



TO: Port Commission

FROM: Blake Anderson, Assistant Harbormaster

DATE: August 18, 2019

SUBJECT: Review of *Almar* Patrol Vessel Replacement Options

BACKGROUND

The Santa Cruz Harbor Patrol provides first responder marine search and rescue service within Santa Cruz County. The Harbor Patrol vessel and crew support other maritime emergency agencies and are an integral part of the County's Coastal Incident Response Plan. Although it has no jurisdictional responsibility outside of the Small Craft Harbor itself, the Harbor Patrol provides search and rescue missions within the three nautical mile line, which extends in Santa Cruz County to three nautical miles offshore including the Monterey Bay. The Port District receives an annual contribution from the County in recognition of providing this service.

The Port District's 28' Almar patrol vessel was acquired in 1998. It was funded, in part, by grant proceeds received from the California Department of Boating and Waterways. The patrol vessel is now over 20 years old and has surpassed its recommended service life. In April 2017, the vessel was surveyed by state inspectors (Department of General Services) and a recommendation was made that the vessel should be removed from service as soon as possible.

Over the last two years, the Port District has sought funding sources to replace the patrol vessel, including the California Division of Boating and Waterways' (DBAW) grant programs. Unfortunately, due to limited funding available in DBAW's program, the Port District did not receive grant funding.

In June 2019, the Port District was successful in securing a one-time budget allocation in the amount of \$530,000 from the State of California to replace its aged patrol vessel. Less a 2% administrative fee, the State will reimburse the Port District up to \$519,400 for purchase of a new vessel in the form of a grant. Additional Capital Improvement Plan (CIP) funding in the amount of \$18,277 was allocated in the District's FY19 budget, bringing total available funding for a new patrol vessel to \$537,677. State funding must be used before May 1, 2022.

ANALYSIS

In an effort to identify suitable replacement options and develop a comprehensive Request for Proposals, Harbor Patrol staff actively researched seven vessel manufacturers, all with varying vessel design options and features. Of the seven manufacturers, staff has identified three capable of producing a vessel suitable for the District's operation. Those manufacturers include Moose Boat, Almar, and SAFE Boat.

To aid in the research, staff performed site visits to three neighboring agencies, all of which operate patrol vessels for search and rescue missions. Staff has had the opportunity to test drive a total of three different patrol boat models and discuss with crewmembers the performance of each craft, as well as the advantages and disadvantages of each. In addition to the site visits, staff had the

opportunity to tour the Moose Boat manufacturing facility in Vallejo to gain further insight into the construction process (site visit notes are included as Attachment A).

Based on the research performed by staff, a list of general vessel specifications has been developed for Committee review and consideration:

VESSEL SIZE

PROPOSED: 33' to 35' vessel length, with an approximate 11' beam

BENEFITS: The proposed vessel size, which is approximately 5' to 7' longer than the current Almar patrol vessel, and 1' greater in beam, will provide increased weight and stability during rough weather conditions. Adequate space is available to accommodate a larger vessel in the current L-dock slip.

HULL DESIGN:

PROPOSED: Aluminum hull with consistent deadrise

BENEFITS: A consistent deadrise provides a greater horizontal profile while transitioning the vessel to plane. This translates to less bow rise when the craft is throttled up, provides increased visibility, and reduces the operator's "blind spot" if the vessel were to be quickly powered up to avoid danger. In terms of safety, this provides a significant advantage to the vessel operator who is often working in critical areas with swimmers, victims, or other rescue personnel in the water.

COLLAR / TUBE DESIGN

PROPOSED: Foam or hybrid (foam/air) filled collar

BENEFITS: A foam or hybrid filled collar provides excellent impact resistance, all while retaining its shape. A foam or hybrid filled collar does not run the risk of developing leaks from sustained use and provides an added safety benefit, as there is no risk of losing vessel stability in the event the tube is punctured. The cost to maintain a foam or hybrid filled tube is significantly less than an air filled tube.

CABIN

PROPOSED: Walkaround cabin

BENEFITS: A walkaround cabin allows easy passage between the bow and aft of the vessel. Walkaround cabins feature sliding doors (both port and starboard), which allow crewmembers quick and safer access to the exterior of the cabin during critical moments.

BOW STEPS AND HANDRAILS

PROPOSED: Add steps/platform and handrail at the bow of the vessel

BENEFITS: Steps/platform and handrail located at the bow of the vessel will provide the vessel operator with safer options for approaching a vessel or victim at sea. The current patrol boat features a closed bow, which makes working from the forward area / bow of the vessel awkward and at times unsafe.

FREEBOARD AND DECK HEIGHT

PROPOSED: Increase freeboard and deck height

BENEFITS: Increasing the freeboard and deck height will provide increased visibility and a drier profile. A higher platform is better suited for offshore rescue work, especially during heavy weather search and rescue missions.

SWIM STEP

PROPOSED: Install a swim step “cut-out” on both the port and starboard side of vessel.

BENEFITS: The current Almar patrol vessel is equipped with a single swim step located on the port side of the vessel. Installing a swim step “cut-out” on both sides of the new vessel will improve the crew’s ability to safely retrieve victims from the water.

ENGINES

PROPOSED: Install new 250 to 350 horsepower engines (depending on manufacturer recommendation)

BENEFITS: The engines on the current Almar patrol boat are approximately halfway through their service life. Due to their size, the engines are likely not adequate to power the new patrol boat. The engines have residual value and can be surplused in accordance with District policies.

ELECTRONICS & SAFETY EQUIPMENT

PROPOSED: Transfer existing electronics from current Almar patrol boat to new vessel

BENEFITS: The current Almar patrol boat is equipped with marine electronics and safety equipment, which was acquired in 2016, utilizing grant funding from the Division of Boating and Waterways. The equipment will be transferred from the current Almar patrol boat and installed on the new patrol vessel, resulting in a cost savings of approximately \$40,000.

Equipment includes:

- FLIR Thermal Imaging Camera and associated rigging
- (2) Simrad 12' MDF Displays and associated implements/rigging
 - Staff anticipates that the service life of the Simrad screens is about 10 years and that the District should keep a reserve on hand to replace the MDF's and radar unit by roughly 2025. Cost for new MDF's and radar is roughly \$10,000.
- Simrad Radar and associated implements/rigging
- Simrad ADF (Direction Finder) Unit and associated rigging
- Survitec self-deploying life raft
- Motorola Police/Fire radio and antenna

DISCUSSION TOPICS

Staff will expand upon the proposed vessel features, specifications and benefits, and respond to questions and receive input from the committee.

Staff is seeking guidance on the RFP process. With committee concurrence, staff is prepared to issue a RFP, analyze submitted bids, and if an acceptable bid is received, present a contract to the full Commission for award. Alternatively, staff can refine the committee report for review by the full Commission, prior to going out to bid.

ATTACHMENTS: A. Site Visit Notes

**ATTACHMENT A
SITE VISIT NOTES – PATROL VESSEL**

Pittsburg Police Department at the Pittsburgh Marina – May 2019

DHM staff had the opportunity to inspect and operate Pittsburg PD's 34' Moose Boat. Feedback from Pittsburg PD staff was overwhelmingly positive regarding the operational capabilities of the vessel. DHM staff was impressed with the overall construction of the vessel and the stability at high speeds and while making tight turns.

The vessel featured a "walkaround" style cabin meaning that the vessel has a walkway approximately 13" wide between the cabin and the gunwale so that the bow of the vessel could be accessed safely in heavy weather. The bow area featured steps and handrails up to the bow, which makes working from the bow area much safer for rescue personnel. Another noticeable characteristic was that the deck and operator's seat were high off the water providing excellent visibility. The vessel also had an impressive amount of storage space for equipment.

One of the operational characteristics that stood out to staff in Pittsburg was the vessel's transition from displacement to plane. Normally, as with the current Almar patrol boat, when a vessel is throttled up rapidly, the stern sinks and bow rises above the operator's field of view as that vessel comes to plane. Once on plane the vessel levels out and the bow drops, and the operator regains forward visibility. The Moose Boat makes that transition at a more horizontal angle allowing forward visibility throughout the transition to plane. In terms of safety, this provides a huge advantage to boat operators as DHM staff are often in critical areas working around swimmers, victims, and other rescue personnel. If one were to have to power up abruptly to get out of a shallow area or have to make a hard quick turn away from danger, losing forward visibility puts anyone in the water at risk of not being seen by the operator. The Moose M3 is unique in that it has a consistent 20 degree deadrise throughout the planning surface of the hull. Many vessels have a variable deadrise throughout the planning surface to make the ride softer but this can also contribute to the bow pointing upwards as the vessel is powered up.

Another desirable feature of the Moose M3 is the collar (tube) design. The collar is foam filled instead of air filled and provides excellent impact resistance while still retaining its shape. Air filled collars are maintenance intensive and have a service life of about 10 years under normal conditions while the foam collars will last the lifetime of the boat. The cost to replace an air-filled collar is about \$15k-20k and the vessel usually needs to be shipped back to the manufacturer to have the work done. There is also a hybrid air/foam collar available and staff may want to consider this option as it provides a softer feel and more cushion. Additionally, the Moose M3 is unique in that the collar is higher off the water than other manufacturers and is not part of the running surface of the hull. This benefits the long term life and condition of the collar as it's not exposed to continuous wear and tear when docking and berthed at the slip. Fenders are used at the point where the aluminum hull meets the dock.

San Mateo County Sheriff's Office Marine Unit at Coyote Point Marina – August 2019

San Mateo operates three patrol vessels (all 35 feet in length) in their area of responsibility. Two of their vessels are berthed at Coyote Point and the third is berthed at Pillar Point Harbor.

Staff was able to test drive the 35' Almar patrol vessel in the San Francisco Bay. The Almar is similar in shape to the District's current patrol vessel, but about 7 feet longer and 2 feet wider. The vessel featured a full cabin with a walk through window hatch forward providing access to a bow well in the front of the vessel. Overall, representatives from SMCSO had a very positive take on the Almar and said it serves its purpose well. The one complaint about the vessel is that the bow is too low and the vessel constantly takes water over the front. Once the water comes in the front of the vessel it leaks through the hatch and the v-berth storage

area gets very wet. This is a design flaw that can be remedied by specifying a different cabin configuration during the build.

The companionway between the inside of the cabin and the bow well was awkward to walk through due to the deck level changes and the size of the hatch to access the bow. During heavy weather it could be difficult to access the bow safely.

Similar to the Moose M3, staff was very impressed with the handling characteristics and overall layout of the Almar. The vessel felt stout and seaworthy and came to plane easily, although, the bow-rise and limited visibility during throttle-up was more pronounced in the Almar vs. the Moose. In high speed turns and maneuvering the vessel performed smoothly. During both test drives (Almar and Moose) the weather was extremely flat and calm so it would've been difficult to compare the two vessel's heavy weather taking ability under those calm conditions.

The vessel had a foam filled collar and after roughly 10 years of use it showed limited signs of wear or damage. The general takeaway by DHM staff after the test drive was that an Almar could be a viable replacement option although the cabin configuration would have to be customized.

The SMCSO Marine Unit also had a 35 foot Farrallon Explorer on site. It is primarily used as a dive boat, as it has specialty equipment on board. According to the unit's Sergeant, the Farrallon is the best heavy weather handling boat in their fleet but it does not maneuver well in tight quarters and they have had problems related to the maintenance of the fiberglass hull. The deep V-hull shape makes maneuvering toward victims and rescuers difficult in wind and swell. Additionally, the bow and forward area of the vessel was virtually inaccessible due to the wide pilothouse. The general takeaway was that the Farrallon is an excellent heavy weather boat but that its application is too narrow and it would not be suitable for the Districts operational needs.

After the visit to Coyote Point, staff was able to tour San Mateo County's 35' Metal Shark patrol boat at Pillar Point Harbor. The vessel is fast and has good visibility, however storage is very limited and the vessel performs poorly in rough weather. The vessel slams in a head sea such that heavy duty shock absorbing seats are an absolute necessity (staff has been underway in the USCG 29 foot Metal Shark in windy conditions and witnessed this first hand).

The hull design of the Metal Shark is not conducive to offshore operations and tends to ride very rough. The vessels were designed as a military force protection platform and designed to be operated within large bays and harbors protecting warships. Based on feedback from SMCSO and USCG personnel, it is the consensus of DHM staff that Metal Shark boats not be considered based on our operational need and local weather conditions.

California Air National Guard at Santa Cruz Harbor – September 2018

The California Air National Guard purchased a 33 foot SAFE Boat in September 2018. It is currently moored on S-Dock and DHM staff has had an opportunity to operate the vessel offshore. The cabin configuration is that of a walkaround, however the overall beam of the boat is narrower than that of the Moose making the interior of the cabin much smaller. The cabin is so narrow that the operator is unable to walk to the stern of the boat through the cabin and must exit from the side doors and walk around to the stern.

The SAFE Boat's decking is lower to the water making the seating height lower with less overall visibility. Also of note is the location of the collar in relation to the water. The foam collar sits in the water and is part of the running surface of the hull. This characteristic results in no freeboard, which creates additional drag and can limit maneuverability. The tube can also suffer from excessive wear from being docked at the slip and side-towing vessels.

When compared with the Moose M3 and the Almar, staff noticed a considerable difference when powering from displacement to plane as the vessel felt underpowered for its weight. The trim change was excessive and the bow rose considerably, limiting forward visibility. Air Guard personnel have directly stated that due to the vessels weight and hull design (variable deadrise and narrower hull), the vessel is underpowered with a full load and doesn't come to plane very well, resulting in slow speeds and excessive fuel consumption. Air Guard personnel have said that 1 additional outboard is needed to adequately power the vessel. The USCG operates many SAFE 33's in their fleet and they are all powered with triple outboards.

Overall, the SAFE 33 is a heavy and seaworthy craft, however staff has concerns over the excessive bow rise, lower seating, limited visibility, width of the cabin, and the absence of freeboard.

Los Angeles Police Department Marine Unit

As part of our research, staff contacted the Los Angeles Police Department Marine Unit as they have a Moose M3 in service in their area. Staff wanted to speak with LAPD personnel that have experience operating the vessel in heavy weather and hear about its capabilities based on their experience. Staff spoke with the unit's Sergeant, who stated that the M3-34 is an excellent heavy weather vessel.

In his experience the vessel handles head seas easily and tracks very well in a following sea. He stated that due to the shallow deadrise the vessel always straightens out when pushed sideways by waves in following seas. He stated that offshore stability when turning in heavy weather is outstanding. He said the only disadvantage of the vessel he could identify is that it's noisy in a head sea because of the vibration of the aluminum hull. He stated that in his experience this is true of all aluminum vessels and that it's not an issue for their agency. He stated that his agency has ordered 3 vessels from Moose Boats over the last 7 years and that the company has been excellent to work with during the build process and after the vessel(s) had been delivered. He stated that if he were to order another boat for his unit and he were given the choice of any manufacturer he would order another Moose M3.

Moose Boat Manufacturing Facility – July 2019

DHM staff toured the Moose Boats' manufacturing facility in Vallejo. Four DHM's made the trip and met with the vice president and the company's naval architect/engineer. We discussed the general needs of the District and the company's ability to customize specifications and features if so desired. The company was working on two large commercial vessels and we were able to see the hulls in progress and get an idea of how the vessels are built. Staff was pleased at the quality of the welds and materials used, which affirmed that the vessels are robustly built. Another advantage of Moose Boats is the fact that they are a local manufacturer and staff can easily travel to the site throughout the build process. Having the manufacturer in close proximity can also expedite service and repairs if necessary.