port Townsend, the Port Ludlow Drainage District, and the Port Gamble S'Klallam Tribe.

Northwest Hydraulic Consultants offers a broad range of services in hydrology and hydraulics including multidimensional numerical modeling, stream and river restoration, fluvial geomorphology, scour assessment, bank stabilization, and sediment transport. These have been their focus since they opened their doors in the Seattle area in 1980, having provided these services to dozens of local agencies over the last 30-plus years. The Seattle office staff is comprised of more than 20 hydrologists, hydraulic engineers, and additional technical staff with broad expertise in engineering application, alternative evaluations, and conceptual and final design of river scour/erosion protection features and habitat restoration projects. Company-wide they have approximately 160 staff, all focused on water resources planning and engineering.

ICF International is an interdisciplinary environmental consulting firm with local Washington State offices in Bellingham, Seattle, and Olympia. Within these three offices are 45 professionals that include fisheries, wetland, and wildlife biologists; civil and hydraulic engineers; environmental planners, and cultural resource specialists. Within the Pacific Northwest they primarily provide support to local municipalities, counties, state agencies, and regional federal offices with this wide range of environmental services. For the past 35 years they have supported these and other clients in the Pacific Northwest with the design and implementation of their projects by conducting environmental studies and preparing environmental documents as necessary to comply with the local, state, and federal laws and policies such as the Endangered Species Act, Clean Water Act, NEPA/SEPA, National Historic Preservation Act, Shoreline Management Act, and local critical area ordinances.

ICF is pleased to feature Torrey Luiting as Lead Ecologist for this project. In addition to her deep and diverse experience as a senior ecologist, wetland biologist, permitting specialist, and project manager, Torrey adds value to the project with her employment



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history with the Seattle District Corps in the Environmental Resources Section. In that capacity she prepared compliance materials and conducted interagency coordination for Corps projects that included levee repair, and she is familiar with the Corps levee vegetation regulations and the Seattle District's local vegetation variance.

HWA GeoSciences, Inc. provides a full range of geotechnical and geoscience solutions to public agencies and engineering/architecture firms, for design and construction of buildings, parks, solid waste, transportation, waterfront, water, wastewater, and stormwater facilities. Since 1978, HWA's engineers, geologists, environmental scientists, construction inspectors, and laboratory technicians have been helping to create a better, safer, more sustainable built environment in the Pacific Northwest and abroad. In addition to their engineering and science services, they operate a state-of-the-art materials testing laboratory, accredited by the American Association for Laboratory Accreditation (A2LA), and the American Association of State Highway and Transportation Officials (AASHTO) R18.

Evaluation of slope, embankment, and levee stability is a hallmark of HWA's skill set. Their background and experience with levee stability evaluation and stabilization of failed levee sections within Clallam County highlights their ability to undertake the Lower Dungeness River Floodplain Restoration and Levee Realignment project.

PROPOSER

Proposer's Name:	Gray & Osborne, Inc.
Proposer's Mailing Address:	3710 168 th Street NE, Building B, Suite 210 Arlington, Washington 98223
Contact Person:	Barry Baker, P.E.
Contact Email, Telephone:	bbaker@g-o.com , (360) 454-5490

ADDENDA RECEIVED

No.	Topic	Date Received	Name of Recipient
2	Notification of Changes in the RFP	November 5, 2015	Barry Baker, P.E.
3	Notification of Changes in the RFP	November 13, 2015	Barry Baker, P.E.
4	Notification of Changes in the RFP	November 18, 2015	Barry Baker, P.E.



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SUBCONSULTANTS

Northwest Hydraulic Consultants	ICF International	HWA GeoSciences, Inc.
16300 Christensen Road Suite 350 Seattle, Washington 98188	710 Second Avenue Suite 550 Seattle, Washington 98104	21312 30 th Drive SE Suite 110 Bothell, Washington 98021
Erik Rowland, P.E.	Mark Matthies Principal	Ralph N. Boirum, P.E. Principal
erowland@nhcweb.com	mark.matthies@icfi.com	rboirum@hwageo.com
(206) 241-6000	(206) 801-2826	(425) 774-0106

We would appreciate the opportunity to share our knowledge of stormwater conveyance issues on this project as well as to serve Clallam County. Please contact me at (360) 454-5490 if you have questions or would like additional information.

Sincerely,

GRAY & OSBORNE, INC.

Barry P. Baker, P.E.

BPB/hhj
Encl.

EXPERIENCE & PAST PERFORMANCE OF THE PRIME CONSULTANT

Gray & Osborne's team of professionals have provided value added engineering design and construction management for public agencies with projects requiring working with both the developed infrastructure and the natural environment. Our staff has assisted public agencies with on-site help during flooding events by working directly with a contractor to stabilize riverbanks and protect vital public infrastructure to managing and coordinating floodplain restoration from the first inception of the projects, through survey, land acquisition, design, permitting, bidding, and final construction. Detailed project examples are provided later in this Proposal.

PROJECT MANAGEMENT SYSTEM

Tracking Process for Budget, Schedule, and Scope

We rely on three tools for tracking adherence to project budget, schedule, and scope:

1. Quality Assurance/Quality Control (QA/QC) Meetings: Project budget, schedule of deliverables, and scope are summarized at each QA/QC meeting (5%, 50% to 70%, and 95%) in a memorandum issued to each QA/QC team member prior to the meeting by the project manager. Our rigorous QA/QC process requires that the project manager develop project summary memoranda at each phase of the project. QA/QC meetings bring senior members of the team into the design process to focus attention on those project elements that present significant risk from the standpoint of cost, reliability, and conformance to regulatory and design standards. The firm's QA/QC program was formalized in 1996 with emphasis on constructability, risk to the owner, reliability, and cost.
2. Monthly Project Summary Reports: Summary reports are provided to the project manager each month which show status of budget and hours billed for each employee category (project manager, project engineer, design engineer, technician) along with target hours and percentage over or under target for each category. We also use project management software to track tasks and milestones and make necessary adjustments to the schedule to maintain the critical path. Unanticipated delays or changes can be addressed through clear and concise communication, allowing the design team to mitigate any impacts on the overall project, schedule, and budget.
3. Monthly Billings: Show hours and dollar amounts being billed for each employee, total hours and dollar amounts billed to date for each employee, total billing for the month, and remaining budget. A monthly progress report detailing progress made during the billing period, budget expended and remaining, and project challenges will be provided.

Scheduling Process and Project Management

We conduct weekly meetings each Monday to coordinate and allocate shared resources including design engineers, technicians, and clerical staff. Project managers input requirements to a database at the end of each week. We utilize Deltek Advantage as our accounting management software. Project budget reports are prepared monthly and distributed to project managers. These reports can be viewed by the project manager at any time, and reports can be printed out at any time and distributed to the project team as necessary.

REECER CREEK FLOODPLAIN RESTORATION

Owner:	Mid-Columbia Fisheries Enhancement Group
Contact:	Margaret Neuman, Executive Director, 509.281.1322
Gray & Osborne, Inc.:	Permitting, Floodplain Restoration Plan and Specifications, and Survey
Project Team:	Barry Baker, P.E., Project Manager, Design and Permitting
Project Cost:	Design and Construction Management – \$74,288
Dates of Work:	Start – 2009; Complete – 2010

In 1999, the City of Ellensburg purchased 320 acres of agricultural property adjacent to West Ellensburg Park to provide additional recreational area and flood control. Reecer Creek, a tributary of the Yakima River, was constrained within a levee through the property. The levee constricted flow, causing flooding on upstream and adjacent properties. The Reecer Creek Floodplain Enhancement project included removal of the existing levee and construction of a new setback levee. Relocating the levee away from the creek created opportunities for stream channel enhancement, stream connectivity with a larger floodplain, and habitat restoration along the length of Reecer Creek. The design and construction were funded by several agencies, including the City of Ellensburg, Salmon Recovery Funding Board, Washington State Department of Fish & Wildlife, Bonneville Power Administration, and the Yakama Nation. Gray & Osborne prepared plans and specifications that incorporated survey, geotechnical, and some design from a previously funded project, as well as provided project coordination and liaison with the permitting agencies, City of Ellensburg, Yakama Nation, and the public.



SUNNYSIDE WASTEWATER TREATMENT PLANT OUTFALLS

Owner:	Lake Stevens Sewer District
Contact:	Michael Bowers, P.E., M.S.E., General Manager, 425.335.8588
Gray & Osborne, Inc.:	Permitting, Design, Construction Management, and Contract Administration
Project Team:	Doug Welch, P.E., Project Manager; Stacey Clear, P.E., Stormwater; Barry Baker, P.E., Construction Management and Mitigation
Project Cost:	Design and Construction Management – \$184,380
Dates of Work:	Start – June 2008; Complete – September 2011

As part of the construction and commissioning of a new membrane bioreactor wastewater treatment plant design, Gray & Osborne provided permitting, design, construction management, and contract administration of new outfalls for treated effluent from the treatment plant and a separate parallel marine outfall for the site stormwater discharge. The parallel 30-inch HDPE effluent and 12-inch HDPE stormwater pipe traversed approximately 1/4 mile of wetland/floodplain and penetrated a U.S. Army Corps of Engineers-certified levee separating Ebey Slough estuary waters from the agricultural/wetland floodplain. The project required construction through a levee and mitigation for wetland impacts in the floodplain pipe alignment. In addition to the environmental concerns, the effluent and stormwater outfall pipes crossed under a major petroleum pipeline. Construction on the landward side of and halfway through the levee included open-trench construction. The marine outfall and waterward construction/connection through the levee included barge, derrick, and commercial diving operations to complete. Gray & Osborne provided full-time inspection during construction and worked with the Washington State Department of Ecology and U.S. Army Corps of Engineers to resolve wetland fill permit violations that had occurred prior to the District's acquisition of the property for the outfall.



PITSHIP POCKET ESTUARY CULVERT REPLACEMENT CONSTRUCTION MANAGEMENT

Owner:	North Olympic Salmon Coalition
Contact:	Rebecca Benjamin, Director, 360.379.8051
Gray & Osborne, Inc.:	Specifications and Construction Management
Project Team:	Nancy Lockett, P.E., Project Manager
Project Cost:	Design and Construction Management – \$24,600
Dates of Work:	Start – 2009; Complete – 2010

Gray & Osborne assisted the North Olympic Salmon Coalition and the City of Sequim with preparation of plans, specifications, and construction management, including submittal review, part-time inspection, preparation of progress estimates, and closeout paperwork, for the Pitship Pocket Estuary Culvert Replacement project. The original plans, prepared by another engineering firm, were not biddable. Gray & Osborne was asked to revise the project plans. The project replaced a 36-inch culvert with a 40-foot span bridge section. The installation of the bridge has ensured habitat connectivity between the Pitship Pocket Estuary and Sequim Bay.



WHITTLE CREEK MITIGATION

Owner:	City of Castle Rock
Contact:	David Vorse, Public Works Director, 360.274.7478
Gray & Osborne, Inc.:	Design, Plans and Specifications, and Construction Management
Project Team:	Barry Baker, P.E., Project Manager/Engineer
Project Cost:	Design and Construction Management – \$61,200
Dates of Work:	Start – 2009; Complete – 2009

The City of Castle Rock constructed a boat launch, two floats, a log boom structure, and adjacent upland amenities including 2.5 acres of parking at river mile 17.4 of the Cowlitz River to support increased water recreation. As habitat mitigation for the project, the City completed restoration activities on Reach 6 of Whittle Creek, a fish-bearing tributary of the Cowlitz River. Gray & Osborne and its subconsultant, GeoEngineers, completed the design and plans and specifications for restoration of Whittle Creek.



Restoration activities on a mile of Whittle Creek included removal of invasive vegetation, removal of dredge spoils and banks regrading, removal of floodplain material to encourage channel-forming processes, and planting of native vegetation. Large woody debris was installed over an area of 1.25 acres to improve habitat-forming processes, increase sinuosity, habitat diversity, and control sediment deposits to improve fish passage and prevent stranding of fish at low flows. The restored creek provides spawning, rearing, and/or migration habitat for the four Endangered Species Act-listed species.

FIRMS' EXPERIENCE PERFORMING PARTICULAR DISCIPLINES OF WORK

HYDRAULIC MODELING AND SCOUR ANALYSIS (NORTHWEST HYDRAULIC CONSULTANTS)

NHC has completed over a thousand hydraulic studies at locations throughout the Pacific Northwest. Typical studies involve hydrologic investigations to determine design discharges, geomorphic evaluations, numerical modeling to estimate design velocities and water surface elevations, determination of FEMA floodway impacts, scour evaluations, and design of channel stabilization and bank protection features that satisfy environmental requirements. Assessments typically include one- or two-dimensional hydraulic modeling depending on site conditions and problems at the site. Because NHC engineers are skilled in numerous numerical models, they have the experience to select the best model and refine parameters to produce the most accurate results. Hydraulic results are compiled into concise reports used to describe lateral stability of the river channel, longitudinal profile degradation/aggradation, contraction scour, local scour, and adequacy of countermeasures.

Winkelman Revetment Reconstruction Alternatives Analysis and Design

Owner: King County
Contact: Chase Barton, 206.477.4854, chase.barton@kingcounty.gov
Key Personnel: Erik Rowland, Principal-in-Charge; Vaughn Collins, Lead Hydraulic Engineer
Project Cost: \$162,759 (Phase 1)
Dates of Work: Start – January 2014; Complete – Ongoing



The Winkelman Revetment on the Snoqualmie River protects the Tolt water supply pipeline, which serves the Seattle metropolitan area. Channel migration exacerbated by a 50-foot deep scour hole has caused bank failure and could threaten the pipeline if not addressed. Phase 1 of the project consists of technical analyses needed to support alternative development, and selection of a preferred alternative for revetment reconstruction. Geomorphic analysis, habitat assessment, existing conditions geotechnical analysis, and development of one- and two-dimensional models to assist with characterization and alternatives analysis have been completed. NHC is currently evaluating feasible alternatives for addressing toe erosion, bank protection, and reconnection of an off-channel wetland to the Snoqualmie River for habitat improvement. Selection of the preferred alternative is planned for May 2014. Project design will commence shortly after, with construction slated for 2015.

Reddington Levee Setback and Extension

Owner: King County
Contact: Erik Peters, 206.477.4797, erik.peters@kingcounty.gov
Key Personnel: Erik Rowland, Principal-in-Charge; Vaughn Collins, Lead Hydraulic Engineer
Project Cost: \$935,000 (Phase 1)
Dates of Work: Start – April 2012; Complete – June 2013



This major Green River flood risk reduction infrastructure project replaced approximately 0.9 mile of substandard levee with an approximately 1.3-mile long setback levee. The project provides a wider river corridor for channel migration and habitat benefits, while protecting critical infrastructure from erosion and scour. Meeting a compressed design schedule required a tightly coordinated design approach. NHC led design for the most complex project elements, which included a combination of rock barbs, large and small engineered log jams, and rock revetment. The project design was completed on time and under budget. Construction was completed in 2013.

GEOMORPHIC RESPONSE ANALYSIS (NORTHWEST HYDRAULIC CONSULTANTS)

NHC has conducted geomorphic and sediment transport studies for several hundred riverine projects from Alaska to South America and Asia, but most of their experience pertains to mountain and foothill streams in the western United States and Canada. Several recent setback projects have used NHC's geomorphic evaluations to assess channel response and aid in design optimization. They have provided expertise for the analysis and modeling of sediment transport in rivers of every type and setting, including evaluating and mitigating problems of stream channel erosion and aggradation associated with land development. Techniques employed have ranged from simple empirical estimates of sediment transport capacity to sophisticated computer modeling with both Corps of Engineers and NHC-developed software. In addition, they own and maintain a wide variety of field surveying and sediment sampling equipment to support their investigations.

Calistoga Setback Levee

Owner: City of Orting
Contact: Ken Wolfe, 360.893.2219, kwolfe@cityoforting.org
Key Personnel: Erik Rowland, Design and Geomorphology
Project Cost: \$1,200,000 (Design); \$400,000 (Land Acquisition); \$15,400,000 (Total Construction)
Dates of Work: Start – 2009; Complete – 2015

NHC provided hydraulics, geomorphology, alternatives analysis, and bank protection/restoration design for the 1.6-mile Calistoga Levee Setback on the Puyallup River. A significant aspect of NHC's work involved determining height for the new levee, geomorphic/sediment response, design of riprap and log spurs to safeguard the levee, and design of habitat enhancement elements within the existing river channel and newly connected floodplain. Construction of the project



was completed in 2015 with NHC providing construction oversight for 25 log jams. The project reconnected 46 acres of floodplain to the middle Puyallup River mainstem in the Orting area, in addition to 55 acres of reconnected side stream/backwater habitat. The consultant team assisted the City of Orting with securing \$13 million in grants including Salmon Recovery Funding Board, Washington State Department of Ecology, Public Works Trust Fund, and USDA-Rural Development funding.

Porter Levee Setback Geomorphic Study

Owner: King County Water and Land Resources
Contact: Fauna Nopp, 206.477.4787, fauna.nopp@kingcounty.gov
Key Personnel: Erik Rowland, Lead Design Engineer and Geomorphology
Project Cost: \$56,000
Dates of Work: Start – July 2013; Complete – Ongoing



Levee Setback Site

NHC was retained to evaluate existing geomorphic and hydraulic conditions and likely future geomorphic response to removal of the Porter Levee along a 1.3-mile long reach of the Green River. Existing conditions were characterized from the basin to project-specific scale and then the natural, unaltered conditions compared with the predicted trajectory of long-term reach morphology following levee removal. A HEC-RAS model was developed to aid with assessing current and setback conditions. NHC also provided feedback, including risks to principal infrastructure and habitat, scour assessment, and calculation of bank protection parameters, for

two County preliminary design concepts. NHC is currently engaged in follow-on hydraulic and geomorphic analysis to support final design.

RIVER EROSION SCOUR PROTECTION DESIGN (NORTHWEST HYDRAULIC CONSULTANTS)

NHC provides a wide range of services for levee and revetment studies, ranging from technical analyses to detailed design and construction support. NHC has designed and overseen the construction of hundreds of bank stabilization and restoration projects throughout the Pacific Northwest and western Canada. Within the past 2 years, NHC was involved in design and construction support for major levee setback projects on the Puyallup and Green Rivers. In addition to new levee construction, NHC recently wrapped up or is currently engaged in several projects involving levee recertification, interior drainage, and geomorphic response for major rivers like the Green, Chehalis, Cedar, Naches, and Yakima Rivers.

Ceres Hill Alternatives Assessment and Bank Protection Design

Owner: Lewis County Public Works
Contact: Rod Lakey, 360.740.2780, rlakey@county.lewis.wa.us
Key Personnel: Erik Rowland, Lead Design Engineer and Geomorphology
Project Cost: \$100,000
Dates of Work: Start – February 2013; Complete – August 2015

The Chehalis River has scoured the river bank and eroded the banks near Ceres Hill Road such that emergency measures were necessary. NHC was retained by Lewis County to develop self-mitigating bank and scour protection designs, perform FEMA No-Rise assessment, and complete on-site evaluation of river bank characteristics and channel morphology to identify constraints that could influence alternatives. A two-dimensional model of the reach was constructed to provide detailed flow distribution and velocity data to aid in the assessment of project design features and evaluation of long-term performance. Alternatives were documented in a basis of a design report and discussed with the County, permitting agencies, and stakeholders. Following approval of the preferred alternative, NHC prepared final design documents and provided construction support for the project in 2015.



Sheet from JARPA Plans

Nooksack River Bank Protection and Habitat Design

Owner: Whatcom County Public works
Contact: Paula Cooper, 360.676.6876, p.cooper@co.whatcom.wa.us
Key Personnel: Erik Rowland, Lead Design Engineer, Lead Hydraulic Engineer, Geomorphology
Project Cost: \$203,000
Dates of Work: Start – March 2007; Complete – February 2010



Constructed Log Jams

The South Fork Nooksack River, near the town of Acme, Washington, was eroding and causing retreat of the left and right banks, which led to more frequent flooding of the town. Lateral channel migration threatened the lower reach of Landing Strip Creek as well as private property along the river. NHC was contracted to design and provide construction guidance for two bank protection and habitat restoration projects along the South Fork Nooksack

River. The projects incorporated over 200 logs into a total of six log jams and restoration of a side channel/creek. NHC's tasks included evaluating the existing conditions, developing a suite of design alternatives, coordinating with the various stakeholders, completing final design documents, and providing on-site construction guidance.

ALTERNATIVES ANALYSIS (GRAY & OSBORNE AND NORTHWEST HYDRAULIC CONSULTANTS)

Gray & Osborne and NHC have a wealth of experience identifying and evaluating alternatives for riverine projects involving flood protection, habitat enhancement, and bank protection. We routinely engage the community, stakeholders, and regulators in a productive manner without compromising project goals. We anticipate the alternative analysis for the Lower Dungeness River project will identify a range of possible design elements and configurations (levee height, log jams, bioengineering, bank resloping, channel relocations, etc.) for an initial screening and discussion with the County.

South Fork Grays River Habitat Enhancement Design

Owner: Cowlitz Tribe Department of Natural Resources
Contact: Amy Boyd, 360.353.9202, aboyd@cowlitz.org
Key Personnel: Erik Rowland, Lead Design and Hydraulic Engineer
Project Cost: \$111,000
Dates of Work: Start – August 2014; Complete – May 2015

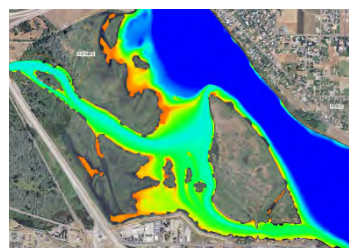


The lower South Fork Grays River has been adversely impacted by historic forest harvest and increased sediment supply. It is chronically disturbed by large-scale aggradation-degradation episodes, which trigger frequent avulsions and have destroyed nearly all the forest on the alluvial valley bottom. NHC evaluated existing conditions, habitat enhancement alternatives, and developed preliminary designs to restore natural geomorphic function and increase the quantity, quality, and stability of aquatic habitat in the project reach. The proposed restoration design utilizes floodplain-scale interventions to restore geomorphic function to the reach and enable long-term recovery of the riparian forest. The existing conditions assessment included field investigations, topographic/bathymetric survey, two-dimensional hydraulic modeling, geomorphic assessment, and a summary report. NHC participated in a meeting to engage key stakeholders in the alternatives analysis process.

Bateman Island Causeway Removal

Owner: Mid-Columbia Fisheries Enhancement Group
Contact: Rebecca Wassel, 509.281.1311, becca@midcolumbiariefeg.com
Key Personnel: Erik Rowland, Principal-in-Charge; Barry Baker, P.E., Project Manager (Gray & Osborne)
Project Cost: \$156,400
Dates of Work: Start – July 2014; Complete – June 2015

Bateman Island sits at the confluence of the Columbia and Yakima Rivers and is connected to the mainland by an earthen causeway. The presence of the causeway has altered flow and water quality conditions in the Yakima delta



and created a water temperature barrier that can delay adult salmon migration. Gray & Osborne assembled a team of experts in river engineering and modeling, fluvial geomorphology, fish biology, geotechnical, and bridge engineering to develop and test alternatives and assess the benefits for aquatic life and the impacts on other stakeholders within the project area.

NHC provided engineering services to support the development of conceptual alternatives that remove the barrier. NHC's tasks included examining channel/

floodplain relationships, geomorphic setting, channel bed material, stability concerns, and any constructability issues at the site. Special attention was given to the anticipated response of the delta bed material and its sediment transport characteristics. NHC also applied hydrodynamic modeling to: (1) assess the sediment transport expected under various causeway removal options, (2) inform the details of the breach opening design, and (3) evaluate and minimize any flood hazard risks. NHC also modeled changes to river temperatures evaluated improvements for salmonid species.

ENGINEERING DESIGN (GRAY & OSBORNE)

Gray & Osborne has provided civil engineering for public agencies for 80 years, including design of natural and structural elements within rivers and floodplains. The engineering design process starts with a clear understanding of the objectives and constraints of the project site. These may be regulatory requirements or property owner needs. Gathering physical information such as hydrology, topography, and soil stability are as necessary as the impacts on all stakeholders. This fundamental understanding is critical to being able to provide the technical analysis and potential solutions. Engineering best practices in the natural systems are based on empirical studies, along with knowledge of tools such as computer modeling. After the analysis is completed, knowing how projects can actually be built by contractors is critical for putting together clear and complete specifications, drawings and cost estimates. Following the design our team completes a quality assurance/quality control by experienced engineers not directly involved in the project to make sure to not be too lost in the details. Each step of the process builds on a long history of completing projects that meet their objectives.

Reecer Creek Floodplain Restoration

Owner: Mid-Columbia Fisheries Enhancement Group
Contact: Margaret Neuman, Executive Director, 509.281.1322
Key Personnel: Barry Baker, P.E., Project Manager, Design and Permitting
Project Cost: Design and Construction Management – \$74,288
Dates of Work: Start – 2009; Complete – 2010

In 1999, the City of Ellensburg purchased 320 acres of agricultural property adjacent to West Ellensburg Park to provide additional recreational area and flood control. Reecer Creek, a tributary of the Yakima River, was constrained within a levee through the property. The levee constricted flow, causing flooding on upstream and adjacent properties. The Reecer Creek Floodplain Enhancement project included removal of the existing levee and construction of a new setback levee. Gray & Osborne prepared plans and specifications that incorporated survey, geotechnical, and some design from a previously funded project, as well as provided project coordination and liaison with the permitting agencies, City of Ellensburg, Yakama Nation, and the public.



Pilchuck River Bank Stabilization and Restoration

Owner: City of Snohomish
Contact: Max Selin, P.E., Senior Project Engineer, 360.282.3196
Key Personnel: Barry Baker, P.E., Project Manager/Lead Engineer
Project Cost: \$42,000
Dates of Work: Start – January 2009; Complete – November 2009

Gray & Osborne provided civil engineering, permitting, and fluvial geomorphic technical services for immediate and emergency repair and restoration of over 800 feet of the Pilchuck River following record floods in January



2009. Up to 30 feet of channel bank width was eroded, which exposed and compromised an existing 18-inch water transmission main that was the primary source of potable water for the City of Snohomish. Gray & Osborne provided survey, field direction for waterline replacement and realignment construction, channel design, and permitting assistance with WDFW and USACE. Channel design treatments included flow diversion structures, channel bed grade control structures, and bioengineered large woody debris bank revetment structures, that provided immediate

and long-term repair to the channel and banks, mitigation against further bank erosion, and protection of the City's water supply pipe. River response was evaluated to assess the geomorphic functionality of proposed and installed treatments to limit the transfer of scour and sediment impacts to upstream or downstream reaches of the project site.

PROFESSIONAL LAND SURVEYING (GRAY & OSBORNE)

For 75 years, surveying has been an integral part of the work performed at Gray & Osborne. We offer topographical, right-of-way, boundary, and construction survey. Our survey services support the firm's design and construction projects, including water and wastewater treatment facilities, utilities, transportation projects, parks and trails, and related infrastructure. With an in-house staff of three survey crews and two licensed Professional Land Surveyors, we can respond quickly and efficiently to project sites located throughout the State of Washington.

Right-of-Way Research, Documentation, Control, and Mapping – Accurately showing the location of right(s)-of-way on design plans requires research of available records for exact location and width parameters. Sources of this information include: city records, county public works department files, warranty deeds, deeds granting right-of-way, and recorded surveys. This research allows our survey crews and drafting department to develop especially accurate maps of the area of interest.

Topographic Mapping – Gray & Osborne has the tools and expertise to provide topographic mapping for all our projects. Our staff utilizes state-of-the-art GPS along with conventional survey methods to establish control and site mapping necessary for the preparation of a base map. The survey crew and drafting department have extensive experience with a variety of mapping types appropriate for a diverse range of projects and situations.

Aerial and Global Positioning System (GPS) Surveying Control – Gray & Osborne provides the control network for all of our projects requiring aerial photometric mapping. GPS equipment is used to locate the aerial panels and control network so they can be placed on the required horizontal and vertical datum. We have performed a number of very successful projects using aerial photometric mapping. The GPS control networks have included medium to larger projects and in some cases an entire city and/or utility district.

As-Constructed Record Surveys – At the completion of some projects, we perform the required as-constructed survey. Since improvements do not always get built as designed, the as-constructed information must be gathered and added to the final construction drawings.

TRANSPORTATION DESIGN (GRAY & OSBORNE)

Gray & Osborne has prepared contract documents for numerous transportation-related projects throughout the State of Washington. Our office has publicly bid more than one project every week for the past 10 years. Our engineers are familiar with relevant codes and standards, as they pertain to the design and construction of transportation projects, and are skilled in the various digital-terrain modeling software (AutoCAD) that provide

accurate and detailed bid documents. This experience allows our engineers to quickly and efficiently provide the client documents to clearly identify impacts to adjacent property, physical features, floodplains, and existing conditions.

Gooseberry Point Pedestrian Pathways

Owner: Lummi Nation
Contact: Tim Ellis, Public Works Director, 360.312.2334
Key Personnel: Barry Baker, P.E., Principal-in-Charge and Environmental/Permitting; Kevin Brown, P.E., Project Manager; Alex Juan, E.I.T., Design Engineer; Stacey Clear, P.E., Stormwater Design; Siew Tan, P.E. (PanGEO), Geotechnical
Project Cost: \$242,000
Dates of Work: Start – December 2014; Complete – Ongoing

Gray & Osborne is currently providing design (transportation, stormwater) and environmental permitting services to the Lummi Nation for the installation of approximately 1.8 miles of pedestrian pathways in the area known as Gooseberry Point. The pathways consist of pervious asphalt pathways, low-impact development (LID) features to address stormwater runoff, retaining walls, roadway widening to meet County design standards, and pavement markings. Gray & Osborne also prepared strip maps, cross sections, and photographic renderings (showing existing and future improvements) for use during an open house presentation to the public.



Bogachiel Way Improvements

Owner: City of Forks
Contact: Audrey Grafstrom, City Clerk/Treasurer, 360.374.5412
Key Personnel: Tim Osborne, P.E., Principal-in-Charge; Kevin Brown, P.E., Project Manager/Engineer; Doug van Gelder, P.E., Stormwater Design; Siew Tan, P.E. (PanGEO), Geotechnical; Barry Baker, P.E., Environmental/Permitting
Project Cost: \$185,000
Dates of Work: Start – January 2009; Complete – April 2010



Gray & Osborne provided topographical survey, roadway design (preliminary and final), utility coordination, stormwater technical information report (TIR), right-of-way acquisition, environmental permitting, and construction management services to the City of Forks for the installation of 2,700 linear feet of new roadway elements on Bogachiel Way from 6th Avenue to Forks Avenue (US 101). Specific improvements included curbs, gutters and sidewalks, storm drainage collection, treatment and infiltration systems, water main improvements, and a new pavement section.

PROJECT APPROACH

TEAM ORGANIZATION STRUCTURE

Gray & Osborne's approach to the development of the Lower Dungeness River Floodplain Restoration and Levee Realignment Project begins with the assembly of talented and experienced professionals who are eager to meet the County's project objectives and who have a firm grasp of the technical and regulatory issues the project requires. Technical excellence is our starting point. In this regard, we have teamed with subconsultants we know and with whom we have ongoing working relationships. Our team of professionals has the breadth and depth of experience and expertise required to specifically assist the County with interdisciplinary and comprehensive engineering support for the project. Appendix II provides resumes for each key person shown on the accompanying organization chart.

Successful completion of the project also calls for strong management skills and a firm belief in service, teamwork, and open and timely communication throughout the process. We take a team approach to all projects, and we look forward to joining the County to form that team.



* Subconsultant

“...When Gray & Osborne has been hired by an agency to do design or construction management, the impression left with us, is that the agency was provided with quality engineering and excellent project documentation.” (Kenneth F. Hash, P.E., SW Region, Local Programs Engineer, WSDOT, March 27, 2012)

TECHNICAL PROJECT APPROACH

To a person, our team of key personnel has the technical skills and abilities of analysis and design; the expertise, experience and understanding of how to apply their skills and abilities; and the confidence to work creatively together in an interdisciplinary and interdependent environment to achieve the project goal to improve flood protection, river and floodplain function, and salmon habitat.

Key Challenge for Overall Project Success

As a key challenge and vital component to this phase of restoring functional ecosystem processes to the lower Dungeness River, we understand the importance and necessity of engaging all project stakeholders throughout the total design process in order to achieve the project goal. Public outreach and stakeholder engagement includes evaluation of potential trade-offs, mitigation of potential and real adverse impacts, and securing support at each design phase to move forward to implementation. We understand that restoration of river and floodplain processes includes protection of public and private resources against potentially adverse impacts.

Our approach to stakeholder engagement begins with a comprehensive review of the project history, which includes reviewing documentation of stakeholder and public participation development of the present project status. This understanding provides a basis for development of design alternatives for individual project elements that are advanced through the design process.

G&O and NHC have a wealth of experience identifying and evaluating alternatives for riverine projects involving flood protection, habitat enhancement, bank protection, and routinely engage the community, stakeholders, and regulators in a productive manner without compromising project goals. We anticipate the alternative analysis for this project will identify a range of possible design elements and configurations (levee height, log jams, bio-engineering, bank re-sloping, channel relocation, etc.) for an initial screening and discussion with the County. Sketches will be prepared for each element, as will a short narrative describing key aspects and expected performance. To better facilitate the evaluation, we will compile the design elements into an interactive spreadsheet based assessment tool developed for previous studies. This tool will allow the project team and County to pick and choose which elements to include in a given alternative, thus allowing evaluation of a tremendous range of possible solutions quickly and efficiently. Once this assessment is complete, a refined list of alternatives (each being a combination of design elements) will be identified for more detailed investigation and preliminary design. These preferred alternatives will then be drawn at a conceptual level, assessed in the hydraulic model, evaluated for constructability and cost, and further ranked against each other in an alternatives matrix. The hydraulic model will be simulated with the same discharges as the existing conditions model in order to assess the impacts of the selected features. Figures will be generated to illustrate water surface rise, bed response, flow distribution, velocity orientation, and magnitude for several representative discharges.

Utilizing these model results and the understanding of reach-wide hydraulic, habitat, and geomorphic processes, an Existing Conditions and Alternatives Assessment memo will be prepared to describe:

- Existing geomorphic and habitat conditions present at the site
- Modeling outputs
- Alternative concept drawings and descriptions

- Channel geomorphic and hydraulic response
- Expected habitat benefits
- Constructability concerns and preliminary cost estimates
- Evaluation matrix to present the pros and cons, benefits, and impacts of each alternative plan

Following this, a meeting will be scheduled to discuss the evaluation of alternatives. Modifications to the alternative designs and documentation will then be made as needed before meeting with key permitting agencies and/or stakeholders to present the preliminary designs. After the County has reviewed the draft Existing Conditions and Alternatives Analysis documentation, the County, G&O team, and interested stakeholders will then confer to determine a preferred alternative for preliminary design.

Our Community Outreach Specialist, Erika Britney, is available to competently facilitate stakeholder and public review. Erika is adept organizing projects, coordinating logistics, preparing meeting agendas and developing and producing meeting materials, summarizing actions and outcomes, and working with a range of experts to gain resolution.

Overall Study Management

The following discussion of our technical approach outlines the road map we will follow to meet the project objectives. Early and regular communication throughout the project – including meeting with the County, the stakeholder and technical advisory groups, and soliciting public input – will be required to ensure that the alternatives development and final design plan meets the project goal.

Gray & Osborne assigns project managers with significant and similar project experience. Typical traits of the project manager include experience, expertise, good communication skills, ability to multitask and identify critical path items, flexibility, commitment to client service, and a team builder. As project manager, Barry Baker's role will be to ensure that all members of the project team are completing tasks on time and within budget, and that the project is on track. Our project management strategy includes selecting a project manager who is experienced and has a keen awareness of the scope of work, has the ability and desire to maintain the schedule of deliverables, and provides good and frequent communication (telephone, fax, letters, e-mail) with team members, especially with the Clallam County Project Manager.

We conduct weekly meetings each Monday to coordinate and allocate shared resources including design engineers, technicians, and clerical staff. Project budget reports are prepared monthly and distributed to project managers. These reports can be viewed by the project manager at any time, and reports can be printed out at any time and distributed to the project team as necessary.

Project Team Communication and Coordination

Communication and **Teamwork** are two of three core elements of Gray & Osborne's business philosophy, as they support and sustain the third core element, **Client Service**. One of the keys to success of the project will be to institute clear lines of communication between all key members of the team including the County and the stakeholder group via telephone, e-mail, and meeting minutes. As Project Manager, Barry Baker will be responsible for day-to-day communications with the County project manager and, as appropriate or directed by the County project manager, other project stakeholders, jurisdictional agencies, and utilities that may have permitting or other approval requirements for the project.

Prior to each scheduled meeting, Gray & Osborne will provide a meeting agenda so that all team members will be able to have the appropriate staff members in attendance. We will submit an information request list to team

members sufficiently ahead of the meeting to ensure the necessary information is available for discussion. As issues develop during the course of the project, we will present these issues to the County and present possible alternatives and solutions to meet emerging challenges.

Management of Subconsultants

Gray & Osborne often works with those subconsultants that have experience working with Gray & Osborne, the client or with conditions in the local area. Subconsultant work is authorized only after a scope of work and a budget are agreed upon by the client and Gray & Osborne. Our subconsultants are required to submit monthly status reports with their billings, which are in turn incorporated into our monthly report to the client.

Quality Assurance/Quality Control

Gray & Osborne maintains a rigorous QA/QC program, which is described in the section following.

PROJECT APPROACH CHART: GRAY & OSBORNE'S CONSULTANT TEAM

Engineering, Design & Community Outreach Services for the Lower Dungeness Floodplain Restoration and Levee Realignment

		TEAM (HOURS)										KEY PERSONNEL							
		% of Total Effort	Gray & Osborne	NHC	HWA	ICF International			G&O General Staff	G&O Key Personnel	Total % All Firms	Project Manager	Lead Civil Engineer	Lead Hydraulic Engineer	Lead Structural Engineer	Lead Fluvial Geomorph	Lead Ecologist	Professional Land Surveyor	Transportation Engineer
TASK #	TASK											Barry Baker, P.E.	Barry Baker, P.E.	Vaughn Collins, P.E.	Myron Basden, P.E., S.E.	Eric Rowland, P.E.	Torrey Luiting	Rick Bond, P.L.S.	Kevin Brown, P.E.
BASELINE SCOPE OF WORK																			
1	Project Management		60	0	0	0				60	60	60							
2	Project Planning & External Coordination		200	72	0	208				200	480	120	80	12		60	32		
3	Towne Road Reconfiguration		200	0	0	0			120	80	200	10	20		40				50
4A	Survey & Base Map Development		200	20	0	0			120	80	220	10	30	20				40	
4B	Geotechnical Exploration and Laboratory Testing		20	0	260	0				20	280		20						
5	Geotechnical Analysis and Design		60	0	144	0			40	20	204		10						10
6	Hydrologic, Hydraulic and Geomorphic Design		120	900	0	64			80	40	1084		20	250		200	40		20
7	65% Design and Intermediate Design Evaluations		1020	550	32	252			560	460	1854	80	260	150	20	200	72		120
8	95% Design		520	240	24	106			300	220	890	40	160	80	10	80	32		20
9	100% Design		310	200	16	16			200	110	542	10	80	40		80	8		20
10	Bidder Inquiry Support		120	60	4	0			50	70	184	20	40	20		20			10
11	Permitting Support		10	60	0	8				10	78	10		20		20	8		
TOTAL BASELINE EFFORT		0%	2840	2102	480	654	0	0	0	1470	1370	360	720	592	70	660	192	40	250
OPTIONAL SCOPE OF WORK																			
12	Engineering Monitoring Plan	NA									0								
13	Support During Construction	NA									0								80

Total																			
Optional			0	0	0	0	0	0	0	0	0								
Total All Work			2840	2102	480	654	0	0	0	1470	1370	6076							

- NOTES
1. This table estimates effort as allocated among team members contributing to the baseline scope of work (Attachment 1) only
Therefore, some team members who provide additional services we propose to offer to the project, do not appear with effort allocated on this chart
 2. Total effort is summed for the baseline scope of work identified in Tasks 1-11 of Attachment A. Since Tasks 12 and 13 are optional they are not included in that sum.
 3. Only hours for "key personnel" specified in RFP Evaluation Criteria D are shown. Staff professionals time whose work would be directed by the lead are not included

APPROACH TO QUALITY ASSURANCE & QUALITY CONTROL

Formalized in 1996, Gray & Osborne maintains a rigorous Quality Assurance/Quality Control (QA/QC) Program to ensure that quality is integral to the completion of each task. Our QA/QC is based on periodic peer review of projects in process; all projects are subject to in-house peer reviews and involve key members of the project team as well as senior staff members who are not directly involved with the project. Inclusion of staff who are not working on the project on a day-to-day basis ensures a fresh look at the project work products, assumptions, and conclusions, and is an excellent proven tool to assure that sound engineering principles and judgment have been applied to every project. We emphasize constructability, risk to the owner, reliability, and cost. Our process is continually emphasized, supported, and improved and is reinforced through employee professional development. Typically, QA/QC meetings would take place to include a kickoff meeting, and at approximately the 5, 30, 60, and 90 percent phases of each project.

For this project, QA/QC reviews will be conducted under the direction of our Principal-in-Charge (Nancy Lockett, P.E.) and Project Manager (Barry Baker, P.E.), and will focus on reviewing major design elements with respect to funding, schedule, budget, traffic control, right-of-way, and constructability issues, as well as to focus attention on those project elements that present significant risk from the standpoint of cost, reliability, and conformance to regulatory and design standards.

Communication and **Teamwork** are two of three core elements of Gray & Osborne's business philosophy, as they support and sustain the third core element, **Client Service**. Communication occurs through our rigorous QA/QC process that requires the project manager to develop project summary memoranda at each phase of the project. Meetings between different elements of the project team are coordinated when needed to work out specific interdisciplinary design issues. We welcome participation by the County at the QA/QC meetings. Barry Baker (Project Manager) will be responsible for day-to-day communications with the County and, as appropriate and in consultation with the County, other project stakeholders and jurisdictional agencies and utilities that may have permitting or other approval requirements for given elements of the project design. We will ensure that all stakeholder concerns are identified in the preliminary stages of design development, and confer with the County to develop an appropriate plan of action to address stakeholder requirements in the most cost effective and timely manner possible. As issues develop during the course of the project, Barry will present these issues to the County and present alternatives and solutions to meet emerging challenges.

ATTACHMENT 2

STATEMENT OF QUALIFICATIONS CERTIFICATION

(Proposer must use this form – All other formats will be rejected and the Proposer will be considered non-responsive, and the proposal will not be evaluated by the County)

The undersigned is authorized to execute this certification on behalf of the Proposer and certifies on the Proposer's behalf that the information presented in this Statement of Qualifications is a complete and accurate statement of facts and that the Proposer has the financial capability to perform the work which is the subject of this solicitation. The Proposer further certifies that it knows of no personal and/or organizational conflicts of interest prohibited under federal, state and local law.

The Proposer certifies that this Proposal is submitted in accordance with this solicitation and all issued addenda, and that the Proposer agrees to be bound by the same.

~~The Proposer's Small Contractors and Suppliers (SCS) utilization as set forth in the Proposal constitutes the Proposer's commitment, if awarded this contract by the County, to use certified and qualified SCSs firms as required by the Agreement.~~

The Proposer designates

(name)

(title)

(phone number)

~~as the person charged with carrying out and reporting the Proposer's use of SCSs to perform Work under this Contract to meet the required percentage established for this Contract.~~

~~The Proposer certifies that it commits that ____% of the total price of the Contract, as amended, shall be performed by Clallam County Certified SCS firms over the duration of the Contract. Clallam County will not evaluate the proposal and will not execute a contract with a Proposer who does not commit to meeting at least the minimum SCS utilization requirement for this Contract.~~

Proposer

Signature


Thomas M. Zerkel, P.E.

Title

President

Date

November 30, 2015

Barry Baker, P.E.

Project Manager

Education

Bachelor of Arts, Ambassador College (1990)
Bachelor of Science Civil Engineering, University of Washington (1995)

Professional Registration

Licensed Engineer: Civil Engineer, Washington (2001)

10-Year Employment History

Gray & Osborne, Inc., 19 years

Professional Experience

Barry is a project manager for surface and stormwater design, wastewater conveyance systems design, construction management and contract administration, and general municipal engineering. Since joining our firm in 1996, Barry has managed large public infrastructure construction projects, prepared plans, specifications and cost estimates for conveyance system and stream restoration projects, reports, proposals, planning documents, and permit and funding applications. Prior to joining Gray & Osborne, Barry worked for King County in road and drainage inventory database management, and the Washington State Department of Transportation in the Traffic System Management Control Center.

Relevant Experience

- ♦ ***Reecer Creek Floodplain Restoration and Levee Setback, City of Ellensburg/Mid-Columbia Fisheries Enhancement Group, 2010*** – Barry provided project management, design, construction management, and contract administration for the Reecer Creek Floodplain Restoration project. Using modeling previously completed by the City and floodplain restoration plans initiated by the Washington State Department of Fish & Wildlife and completed by Anchor QEA, Inc., Gray & Osborne completed survey, design, and development of specifications to meet USACE standards for the levee setback. Barry incorporated the initially separate projects into one single bid packet to be able to maintain the existing levee protection while constructing the new levee.
- ♦ ***Bateman Island Causeway Modification Conceptual Design, Mid-Columbia Fisheries Enhancement Group, 2015*** – As project manager for the Bateman Island Causeway Modification Conceptual Design project for Mid-Columbia Fisheries Enhancement Group, Barry assembled and managed a multidiscipline team to provide complex temperature and hydraulic modeling at the confluence of the Yakima and Columbia Rivers; identify ecological impacts on listed salmonid species and predator species; geotechnical review of soils; structural bridge alternatives; engineering design and cost estimating; and public presentation and consultation for recreation, business, environmental, regulatory, and public agency stakeholders. The project was completed within the Salmon Recovery Funding Board and Washington State Department of Ecology funding budget and schedule requirements and was presented at the Yakima Science and Management Conference in June 2015.



- ♦ ***Membrane Bioreactor Wastewater Treatment Plant, Lake Stevens Sewer District, 2009 to 2015*** – Barry provided the contract administration and overall construction management for the construction of a new tertiary wastewater treatment plant and the related infrastructure to redirect flows from an old lagoon treatment plant located in the Ebey Slough floodplain. The overall project cost of \$120 million included the treatment plant, a new lift station constructed adjacent to the floodplain, gravity conveyance modifications, a new outfall pipeline through the floodplain and existing levee, wetland impact mitigation, and roadway modifications. Barry administered five different construction contractors, six subconsultants, and equipment suppliers of specialized equipment. When the outfall project encountered illegal fill placed in the wetlands by previous owners, he brought in the Washington State Department of Ecology and the U.S. Army Corps of Engineers to resolve the illegal fill issue and maintain the overall project schedule for the outfall and treatment plant. He negotiated 24 change orders resulting in a reduction of the original bid price of over \$4 million.
- ♦ ***Pilchuck River Bank Stabilization, City of Snohomish, 2009*** – Barry provided civil engineering, permitting, and subcontracted for fluvial geomorphic technical services for an immediate and emergency repair and restoration of over 800 feet of the Pilchuck River following record floods in January 2009. Flood-induced bank erosion exposed and compromised an existing 18-inch water transmission main, which was the primary source of potable water for the City of Snohomish. Gray & Osborne developed channel treatments that provided immediate and long-term repair to the channel and banks, mitigation against further bank erosion, and protection of the City's water supply pipe. The design team assessed the geomorphic functionality of proposed and installed treatments to limit transferring scour and deposition impacts to upstream or downstream reaches of the project site. Barry managed the Gray & Osborne resources for survey, field direction for waterline replacement and realignment construction, and permitting assistance with Washington State Department of Fish & Wildlife and U.S. Army Corps of Engineers.
- ♦ ***Tributary 0057 Channel Relocation, City of Kenmore, 2014*** – Barry served as project manager and project engineer to reconnect the stream with its floodplain and restore the natural stream and sediment transport process, which will reduce flooding, enhance degraded wetlands through hydrologic connection, make conveyance and storage improvements, and provide fish-passable connection between the Sammamish River floodplain and the stream. The old stream drainage system flows through highly modified channels, culverts, a sediment vault, and a "high-flow" bypass that has essentially become the primary channel. The project replaced approximately 250 feet of existing 36-inch storm drainage conveyance piping with 10-foot by 5-foot (interior dimensions) concrete box culvert and removed the existing undersized sediment vault. Approximately 230 feet of the existing pipe and the sediment vault was within the paved right-of-way of NE 170th Street and the remaining 200 feet was on private property in an easement. Approximately 1,265 square feet of existing wetlands were directly impacted during construction at the point of connection between the new channel and the existing stream within the wetland, but the project reduced erosive hydraulics through energy dispersion and grade control, grading to increase channel wetted perimeter, and planting to provide shading and improved wetland functions.



Barry Baker, P.E.

Lead Civil Design Engineer

Education

Bachelor of Arts, Ambassador College (1990)
Bachelor of Science Civil Engineering, University of Washington (1995)

Professional Registration

Licensed Engineer: Civil Engineer, Washington (2001)

10-Year Employment History

Gray & Osborne, Inc., 19 years

Professional Experience

Barry is a project manager for surface and stormwater design, wastewater conveyance systems design, construction management and contract administration, and general municipal engineering. Since joining our firm in 1996, Barry has managed large public infrastructure construction projects, prepared plans, specifications and cost estimates for conveyance system and stream restoration projects, reports, proposals, planning documents, and permit and funding applications. Prior to joining Gray & Osborne, Barry worked for King County in road and drainage inventory database management, and the Washington State Department of Transportation in the Traffic System Management Control Center.

Relevant Experience

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remaining 200 feet was on private property in an easement. Approximately 1,265 square feet of existing wetlands were directly impacted during construction at the point of connection between the new channel and the existing stream within the wetland, but the project reduced erosive hydraulics through energy dispersion and grade control, grading to increase channel wetted perimeter, and planting to provide shading and improved wetland functions.

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- ♦ ***Downtown Flood Prevention Project, City of Kalama, 2007*** – Barry completed predesign for protection of the City of Kalama from Columbia and Kalama River floodwaters as well as the means of conveying stormwater runoff during river flooding events. The design included Elm Street Pump Station, Kingwood Street Pump Stations, Elm Street, Ivy Street, and Kingwood Street slide gates and the flood diking system under the Interstate 5 freeway at Elm Street. The project area is located in downtown Kalama where there are three primary storm drainage systems conveying water to the Columbia and Kalama Rivers. The analysis in the Comprehensive Flood Hazard Management Plan (CFHMP) indicated that Interstate 5 could protect downtown Kalama from future Columbia River flooding because it forms a very effective diking system separating the downtown commercial area from the Columbia River. This diking system failed to protect downtown in the winter of 1995–1996 because it was effectively breached at the Elm Street underpass and by the City's stormwater conveyance system under the freeway at Elm Street, Ivy Street, and Kingwood Street. The predesign included analyzing the flow rate and volumes of the three drainage basins and recommending alternatives.



Key Personnel Role: Hydraulic Engineer

Experience

Snohomish County Surface Water Management, Engineer I-IV, 1991-2006

NHC, Senior/Associate Engineer, 2006-2015

Education

B.Sc., Civil Engineering, University of Washington, 1991

License/Affiliations

Registered Professional Engineer, Washington (1995), Oregon (2010), Idaho (2012)

Member, Association of State Floodplain Managers

Certified Floodplain Manager (2008)

Years Experience

24 Years Total

8 Years with NHC

Areas of Expertise

1-D and 2-D hydrodynamic modeling of complex river and estuary systems

Planning and analysis of flood control and habitat restoration projects under Corps, FEMA, state, and local planning processes

Federal, state, and local floodplain regulations

Design of levee, habitat restoration, and bank protection projects

Levee accreditation

Hydrologic data collection systems

Vaughn Collins has broad based experience in hydraulic modeling and design of flood hazard reduction and habitat restoration projects on large river systems. His experience includes 16 years with Snohomish County where he performed project management, design team lead, hydraulic analysis, public outreach, and emergency flood response tasks. His technical experience includes one- and two-dimensional modeling of numerous complex habitat restoration and flood control projects using HEC-RAS (steady, unsteady, and two-dimensional), RiverFlow2D, Flo2D, River2D, SRH2D, Telemac, FESWMS, and FEQ. Vaughn has designed many levee, habitat restoration, and stream bank protection projects in estuaries and rivers throughout the Pacific Northwest, and has additional experience in floodplain mapping studies, geomorphic analysis, scour evaluations, hydrologic data collection and construction supervision.

Selected Project Experience

Winkelman Revetment Alternatives Analysis and Design, Carlstad Consulting, King County, WA, 2014-Present. Project manager/Lead hydraulic engineer on multi-disciplinary team for evaluation of Snoqualmie River revetment repair alternatives. Defined bathymetric survey scope. Updated and calibrated an existing unsteady HEC-RAS model. Created a variant using beta HEC-RAS 5.0 with two-dimensional areas integrated into the model to evaluate the influence of floodplain tributaries, culverts and storage on the site's complex small flood dynamics. Conducted hydrologic analysis for seasonal flood frequency analysis and joint probabilities of local- main river flood peaks. Developed and calibrated Telemac and RiverFlow2D two-dimensional models of the project area for use in large flood analysis. Conducted bend scour analysis, development of alternatives, and hydraulic analysis of flooding, including zero-rise for regulatory compliance.

Green River System Wide Improvement Framework, Tetra Tech, King County, WA, 2013-Present. Lead hydraulic engineer on multi-disciplinary team for SWIF project. Directed updating of Flo2D and HEC-RAS models of the lower Green River. Developed hydraulic approach, levee breach approach, and economics integration with other team members. Directed over 100 Flo-2D simulations of multiple levee breach and levee alignment scenarios.

Coal Creek Flooding Analysis, City of Bellevue, Bellevue, WA, 2013-Present. Lead hydraulic engineer for study of urban flooding problems on the developed alluvial fan of Coal Creek. Defined channel survey needs, directed development of HEC-RAS model of the creek, and calibrated the model. Developed rating curve of complex stormwater pond outlet structure using forensic evidence for use in HSPF and HEC-RAS models. Determined causes of flooding and evaluated mitigation alternatives, including control structure retrofits and stormwater/stream separation systems.

Reddington Setback Levee Design, Tetra Tech, King County, WA, 2012-2013. Lead Hydraulic Engineer/Lead Designer for erosion protection system components of the setback levee. Used HEC-RAS and Flo-2D models to evaluate project alternatives and provide zero-rise analysis. Used geomorphic and hydraulic analysis to separate the levee into segments with different protection strategies ranging from none, to rock barbs and rock revetments. Developed composite scour estimates and force balance estimates for ELJ design using hydraulic models.

Vaughn Collins, P.E., CFM

Southern Flow Corridor, Tillamook County, OR, 2009-Present. Project Manager/Lead Hydraulic Engineer responsible for analysis and design of large-scale habitat restoration/flood reduction project at the head of Tillamook Bay. Updated and calibrated complex HEC-RAS model, and evaluated hydraulics for numerous project alternatives. Directed subconsultants. Modelled the selected project design, which included removal of 8 miles of levee and of 2 miles of new levee, high capacity floodgates, tidal marsh restoration, and agricultural drainage improvements. Presented at stakeholder and public meetings discussing various alternatives. Prepared a benefit-cost analysis that was used to successfully obtain \$4.5 million in FEMA funding.

Surrey Climate Change Analysis, City of Surrey, BC, Canada, 2014. Provided oversight, direction, and quality assurance in the development, calibration, and use of a very complex unsteady HEC-RAS model of the Nicomekl and Serpentine Rivers. Model inputs were derived from HSPF modeling and long-term simulations were run to evaluate flood risk due to sea-level rise and climate change. HEC-RAS 5.0 (beta) was used for two-dimensional simulation of sea dike breaching and propagation of the flood wave across the area.

China Camp Creek Restoration Project Hydraulic Analysis, Beaver Slough Drainage District, Coquille, OR, 2011-Present. Lead Hydraulic Engineer. Developed and calibrated 27-mile long unsteady HEC-RAS model and simulated numerous proposed alternatives. Used HEC-RAS rules based programming to simulate the proposed regulation mechanism. Key issues were bi-directional fish passage velocities through the proposed structure and the potential for increased offsite flooding or higher water levels on adjacent agricultural lands. Participated in several public meetings and gave presentations regarding the analysis.

Lower Nooksack River Habitat Assessment, Whatcom County Public Works River and Flood Division, Whatcom County, WA, 2014–Present. Serving on design team for evaluation of multiple large-scale restoration projects in the lower Nooksack River. Providing quality assurance on hydraulic modeling by others, scoped and then implementing geomorphic analysis, and incorporating modeling results in analysis of potential issues with various alternatives.

Hydraulic Analysis for Levee Certifications, City of Kent, King County, Washington, 2009-2014. Project Manager for providing hydraulic portions of levee accreditation materials to FEMA. Directed development of linked HSPF/HEC-RAS models used for interior drainage analysis. Directed use of SWMM model for evaluation of changes to stormwater runoff related to levee improvements. Provided scour, drawdown and other hydraulic parameters needed by geotechnical firms. Modeled changes to floodplain extents using Flo-2D model and produced new floodplain maps.

Seaside Highway 101 Flood Analysis, Clatsop County Public Works, Clatsop County, OR, 2010-2014. Project manager/Lead modeler for project to reduce chronic road flooding. Directed HSPF modeling. Designed stream gage network and trained County staff in installation and operation. Conducted high flow measurements using ADCPs and current meters. Created and calibrated a HEC-RAS model and evaluated various alternatives to meet project objectives. Designed selected restoration project and conducted post-construction flood level reduction validation using stream gage data.

Skagit River General Investigation Study, Skagit County Public Works, Skagit County, WA, 2009-2013. Lead Hydraulic Engineer. Reviewed existing HEC-RAS and Flo-2D models and implemented extensive updating and recalibration. Responsible for conceptual design and modeling of 38 flood control measures. Coordinated with geotechnical and economics groups to interface hydraulic work with overall plan analysis. Project work included reevaluating historic flood magnitudes and a comprehensive update of hydrologic technical data for existing conditions.

Cottonwood Slough Restoration Project Conceptual Design, Skagit Conservation District, Skagit County, WA, 2010, 2015. Project Manager/Lead modeler for evaluation of a 4500-foot side channel restoration project. Developed HEC-RAS and RiverFlo-2D hydrodynamic models of the site for evaluating alternatives. Conducted a sediment transport analysis including 1-D numerical modeling in HEC-RAS to evaluate project sustainability. Currently (2015) updating analysis and extending work to another side channel nearby.

Green River Floodplain Mapping, King County, WA, 2007-2008. Responsible for hydraulic numerical modeling for the Green River floodplain mapping study. Under a short timeline, developed a two-dimensional FLO-2D model for 20 miles of the lower Green River; applied GIS methods to automate model inputs; calibrated the model; simulated multiple levee failure scenarios; and developed draft FEMA flood maps based on the modeling. Hydrologic analysis for the project included reservoir operations. Subsequent work using this model has included inundation mapping for emergency dam flow release scenarios and evaluating effects of temporary flood barriers on river stage.

Myron Basden, P.E., S.E.

Structural Engineer

Education

Bachelor of Science Civil Engineering, University of Washington (2005)

Professional Registration

Licensed Engineer: Civil Engineer, Washington (2009); Structural Engineer, Washington (2011)

10-Year Employment History

Gray & Osborne, Inc., 5 years

Professional Experience

Myron has over 10 years of experience in the structural engineering of buildings and utility structures. He has experience with a wide variety of structures including wastewater facilities, reservoirs, decant facilities, utility structures, medical centers, and commercial/residential. His design experience includes seismic design, seismic retrofits, renovation of existing buildings, thermal expansion/contraction, and vibration. Myron's specialized reservoir experience includes design of new reservoirs and seismic analysis of existing reservoirs. He has performed structural analysis for over 10 reservoirs within the past 3 years. At Gray & Osborne he is the lead project manager for structural projects and manages the Technician Group in Gray & Osborne's Seattle office. He is a member of the Structural Engineers Association of Washington State (SEAW).

Relevant Experience

- ♦ ***Reservoir Inspection and Assessment, Northshore Utility District, 2015*** – Inspection of existing 4.3 million-gallon prestressed concrete tank. Performed seismic analysis and condition assessment and provided a report of findings and recommended repairs.
- ♦ ***Reservoir Inspection and Assessment, Woodinville Water District, 2014*** – Performed inspection of existing steel reservoir and provided a report of findings and recommended repairs.
- ♦ ***Reservoir Modifications and Repair, Northshore Utility District, 2014*** – Provided plans, specifications, and cost estimates for recoating and modifications to an existing 3 MG steel reservoir and roof repair of an existing 4 MG steel reservoir.
- ♦ ***Reservoir Modifications, Silver Lake Water & Sewer District, 2014*** – Provided plans, specifications, and cost estimates for recoating and modifications to an existing 4 MG steel reservoir. Added spiral stair to roof and added catwalk along perimeter of domed roof.
- ♦ Water Pollution Control Plant Biosolids Dewatering Improvements, City of Puyallup, 2014
- ♦ Wastewater Treatment Plant Expansion, City of Sumner, 2014



- ♦ Sandy Point Wastewater Treatment Facility Improvements, Lummi Tribal Sewer & Water District, 2014
- ♦ Wastewater Treatment Facility Improvements, City of Mabton, 2013
- ♦ Wastewater Treatment Facility Electrical Upgrades, City of Granite Falls, 2013
- ♦ Willapa Regional Wastewater Facilities, Cities of Raymond and South Bend, 2012 – New wastewater treatment facility.
- ♦ Digester Aeration Improvements and Effluent Filter, Mukilteo Water & Wastewater District, 2012
- ♦ Headworks Improvements, Mukilteo Water & Wastewater District, 2012
- ♦ Wastewater Treatment Facility Improvements, City of Bridgeport, 2012
- ♦ Generator Upgrade and Flooding Mitigation Improvements, City of Puyallup, 2012
- ♦ Wastewater Treatment Plant Effluent Pump Station and Digester Mix Pump Modifications, City of Sumner, 2012
- ♦ ***3 MG Reservoir Roof Inspection, Structural Analysis, and Recommendations Report, City of Anacortes, 2011*** – Performed seismic analysis of existing reservoir and provided recommendations for repair of corrosion damage.
- ♦ Wastewater Treatment Facility Improvements, City of Omak, 2011



Lead Geotechnical Engineer**Ralph Boirum, PE | Geotechnical Engineer, Principal**

Education MS, Civil Engineering, University of Illinois, 1973
BS, Civil Engineering, University of Illinois, 1972

Registration Professional Engineer (Civil): 1976/Washington #15976, 2003/Oregon #73516PE
2003/Illinois #062-056983, 1980/Alaska #CE4898

Total Years' Experience 40 years

Years with Firm 20 years



Mr. Boirum has 40 years of geotechnical consulting experience in the Pacific Northwest. During the course of his career, Mr. Boirum has acquired well-rounded experience working on more than 6,000 geotechnical engineering projects ranging from small residential jobs to large municipal and heavy industrial projects. Projects have included field explorations, design studies, contract drawings and specifications, and report preparation. Mr. Boirum has provided geotechnical engineering, including design, for dozens of pump and lift stations, roadway improvement, water treatment facility and reservoir projects. His "hands-on" approach has lead

Mr. Boirum to follow many of these projects through construction. Mr. Boirum also has extensive experience in foundation and earthwork construction.

CLALLAM BAY WATER TANK, CLALLAM BAY, WASHINGTON.

OWNER: WASHINGTON STATE DEPARTMENT OF CORRECTIONS **DATE:** 1995

The project consisted of the design and construction of a new half million gallon water tank for the Clallam Bay Corrections Center in Clallam Bay, Washington. The facility was planned as a covered tank with a diameter of 60 feet and a height of 28 feet. Mr. Boirum conducted an on-site subsurface exploration program and reviewed existing geological and geotechnical data for the area. Ralph provided recommendations for foundation design, maximum inclination of cut slopes and temporary excavations, and general excavation and drainage considerations were provided.

LOWER ELWHA WASTEWATER COLLECTION SYSTEM, PORT ANGELES, WASHINGTON.

OWNER: CLALLAM COUNTY **DATE:** 2007

Mr. Boirum provided geotechnical services for the proposed wastewater collection system. The project included drilling soil borings at the proposed pump station site and the proposed creek crossings, and digging test pits at selected locations along the proposed pipeline routes to identify soil types and ground water conditions. Ralph provided analyses of the exploration data to develop recommendations for design and construction of the proposed facilities. The analyses considered various methods for creek crossings, including open trenching, directional drilling, bore and jack, micro-tunneling and bridging.

LAKE STEVENS WASTEWATER TREATMENT PLANT, LAKE STEVENS, WASHINGTON.

OWNER: LAKE STEVENS SEWER DISTRICT **DATE:** 2004

Principal-in-Charge of geotechnical investigation for treatment plant improvements, which included access road rehabilitation, a new waterline, a canopy over the existing headworks building, chlorine contact tank conversion

to a UV exposure basin, and a new vehicle ramp to the tank. Geotechnical recommendations were provided for the use of steel plates on the road to distribute the load from heavy truck traffic, the use of horizontal directional drilling to probe the waterline alignment, the use of bottom ash to partially fill the existing chlorine contact tank so that the UV exposure basin could be placed within it without overloading the pile foundations, and the use of bottom ash contained between two rows of mechanically stabilized earth (MSE) walls attached by geogrid to build the ramp.

EBEY SLOUGH LEVEE STABILITY EVALUATION.

OWNER: LAKE STEVENS SEWER DISTRICT **DATE:** 1999

Mr. Boirum evaluated 4.6 miles of river levee along Ebey Slough where failure could result in flooding of the Lake Stevens wastewater treatment plant. The evaluation included working from a boat to measure the steepness of the levee above and below the water line at selected locations to identify critical slopes. The river bank was also inspected from the shore to identify slumps, slides, cracks and highly eroded areas. From this work, six locations were identified as critical and in need of immediate repair. A number of other locations were identified for future repair. This information was provided to Snohomish County Diking District #2, which subsequently performed the repairs.

EBEY SLOUGH LEVEE FAILURE REPAIR, LAKE STEVENS, WASHINGTON.

OWNER: LAKE STEVENS SEWER DISTRICT **DATE:** 2000

A failure involving about 700 feet of the levee along Ebey Slough of the Snohomish River in 1999 threatened to flood the Lake Stevens Wastewater treatment plant. The plant is located in the flood plain below high tide level and the failure, which nearly breached the levee, would have spread untreated sewage throughout Puget Sound and left the lake Stevens area without sewage treatment. Mr. Boirum led ongoing efforts to patch the levee and prevent a catastrophic failure and designed permanent repairs. Repair efforts were complicated by low residual shear strengths in the very soft, highly compressible soils. Mr. Boirum developed a scheme for levee repair which was implemented by the US Army Corp of Engineers, after the governor declared an emergency and asked for federal assistance in funding the repairs.

GREEN RIVER LEVEE IMPROVEMENT PROJECT, KING COUNTY, WASHINGTON.

OWNER: CITY OF KENT **DATE:** 2012

Mr. Boirum evaluated the stability and erosion control of two sections of the levee totaling about one-half mile of riverbank. The work included evaluation of the stability of the riverbank and development of environmentally friendly means to increase the resistance to stream bank erosion.



Education

M.S. in Civil Engineering,
Washington State
University, (specialized in
hydraulics, sediment
transport, and fish
passage)

B.S. in Civil Engineering,
Washington State
University

License/Affiliations

Registered Professional
Engineer, WA

Years Experience

16 Years Total

14 Years with NHC

Areas of Expertise

Over **60** projects involving
sedimentation, erosion,
and scour analysis

Designed and provided
construction oversight on
over a dozen habitat
restoration and bank
protection projects

Prepared conceptual,
preliminary, and/or
final designs for over **70**
wetland/stream
enhancement projects

Participated in over **50**
bank stabilization
assessments

Participated in
approximately **80** stream
and river geomorphic
analyses

Designed nearly **50** bank
protection works

Erik Rowland is a principal with NHC and provides sixteen years of experience in many phases of the project requirements including river engineering, geomorphology, numerical modeling, and flood hazard assessment. Erik has worked on well over 100 assignments, with the majority relating to river engineering, flood hazards, and geomorphic assessments. He has led or provided technical review of over 70 design projects, participated in over 80 geomorphic assessments, completed dozens of sediment studies, performed or overseen dozens of bridge assessments, completed over 60 scour and stream stability assessments, and provided construction guidance for many of these projects. Erik leads the river design and geomorphology group for NHC's Washington office and has extensive experience in successfully communicating and coordinating river projects with resource agencies, working with private citizens, and guiding contractors and municipal crews during construction projects in a manner that achieves both technical success and positive public perception.

Selected Project Experience

Green River, Porter Levee Setback Geomorphic Study, Auburn, WA. Project manager and principal-in-charge of geomorphic reach analysis for levee setback project on the Green River. King County is planning to set back the Porter Levee and retained NHC to assist with geomorphic analysis and response, hydraulic modeling, and survey. Tasks involve a bathymetric survey of approximately 1 mile of the river, construction of a complex multi-reach HEC-RAS model, evaluation of existing channel morphology and likely geomorphic response following removal of the levee.

Puyallup River, Calistoga Levee Setback Design and Habitat Restoration, Orting, WA. Principal responsible for design of 25 log jams and over one mile of riprap armoring to protect a new setback levee along the Puyallup River. Primary duties included assisting with geomorphic reach assessment, detailed design of riprap and log jams, stakeholder coordination, construction support, and reporting.

Green River, Reddington Levee Setback and Extension, King County Water and Land Resources Division, King County, WA. Principal responsible for review and approval of design of erosion protection and habitat enhancement features of a levee setback project on the Green River. Part of NHC team that designed over 40 log structures, several rock spurs, over a mile of riprap revetment associated with levee setback project along the Green River. Reviewed final plans, specifications, cost estimates, design calculations, and technical documents.

Yakima River, Gladmar Park Embankment Repair and Geomorphic Analysis, Kittitas County, WA. Managed project to repair embankment at Gladmar Park along the Yakima River and to reduce the possibility of an avulsion through the park. Floods in 1996 and 2009 damaged the embankment, destroyed access to the park, and threatened to cut off water to a major irrigation intake. The project involves topographic and bathymetric surveys, hydrologic analysis, 2-D hydraulic modeling, CMZ mapping, sediment transport, alternatives development, and reporting.

South Fork Grays River Restoration, Cowlitz Tribe, Pacific County, WA. Principal responsible for developing a long-term habitat enhancement plan for the South Fork Grays River. The proposed restoration design utilizes floodplain-scale interventions to restore geomorphic function to the reach and enable long-term recovery of the riparian forest. Project tasks included field investigations, topographic/bathymetric

Erik R. Rowland, M.S., P.E.

survey, 2D hydraulic modeling, sediment modeling, geomorphic assessment, alternatives assessment, and a summary report. As Principal in charge of this project, Erik was involved in project management, existing conditions assessment, hydraulic analysis, geomorphic assessment, preliminary engineering design, and reporting.

Skagit River Geomorphic Assessment, Skagit County, WA. Managed a project to assess the geomorphic risk of removing riprap along a section of the Skagit River near Lyman. Skagit County is looking to remove several hundred feet of riprap from County owned property and needed a geomorphic assessment to determine the risk to private property and gauge the habitat benefit in terms of reclaimed floodplain. Responsible tasks included field investigation, interpretation of historic aerial photos, predicting rate of migration with and without riprap in-place, and reporting.

Pilchuck River Channel Migration Zone Study, Granite Falls, WA. Project manager of channel migration zone (CMZ) study along the Pilchuck River in Snohomish County. The CMZ study was required by Snohomish County to support the replacement of Bridge 581 over the Pilchuck River. Washington DNR guidelines were used to map channel migration, identify avulsion hazards, disconnected migration areas, migration rates, hazard areas, etc. Sediment transport through the bridge was investigated as was a detailed review of the County's River FLO2D model of the site.

Snoqualmie River – Winkelman Bank Protection Alternatives Assessment & Design, King County Rivers, King County, WA. Principal leading alternatives assessment, design, and hydraulics for bank protection project along the Snoqualmie River to safeguard a major SPU waterline. Responsible tasks include field investigations, County meetings, review of 2D modeling, participating in geomorphic assessment, alternatives assessment, cost estimating, design, and reporting.

Sammamish River – Willowmoor Restoration, King County Rivers, King County, WA. Managed project to develop conceptual design alternatives for a habitat enhancement and flood control on Sammamish River immediately downstream of Lake Sammamish. Led geomorphic assessment and development of restoration and flood protection designs, including modifications to a channel spanning weir, side channel development, and floodplain enhancement. Worked collaboratively with project team consisting of County staff, other consultants, and stakeholder advisory group to establish project objectives and performance criteria. Assisted with the development of an alternatives summary report, attended design charrettes, and presented project findings at stakeholder/community meeting.

Nisqually River Bridge Replacement Damage Investigation, Elbe, WA. Project manager, lead designer, and geomorphologist for countermeasure design at a DNR bridge over the Nisqually River near Elbe. Erik led an alternatives analysis, presented to stakeholders, and completed a geomorphic assessment of bank erosion, channel migration, and scour potential for the design of features at the bridge. Detailed designs included rock barbs to limit toe erosion upstream of the bridge, riprap revetment to protect approach fills, and engineered log jams for bank stability. Erik provided field supervision during the 2014 construction.

Chehalis River, Reach Analysis and Bank Stabilization at Ceres Hill Bridge, Lewis County, WA. Project manager and principal-in-charge of project to protect an existing bridge over the Chehalis River near Chehalis. Project tasks included: alternatives analysis, evaluation of stream hydraulics with 1-D and 2-D hydraulic models, geomorphic assessment, reporting, countermeasure design, and coordination with client and stakeholders. Riprap countermeasures were installed in 2014 to safeguard a scour critical abutment and twenty log jams were installed in 2015 to prevent bank erosion.

Nooksack River, South Fork Bank Protection and Restoration, Whatcom County, WA Project manager and engineer of record for bank protection/habitat restoration project along an eroding bank of the SF Nooksack River near Acme. Tasks included field reconnaissance, topographic and bathymetric survey, 2D hydraulic modeling, assessment of geomorphic response, meetings with regulatory agencies and stakeholders, development of concept drawings, and a design report. The final design included two large apex jams, four bank roughening jams, and restoration of a side channel. Erik provided construction support for the project during the summers of 2009 and 2010.

Sediment Management as a Risk Reduction Tool (SMRRT), Pierce County Public Works and Utilities, Pierce County, WA. Project manager and principal leading NHC's involvement in a large sediment removal study along the Puyallup, White, and Carbon Rivers. NHC is tasked with 1 and 2D hydraulic modeling of existing conditions and alternatives, sediment transport modeling, assisting with alternatives assessment, and leading engineering design of the preferred alternative. The outcome of this project will inform Pierce County if and where sediment extraction is feasible for reducing flood levels in the Puyallup River system.

TORREY LUITING

Lead Ecologist

Torrey Luiting is a senior ecologist, wetland biologist, permitting specialist, and project manager with 18 years of professional experience in natural resources plans and permitting, including wetland, fisheries, and floodplain restoration; watershed and reach assessments; restoration master plans; EIS preparation; wetland delineation, mitigation design and monitoring; project permitting; and project management. Torrey's expertise includes ecological analysis of restoration engineering designs, landscape-scale natural resources plans, project specific restoration plans, site specific wetland delineation and functional assessments, and managing the permitting process. Torrey has more than 10 years of experience with local Critical Areas Ordinances, ESA, 404, 401, CZMA, and NEPA and SEPA EAs and EISs, including alternatives and cumulative impacts analyses.

Torrey formerly worked for the Seattle District Corps in the Environmental Resources Section preparing compliance materials and conducting interagency coordination for Corps projects including levee repair, Section 1135 and 206 authorized restoration projects, and annual maintenance dredging projects. Torrey also served as a temporary project manager in the Regulatory Branch reviewing Section 10 and Section 404 nationwide and individual permits. Torrey is also familiar with the Corps levee vegetation regulations and the Seattle District's local vegetation variance.

Project Experience

Smith Island 12th Street, Dike Setback and Estuary Restoration Monitoring —City of Everett Public Works, WA (2012-present)

Project Manager and Wetland Ecologist. Torrey manages a 50-acre dike setback/dike breach restoration project in the lower Snohomish River. She is currently managing the preparation of 75% construction plans and specifications that include development of wetland floodplains, side channels for fish habitat within the floodplain restored by the setback and breach. Torrey completed a wetland delineation and rating under federal, state, and local regulations and is preparing the JARPA permit package for CWA Section 404 and 401, ESA, NHPA, HPA, and local permit compliance. Her project team conducted Phase 2 testing for soil lead and arsenic and is designing marsh benches to reuse onsite materials consistent with the Phase 2 findings. ICF will prepare an Advance Compensatory Mitigation Plan to gain aquatic habitat credits that can be used for future City dike improvement needs.

Years of Experience

- 18 years total
- 10 years ICF

Education

- MS, College of Ocean and Fisheries Sciences, University of Washington, 1996
- BS, Environmental Science, University of Wisconsin, Green Bay, 1992

Professional Memberships

- NW Association of Environmental Professionals
- Society of Ecological Restoration
- Society of Wetland Scientists

Certifications

- Pierce County Wetland Specialist
- Professional Wetland Scientist, in process

Training

- Puget Sound Coastal Processes, Shoreline Modifications, and Beach Restoration, 2014
- Calculating Credits and Debits for Compensatory Wetlands Mitigation, 2011
- Selecting Mitigation Sites Using a Watershed Approach, 2011
- How to Use Wetland Bank Credits for Mitigation, December 2010
- Field Indicators of Hydric Soils, July 2009
- Wetland Restoration and Mitigation Design, December 2008
- Western Washington Wetland Rating System, March 2007

Torrey also manages the implementation of a 10-year, monitoring and adaptive management of a 2007 intertidal dike breach on the adjacent property. Torrey led the analysis of bridge infrastructure removal alternatives to address hydraulic functions and related biological benefits to fish, wildlife, vegetation within the restored floodplain. She worked with all agencies to coordinate modifications to mitigation performance standards in light of developing site conditions.

Gray and Stormy Reaches, Entiat River—U.S. Bureau of Reclamation, Entiat River, Washington (2014-present)

Lead Ecologist. Torrey is the lead ecologist for a 4-mile river restoration project which includes a 1,100-foot levee removal, side channel development, and installation of large wood structures. The project goal is to restore natural floodplain processes to improve fish habitat and floodplain wetlands. She is delineated hundreds of acres of wetlands and evaluated wetland functions to determine how the project design can provide the greatest benefit to fish habitat and wetland floodplain conditions. She is working with the engineering design team to develop conceptual and “permit ready” designs to identify access and staging sites to minimize impacts, and led the analysis of habitat functional lift based on hydraulic model results from proposed LWM structures and side channel construction.

Curley Creek Watershed Assessment, Natural Systems Design and Suquamish Indian Tribe, Washington (ongoing-2015)

Project Manager and Riparian Technical Lead. Multidisciplinary watershed assessment of the Curley Creek watershed near Port Orchard to determine limiting factors from both a salmonid and a geomorphic perspective; analysis and documentation in Open Standards format, including establishment of KEAs, results chains, and prioritization of strategies and actions to create a matrix of potential restoration and protection projects ranked by benefit.

Chico Creek Watershed Assessment and Open Standards Translation, Natural Systems Design and Suquamish Indian Tribe, Washington (2013-2015)

Project Manager and Riparian Technical Lead. Torrey led the completion of riparian components of a multidisciplinary watershed assessment of the Chico Creek watershed near Bremerton. Assessment determined limiting factors from salmonid and geomorphic perspective and created a matrix of potential restoration and protection projects ranked by benefit. Torrey managed the translation of the assessment into Open Standards framework results chains.

Steelhead Recovery Plan, Nisqually Indian Tribe, Olympia Washington (2013-2014)

Project Manager and Documentation Lead. Completion of first steelhead recovery plan for the Nisqually River basin, including integration of EDT model results with stream habitat and riparian components to determine limiting factors for recovery of basin’s steelhead and design a recovery plan that meets the Tribes’ restoration and harvest goals.

South Fork Dogfish Creek Restoration Master Plan—Poulsbo Public Works Department, Poulsbo Washington (2009-2011).

Project Manager. Managed the development of a Restoration Master Plan for lower SF Dogfish Creek, upstream of its discharge point into Puget Sound. Urban flooding, undersized culverts, bed and bank scour, lack of floodplain storage capacity, and degraded fish habitat were identified as issues to be addressed in the Master Plan. The project included a data gap and stormwater system analysis, GIS mapping, and identification of restoration opportunities. The Master Plan included a prioritized matrix of restoration actions and projects, including alignment with grant sources.

Rick Bond, P.L.S.

Professional Land Surveyor

Education

Associate of Applied Science, ITT Technical College (1991)

Professional Registration

Professional Land Surveyor: Washington (2003); Utah (2001)

10-Year Employment History

Gray & Osborne, Inc., 10 years

Professional Experience

Rick has over 20 years of experience in land surveying. He has extensive experience in boundary resolutions, writing and interpreting legal descriptions, subdivision and platting, GLO retracement, and construction surveying. He was the survey manager for an Auburn engineering office, managing as many as seven employees. He understands budgets, scheduling, and teamwork.

Rick is proficient using a variety of software, including AutoCAD Civil 3D 2011, Land Desktop, and Micro Survey Starnet V7. He has extensive field experience in all phases of surveying and with a variety of surveying equipment.

Relevant Experience

- ♦ ***ULID No. 6 Sewer Piping Project, North Bend, Washington*** – This \$10 million project provided for the installation of 64,000 linear feet of gravity sewer main, ranging in diameter between 8- and 27-inch pipes. Mr. Bond was responsible for construction staking calculations and management of survey crew. He prepared legal descriptions and exhibits for portions of public right-of-way to be vacated.
- ♦ ***Willapa Regional Wastewater Conveyance Facilities, Cities of Raymond and South Bend, Washington*** – This project consisted of the construction of one new pump station in the City of South Bend (Pump Station No. 3), upgrade two existing pump stations in the City of Raymond (Pump Station Nos. 1 and 11), installation a soil preload over the site of the new Regional WWTP, and installation of 6,900 linear feet of 12-inch HDPE force main piping installed by directional drilling. Mr. Bond is responsible for construction staking calculations and management of the survey crew.
- ♦ ***Monroe Correctional Complex Close Sewer Lagoon, Washington State Department of Corrections, Monroe, Washington*** – Project Surveyor for this project to revise the existing sewer collection system and decommission the existing wastewater pretreatment facility at the Monroe Correctional Complex. Work includes installation of approximately 9,000 feet of gravity sewer pipe, construction of one new screening and sampling building, decommissioning of the existing sewer pretreatment facility, removal of biosolids from an abandoned sewage treatment lagoon, and demolition of three pump stations. Mr. Bond managed the survey crew during utility and topographic survey. He prepared legal descriptions and exhibits for proposed utility easements.



- ♦ ***Utility System SCADA Upgrade, Lynnwood, Washington*** – This \$1.2 million utility project provided for a major upgrade to the City's Supervisory Control and Data Acquisition (SCADA) system for various water, wastewater, and stormwater utility facilities. The project will install fiber optic cable from these facilities to connect to the City's traffic signal fiber optic cable network, providing for communications to City Hall, the City's Utilities and Maintenance Center, and the City's Wastewater Treatment Facility. Responsibilities included management of the survey crew and research and calculations for the establishment of right-of-way.
- ♦ ***Milton Way Improvement Project, Milton, Washington*** – This \$2.5 million street improvement project reconstructed approximately 2,500 linear feet of this arterial street, including storm drainage improvement, sanitary sewer main, water main replacement, curb, gutter, sidewalk, and retaining walls. Mr. Bond provided management of the survey team and prepared construction calculations for all necessary items to be staked. He prepared legal descriptions and exhibits for right-of-way acquisition. He prepared and filed a Record of Survey showing new survey monuments set.



Kevin Brown, P.E.

Transportation Engineer

Education

Bachelor of Science Civil Engineering, Washington State University (1997)

Professional Registration

Licensed Engineer: Civil Engineer, Washington (2003)

10-Year Employment History

Gray & Osborne, Inc., 17 years

Professional Experience

Kevin has over 17 years of transportation experience. His team leadership skills are valued assets and are demonstrated through his ability to communicate and coordinate work to the client, local property owners, regulatory agencies, and utility purveyors, along with his excellent computer skills and design and construction management experience. Since joining Gray & Osborne, Kevin has prepared detailed design documents for pavement preservation projects, full-street reconstruction, and numerous utility improvements. The plans and specifications he has prepared are consistent with AASHTO, WSDOT, and local design standards.

Relevant Experience

- ♦ ***SE 84th Street Extension Design Report, City of Newcastle, 2015*** – Served as Project Manager for this project that evaluated various alternatives to extend SE 84th Street within the City of Newcastle. The roadway extension bisects Newport Hills Creek and other critical areas. Our work involved investigating various roadway alignments and cross sections to meet current design standards while minimizing impacts on the critical areas, and also included preparation of budgetary costs estimates for the various options. Specific options evaluated in this report included storm drainage treatment and detention requirements, retaining walls, fish passable culverts, and right-of-way impacts.
- ♦ ***Bogachiel Way Improvements, City of Forks, 2008*** – Served as Project Manager and Design Engineer for this TIB and federally funded project that totaled \$1.1 million. The project included construction of 2,700 feet of curb, gutter and sidewalk, with right-of-way acquisition, road widening and realignment, storm drainage improvements, driveway reconstruction, utility relocation, landscaping, and channelization. This project required the preparation of a full design memorandum (per the Local Agency Guidelines Manual) that was reviewed and approved by WSDOT Local Programs. Presentations to the public and City Council were also completed for this project. Kevin has experience working in Clallam County and is familiar with local challenges, including limitations of existing materials and specialty contractors.
- ♦ ***East Division Street Improvements, City of Forks, 2012*** – Served as Project Manager and Design Engineer for this TIB and City funded project. This \$890,000 project included construction of 1,600 feet of curb, gutter and sidewalk, road widening, storm drainage improvements, driveway reconstruction, ADA-compliant access ramps, utility relocation, landscaping, and channelization. Public outreach included presentations to the public. Strip maps, cross sections and photographic renderings (showing existing and future improvements) were presented in an open house format.



- ♦ ***Gooseberry Point Pedestrian Pathways, Lummi Nation, 2015*** – Served as Project Manager for this federally funded project for the installation of approximately 1.8 miles of pedestrian pathway that included pervious asphalt pathways, low-impact development (LID) features to address stormwater runoff, retaining walls, roadway widening to meet County design standards, and pavement markings. A presentation to the public was also completed for this project. A portion of this project is located along the shoreline of Bellingham Bay, for which environmental and cultural resources were required to be addressed.
- ♦ ***Albert Street Improvements Phases 1 and 2, Town of Wilkeson, 2011 and 2015*** – Served as Project Manager for this County funded (Community Development Block Grant) for the installation of 1,800 feet of curb, gutter and sidewalks, upgrades to the existing water and storm systems, driveway reconstruction, utility coordination/relocation, and pavement section reconstruction. Presentations to the public and Town Council were also completed for this project. This project is located near Wilkeson Creek and required compliance with the local shoreline management regulations.
- ♦ ***Rio Vista Avenue Improvements, City of Burlington, 2015*** – Served as Project Manager for this TIB, Skagit County PUD, and City funded project. This \$1.2 million project included construction of 1,300 feet of curb, gutter and sidewalk, road widening, storm drainage improvements (including stormwater treatment manholes), water main improvements (designed for the Skagit County PUD), sanitary sewer improvements, driveway reconstruction, ADA-compliant access ramps, utility relocation (coordinated work with private utility companies), landscaping, and channelization. Public outreach included presentations to the public. Strip maps, cross sections and photographic renderings (showing existing and future improvements) were presented in an open house format.
- ♦ ***South Granite Avenue Improvements Phase 1 (2007), Phase 2 (2011), Phase 3 (2013), and Phase 4 (2016), City of Granite Falls*** – Served as Project Manager and Design Engineer for this multiphase TIB and City funded project. All told this \$2.7 million project included construction of 2,800 feet of curb, gutter and sidewalk (Phase 3 included pervious concrete sidewalks), road widening, retaining walls, storm drainage improvements, water main improvements, driveway reconstruction, intersection realignments, ADA-compliant access ramps, utility relocation (coordinated work with private utility companies), street lighting, landscaping, and channelization. Presentations were made to the City Council and the local residents identifying what the project entailed and specific impacts to various private properties.
- ♦ ***Date Avenue Improvements, City of Sultan, 2015*** – Served as Project Manager and Design Engineer for this TIB and City funded project. This \$450,000 project included construction of 600 feet of curb, gutter and sidewalk, storm drainage improvements, water main improvements, sewer improvements (existing sewer main was lined to save on trenching costs), roadway rehabilitation with cement treated base, driveway reconstruction, ADA-compliant access ramps, utility relocation (coordinated work with private utility companies), and channelization. Because this project was located in front of the local elementary school, schedule was critical. Design efforts needed to be completed to ensure construction could take place during the summer while school was out of session. Construction of the project was completed on time, with no change orders, allowing school to start on schedule.



ERIKA BRITNEY

Community Outreach/Environmental Specialist

Erika Britney has 19 years of environmental experience in water and natural resource management, including over 5-years of multi-party workgroup facilitation involving client organizations, project teams, and stakeholder groups. She specializes in bringing together technical information from multiple parties and technical fields (science, economics, business) and compiling and producing consolidated information and tools for cross-disciplinary application. Erika has supported the facilitation on multiple multidisciplinary projects involving inputs from a variety of technical fields including wetland scientists, web developers, engineers, economists, and fish biologists. Erika began her career supporting and co-facilitating public engagement processes and worked on several large, high profile processes including the Britannia Mine Site reclamation project, Nechako Environmental Enhancement planning process and community outreach program and the Special Commission Skytrain review. Through this early work, she learned the essential skills necessary to plan and execute potentially controversial, multi-stakeholder processes. She is adept organizing projects, coordinating logistics, preparing meeting agendas and developing and producing meeting materials, summarizing actions and outcomes, and working with a range of experts to gain resolution. Through Erika's project work she has experience in developing goal oriented meeting agendas, planning meeting logistics (meeting rooms, materials, technology, etc.), taking thorough meeting notes and documenting decision that have been made, and co-facilitating or supporting lead facilitators.

Project Experience

Upper Colorado Region Sustainability and Environment Management System (SEMS)—North State Resources/Bureau of Reclamation, Upper Colorado Region, Multiple Locations

Erika Britney recently facilitated the development of an action plan for implementing a sustainability and environmental management system collaboratively with representatives from each of the departments and areas offices of the Bureau of Reclamation Upper Colorado Region. Erika helped prepare annual report to the Management Team on the status of the SEMS and mapping out actions necessary to address missing elements of the SEMS. Erika planned, develop and delivered a tailored, 24-hour training class to demystify the SEMS to selected Reclamation staff to help build staff competencies and facilitated development of an 9-month action plan to guide SEMS planning and implementation. UC region was successful in their audit 9-months later. (2012)

"The course (was) presented in a way I could understand it. I understand it much better—thank you—because it was presented good." – Anonymous feedback received from the course evaluation questionnaire given to Reclamation staff immediately following the training course

Years of Experience

- Total: 19
- ICF: October 2007-2015
(Cherry Environmental, prior)

Education

- Post-Baccalaureate Diploma, Environmental Science, Capilano College, North Vancouver, British Columbia,
- BS, Physical Geography, University of British Columbia,

Professional Certifications

- Certified Solid Waste Consultant, Environmental Waste Solutions, 2003
- RABQSA Principal Environmental Auditor, 2012

Key Skills

- Project Management
- Landscape Analysis and Ecosystem Goods and Services
- Multi-disciplinary analysis and problem solving
- Facilitation
- Technical Writing

Priority Areas for Voluntary Incentives and Regulatory Programs — Puget Sound Partnership, WA

Project manager and facilitator. Supported WA State Puget Sound Partnership and WA State Conservation Commission to evaluate strengths and weaknesses of incentive programs and identify opportunities to improve implementation to provide more measurable benefit to water quality for salmon and shellfish. Puget Sound Conservation Districts, conservation interests, tribal and environmental communities, funding and regulatory agencies, and applicable industries and sectors were engaged in a process to identify priority areas to better target and coordinate implementation of voluntary incentive programs. A range of potential next steps that could be taken to advance better, more data-driven understanding and measurement of VIP effectiveness and to improve effectiveness of VIPs was developed for the WSCC report to the Partnership. Erika planned and co-facilitated meetings and coordinated with participants on pre- and post-meeting follow-up and prepared meeting notes. (2013-2104)

Action Agenda Planning – 2014 Update to the Action Agenda — Puget Sound Partnership, WA

Project manager and facilitator for the 2014 Update to the Puget Sound Action Agenda. Erika facilitated the process to update the 2012 regional near term actions (NTAs) from State Caucus members, federal and non-governments NTA owners. This included preparing information materials, meetings agendas and notes and arranging logistics for the State Caucus meeting. She worked with the partnership to plan the public input process, including two public meetings and an online survey and facilitated the process to update the NTAs included in the Strategic Initiatives, facilitating and preparing meeting notes for 6 meetings. She also oversaw standardizing and updating Local Integrating Organization (LIO) profiles, developing potential NTAs based on recommendations contained in the Blue Ribbon Panel on Ocean Acidification report, improve usability/readability in the Action Agenda, and presentation of the update to the Action Agenda to the Science Panel, Ecosystem Coordination Board (ECB) and Leadership Council (LC). (2013-2014)

Bay Delta Conservation Plan (BDCP)—DWR/SAIC, Sacramento, California

The BDCP is the most costly and possibly the most ambitious HCP ever attempted, seeking to reconcile the ecological needs of 60 species and 14 natural communities in the Sacramento-San Joaquin Delta with two giant water projects that provide the main water supply for 25 million people. ICF has been preparing the conservation plan in close collaboration with numerous public agencies and private and public stakeholders. Erika is task order manager responsible for contract compliance on five separate task orders with over 30 subconsultants. In this role she facilitates internal program management functions and coordination meetings and manages contract administration with the client . (2013-current)

Lower Stillaguamish Initiative, Facilitation and Technical Assistance for Snohomish County—RW Beck, Snohomish County, Washington.

Project manager - technical lead. Erika assisted the Stillaguamish Watershed Coordinator lead a community-based strategic planning process to identify community expectations, strategies, and action plans for the future use, protection and restoration of the Lower Stillaguamish River, floodplain and estuary. Tasks included meeting support, logistics and facilitation, preparation of an annotated bibliography of technical documents and resources for the project area, and analysis and evaluation of process improvements. (2009-2010)

Puget Sound Salmon Recovery Council (PSSRC) Address Regulatory Exemptions (Project #2) — Puget Sound Partnership, Tacoma, WA

Project manager and technical lead for an evaluation of shoreline armoring and no net loss portions of the Shoreline Management Acts and of the updated Shoreline Master Programs of Jefferson, Whatcom, Snohomish and King Counties based on research questions developed by Northwest Indian Fisheries Council (NWIFC). Project work involved reviewing the SMA and county SMPs and related documentation and spatial data, evaluating interaction between shoreline permitting with the HPA, 404 permit processes and FEMA Floodplain insurance program and performing a cross cutting analysis to identify similarities, differences and potential gaps or weaknesses that reduce the level of protection SMA provides for shoreline resources. (2014)



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