



HYDROLOGIC & HYDRAULIC ENGINEERING



The interaction between water and environment is riddled with complexities. PND's specialized field-tested techniques allow us to overcome challenges and develop precise hydrologic and hydraulic (H&H) solutions. By using sophisticated modeling methods, PND develops effective solutions for civil drainage, erosion protection, and other H&H needs in most any environment.

“PND provided excellent owner support throughout design and construction management. They were easy to work with, fair, reasonable, highly technically competent, and they were professional at all times. They truly worked with owners and stakeholders as part of the team and took ownership in their design and the outcome on the ground.”

—AMY KLEIN, PE, PROJECT
MANAGER, USFWS

JIMS' LANDING BOAT LAUNCH & PARKING AREA IMPROVEMENTS

Named after a pair of gold miners named Jim who established a trailhead in the vicinity of the current USFWS boat launch and parking area in Cooper Landing, Alaska, Jims' Landing is a popular recreational facility in the Kenai National Wildlife Refuge. The entire extent of the facility and the improvements project is within the 100-year floodplain on the north outer bank of the Kenai River, which is prone to erosion. PND hydraulic engineers used SRH-2D to model the river adjacent to the ramp and determine how improvements might affect localized river hydraulics, erosion/sedimentation potential, and overall operations. The model provided velocity data that informed the design of the ramp as well as 550 feet of upstream bioengineered bank stabilization where active erosion was occurring.



WSDOT FISH PASSAGE IMPROVEMENT PROJECTS

PND has served as designer-of-record for several design-build projects with Kiewit over the last decade for the Washington State Department of Transportation (WSDOT) in response to a federal permanent injunction requiring the state to correct its fish barriers. PND designed fish barrier replacements under Interstate 5, a frontage road, and State Route 548 at California Creek near Ferndale, Washington; Schoolyard Creek and Trafton Creek under SR-530 near Arlington, Washington; and beneath I-5 and Old Samish Road at Lake Creek and Chuckanut Creek near Bellingham, Washington.



MYSTERY CREEK AOP STUDY

PND completed site survey and hydrologic/geomorphic assessments, H&H analyses, and developed alternative crossing concepts for 12 stream crossings along Mystery Creek Road within the Kenai National Wildlife Refuge under a term contract task order for U.S. Fish & Wildlife Service (USFWS). The streams varied in size and gradient, from bankfull widths ranging from 3 to 20 feet and consisting of low-gradient pool riffle to higher gradient wood-forced step-pool streams. Due to funding limits, USFWS only selected one of the 12 crossings for full design. PND provided 100% design plans, specifications, and construction cost estimates, including project permitting, for the prioritized culvert replacement.



CONNECTING ANCHORAGE TRAILS IMPROVEMENTS

PND provided civil, structural, geotechnical, H&H, survey, permitting, and contract administration/construction support services for this federally funded project in Far North Bicentennial Park in Anchorage, Alaska. PND designed four bridge crossings, which included hydraulic site reconnaissance and discovery of substantial aufeis presence on two North Fork Campbell Creek crossings and a wide, dynamic floodplain with extensive beaver activity on South Fork Campbell Creek. PND used 2D hydraulic modeling to confidently determine design flows and hydraulics in order to design new bridge structures, revetments, and bank stabilization measures to maintain the streams in their existing channels.

