

DON D. STATTER HARBOR IMPROVEMENTS

PHASE IIIA & IIIB
COMPLETED JUNE 2021
JUNEAU, ALASKA



2021 OUTSTANDING PROJECT OF THE YEAR NOMINATION ASCE ALASKA SECTION – JUNEAU BRANCH

Nominated by
PND Engineers, Inc. – Juneau Office



ENGINEERS, INC.

Owner:
City and Borough of Juneau



PROJECT DESCRIPTION

In 2019, PND Engineers, Inc. (PND) began work on a multi-phased expansion of Don D. Statter Harbor as part of a broader master plan effort. Statter Harbor is the busiest small-boat harbor in Alaska and is integral to Juneau's local economy. The harbor boasts 10,000 linear feet of transient moorage and serves commercial fishermen, recreational boaters, and many tourists each year. Phase I improvements replaced aging mooring floats and Phase II added nearly 5 acres of uplands and a boat launch ramp. The City and Borough of Juneau (CBJ) Docks and Harbors retained PND to implement Phase III, with IIIA and IIIB recently completed. PND's design not only expands opportunities for passenger-for-hire vessels to operate alongside commercial vessels and recreational boaters during the busy summer tourism season, but also provides year-round accommodations for live-aboard patrons.

PHASE IIIA

PND expanded the harbor basin in Phase IIIA. The process involved dredging 20,000 cubic yards of material across 1.5 acres to reach a depth of minus 16 feet below the Mean Lower Low Water (MLLW) to accommodate floats and vessels. To achieve this elevation, Pacific Pile & Marine (PPM) blasted 2,500 cubic yards of bedrock throughout the basin. A temporary drilling pad used to drill and blast the rock pinnacle was constructed with 15,000 cubic yards of imported shot rock. After dredging, the shot rock was relocated to the uplands site to surcharge and strengthen a layer of deep lean clay before the construction of a Mechanically Stabilized Earth (MSE) concrete block wall in Phase IIIB. All of the material removed from the basin was disposed at an off-site, permit-approved marine disposal site.

PHASE IIIB

Phase IIIB focused on uplands development, including construction of an 18-foot-high by 300-foot-long MSE concrete block wall, and offshore moorage improvements. Anticipating future uplands building development, 18-inch-diameter corrugated pile sleeves were installed behind the MSE wall to support future pile foundations. Offshore improvements included the construction of 16-foot-wide timber floats to provide an additional 1,150 linear feet of moorage within the harbor. The floats are outfitted with heat-traced water and sewer piping to allow for year-round operation, as well as a dry fire suppression system. Float electrical systems include glare-resistant lighting and 22 shore power connections. Two of the power pedestals can provide a 480-volt service capable of charging electric vessels. The floats are secured in place with 16-inch-diameter steel piles, of which, 13 were drilled into bedrock. Drilling into the bedrock was accomplished using a down-the-hole pneumatic hammer mounted to a hydraulic turn table. Piles were sized and spaced to allow vessels to raft three rows deep, thus tripling the available moorage when necessary. The floats are accessed from the uplands by a new 100-foot-long by 10-foot-wide covered aluminum gangway, which is supported by a pile-supported concrete dock.



1. INNOVATION

Our team solved technically challenging aspects of this project using an innovative design for underwater drilling and blasting, along with other construction methods and techniques that minimized environmental impact and ensured materials and space were used in the most cost-effective manner possible.



Developing the harbor basin to accommodate future floats and marine vessels required a harbor depth of minus 16 feet below MLLW and the addition of 1,150 linear feet of moorage. To meet these requirements, our team, led by PPM, dredged 20,000 cubic yards of material and drilled and blasted 2,500 cubic yards of rock across 1.5 acres. We imported 15,000 cubic yards of shot rock to construct a temporary drilling pad, which allowed PPM to drill continuously through tidal cycles. Not only did drilling from a rock pad reduce construction time and cost, but the process also buffered underwater blasts, minimizing the impact to

local marine life by damping the noise generated by drilling and blasting operations. Trained observers were strategically placed throughout the project site to confirm no marine mammals were in the immediate blast zone prior to and during any blasting efforts.

Our team strategically recycled the shot rock after blasting, using it to surcharge and consolidate a subterranean layer of lean clay below the uplands site for one year. Once the foundation soils were stabilized, Trucano Construction Co. began construction on the 18-foot-high by 300-foot-long MSE retaining wall. An MSE wall is a cost-effective choice that works well in tidal zones. Our design incorporated precast concrete instead of cast-in-place concrete for the wall, since precast concrete does not require a cure time before being inundated with seawater. The MSE wall created an additional third of an acre of usable uplands with the backfill used to stabilize it. During construction, our team prepared the uplands site for future development by installing eight, 18-inch-diameter corrugated pile sleeves behind the MSE wall. The pile sleeves are located in reinforced soils to allow for efficient pile installation that will not damage the structural integrity of the wall's reinforcement fabrics.



PND designed timber floats with steel bracing members to achieve a classic aesthetic system. The floats were designed to resist three times the industry standard design load to accommodate large assembly loads for passenger staging. Float restraint piles were socketed into bedrock so piles could be installed despite the soft, thin layer of overburden present at the site. To minimize marine growth and provide floats with a longer service life, only the dock's HDPE flotation tubs are located in the water. No steel or timber elements of the floats are submerged within salt water. The harbor was laid out and piles were sized and spaced to allow vessels to raft three rows deep to increase available moorage when necessary during the

busy summer months. Two electrical pedestals were sized for charging electrical vessels. For year-round harbor users, we incorporated a heat-traced water system and sewer pump-out system that uses insulated and heated pedestals.

2. BENEFIT TO COMMUNITY

Statter Harbor serves as the home base for commercial fishermen, recreational boaters, and live-aboard residents, as well as a hub for passenger-for-hire vessels during the summer. The harbor expansion focused on enhancing Juneau's opportunities for tourism while supporting existing usage by local commercial fishermen and recreational users.

PND's design provides a dedicated space within the harbor for passenger-for-hire vessels and for-hire floats, eliminating conflicts between tour operators and commercial and recreational users of the harbor by reducing congestion on land and in water. The harbor design allows vessels to raft three rows deep. The new 100-foot-long by 10-foot-wide covered aluminum gangway provides the community and groups of tourists with an ADA-compliant pathway for transport from the floats to the uplands, including



The Statter family cuts the ribbon for the new harbor development. Photo courtesy of CBJ.

“I’m extremely happy with the completed project as the owner. The whole team demonstrated expert technical skills; the design and construction team collaborated to create a world-class facility that further cements Juneau’s reputation as the Southeast Alaska maritime center of excellence.”

**– Capt. Matthew Creswell,
Harbormaster, CBJ**

small vehicle transport. By creating a third of an acre of additional uplands with the MSE wall, PND's design generated more space for future Phase IIIC work such as development of parking lots, passenger staging areas, covered shelters, and restrooms, as well as improvements to the kayak ramp. The additional moorage and uplands space and the second harbor access point reduce congestion, improve safety, and allow for increased activity and income for the CBJ harbor. The design additionally provides reliable electrical service to floats for charging future electric vessels.

PND's layout allows local live-aboard patrons to move to the inner harbor for protection from winter storms and gives them new year-round potable water access thanks to insulated and heat-traced water and sewer piping services.



Top Left: New gangway and MSE wall.

Top Right: Sewage pumpout station using insulated and heated pedestal.

Bottom Left: Insulated, heat-traced water pedestal.

Bottom Right: A family using the new gangway to access the floats.

3. PROJECT MANAGEMENT

PND provided preliminary through final design, permitting, contract administration, and construction administration and inspection services for this multi-phased, \$8.3 million project. Our work on Statter Harbor began by developing the Statter Harbor Improvements master plan in 2008. Master plan development and our previous work on the harbor provided us with a unique understanding of the site and project goals. This familiarity allowed our design team to develop a phased project approach and schedule that would achieve project goals while maintaining evolving budgets. We also proactively identified and resolved all issues. By phasing construction work, we were able to structure the design teams to include project managers and contractors who excelled in the design aspects of each phase. PPM performed Phase IIIA dredging work and Trucano Construction Co. performed Phase IIIB moorage and uplands work.

PND led construction engineering for both phases of this project, which required clear communication between the construction contractors, CBJ, and PND. During phase IIIA, PND provided a full-time, on-site engineer to monitor dredging, drilling, and blasting activities. In Phase IIIB, PND also provided a full-time inspector for the MSE wall, float construction, pile installation, and float utilities.

In order to comply with project permits, CBJ provided trained marine mammal observers to identify marine mammals and other animals that entered the shutdown zone during construction. PND had to coordinate closely with the marine mammal observers and the contractors, so observers were in-place and ready when the contractors were drilling or installing piling. This process also required constant communication to ensure operations could be stopped when a marine mammal entered the shutdown zone. PND was instrumental in these communications to ensure both permits and contracts were adhered to during the construction process.

PND Team

Dick Somerville, P.E., M. ASCE

Principal-in-Charge IIIA & IIIB; Engineer-of-Record & Project Manager IIIA

John DeMuth, P.E., S.E., M. ASCE

Engineer-of-Record & Project Manager IIIB

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Construction Administration IIIB

CBJ Ownership Team

Carl Uchytel, P.E.

City & Borough of Juneau Port Director

Erich Schaal, P.E.

City & Borough of Juneau Port Engineer

Matthew Sill, P.E.

City & Borough of Juneau Deputy Port Engineer

Captain Matthew Creswell, CMO

City & Borough of Juneau Harbormaster



4. VALUE ENGINEERING

Our team incorporated cost-effective design and construction recommendations every step of the way on this project, ensuring CBJ received the highest-quality and most economical design possible. In particular, our decision to phase the project reduced overall project costs and timelines. Phasing the project allowed for more competition between contractors, reducing costs for CBJ. Phase IIIA focused on dredging and blasting only, which requires a very specialized contractor and allowed such companies to compete for the role. Now separated from dredging and blasting work, Phase IIIB attracted a broader group of local bidders to choose from.

PND incorporated a drilling pad into the dredging work to allow for continuous drilling through all tidal cycles, minimizing environmental impacts and reducing the project timeline. We developed the pad using imported shot rock knowing we could reallocate it to surcharge and consolidate the uplands area. By importing fill for the blasting operation and reusing the material for consolidation and MSE wall construction, we used the same material to achieve three project goals. Phasing played an additional role here, allowing CBJ to secure funds for Phase IIIB while Phase IIIA was under construction. Project phasing also prevented CBJ from hiring a contractor to wait onsite for months to consolidate the clay layer because consolidation occurred between contracts.



Thank you for reviewing our application. For more information, please contact Dick Somerville, P.E., Vice President, PND Engineers, Inc., at 907.586.2093 or dsomerville@pndengineers.com.

