

MERRI-MAR YACHT BASIN, Newburyport, Massachusetts

In 2007, Merri-Mar Yacht Basin, Inc. (“Merri-Mar”) installed a collection apron and closed-loop treatment system for the wastewater generated from its boat bottom pressure washing activities. Merri-Mar operates a 50 ton straddle lift and washes approximately 130 to 150 boat bottoms per year – majority of the boat bottom washing activities occur September through November. Merri-Mar is located on the Merrimac River where hauling boats is primarily impacted by the tide; and, on average, can haul 8 to 10 boats per day before low tide sets in. During the 2007 hauling season, Merri-Mar hauled approximately 130 boats which averaged 35 feet in length.

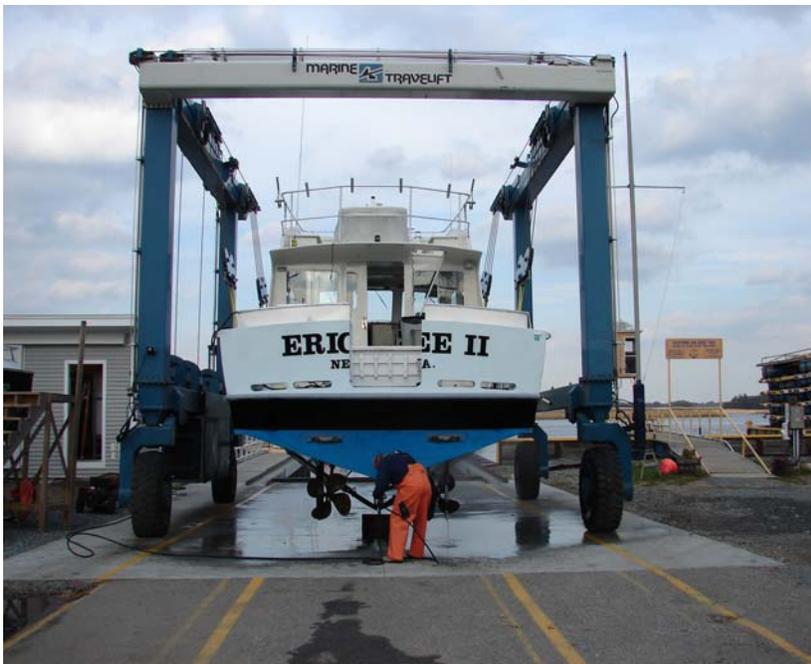


Figure 1 - 30' x 55' Collection Apron

solids are transferred to the sump. While some solids could settle, the trench bottom cleaning has been minimal. During the 2007 hauling season, Merri-Mar removed less than half a five (5) gallon pail of bottom solids. All other, solids were treated and filtered. The collection sump is equipped with a removable plug that is installed prior to the boat washing and is removed after the trench and sump have been cleaned and prior to any storm water events.

The collected wastewater is automatically transferred from the sump to the treatment system and stored in the reactor tank (**Figure 2**) until sufficient wastewater has been collected for a treatment. A typical treatment consists of 450 to 500 gallons (13 – 15 boats) and the average treatment time for this volume was 45 to 60 minutes. The treatment system never impacted any pressure washing activities. The wastewater is chemically treated to promote solids conditioning/settling (**Figure 3**). The reactor is

Merri-Mar’s system was designed and manufactured by EBI Consulting (“EBI”). This system employs chemical and physical treatment solutions. The system includes a concrete apron for collecting wash water, chemical reactor tank, mixer, reusable filter media and a treated water collection tank. The collection apron is concrete with an integral grated trench that is designed to keep wastewater and solids moving along to a small collection sump. The collected wastewater and solids are automatically transferred to the closed-loop treatment system. At the end of each day, typically, both the collection apron and trench are pressure washed so that all the



Figure 2 – Reactor Tank & Mixer

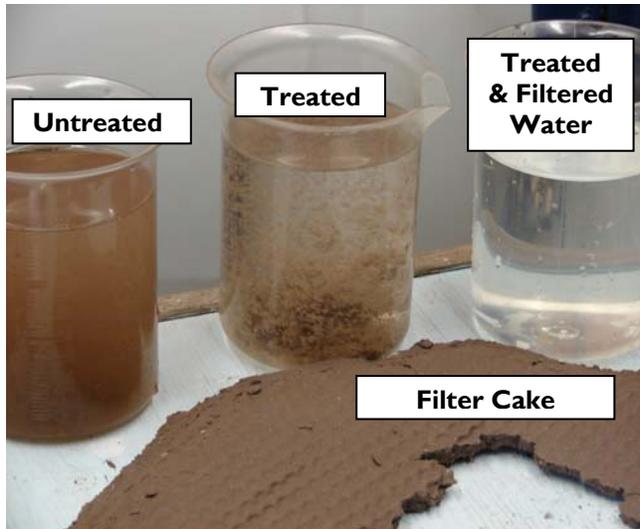


Figure 3 – Treated Pressure Wash Water

solids including the following: paint chips, bottom algae (brown bottom slim), barnacles, weeds, “mud shrimp”, sand, and silt. Essentially, if it can be pumped to the reactor it is treated and filtered. Merri-Mar generated approximately 6.5 ft³ of filtered solids in 2007, which is equivalent to approximately ¾ of a 55 gallon drum.



Figure 4 – Filter & Transfer Pump

The treated washwater is clear; solids free; and it is aerated to control odor and increase the volatilizing of organic compounds. The collected treated water is automatically transferred to the powerwashing unit at a flow rate of 6 – 8 gallons per minute (GPM) at 30 - 40 PSIG. The recirculation pump continuously recirculates the treated water until the power wash system calls for more water.

Since the system is closed-loop, it does not require any discharge permits or licensed operators to manage the system. The only byproduct generated from the system is the dewatered filtered solids which was tested and determined to be a non-regulated material. Specifically, Merri-Mar had the treatment solids sampled and analyzed for toxicity hazardous waste characteristics via the TCLP analysis for RCRA 8 metals and the results of the sampling indicated that all metals were

non detectable. The project at Merri-Mar included the design and engineering of a closed-loop treatment system, the design and installation of a new collection apron and storage building. The total project cost was approximately \$60,000 - \$70,000.



Figure 5 – 25% to 35% Solid Filter Cake

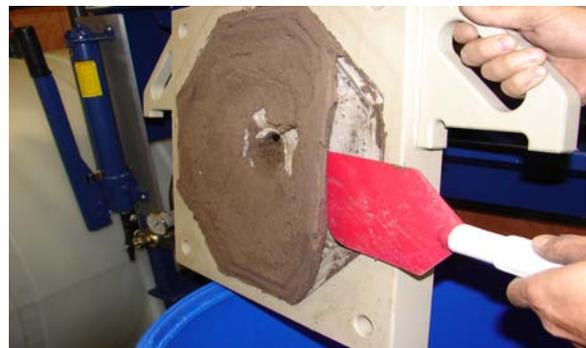


Figure 6 – Filter Cake being removed

then shut down and the treated solids are allowed to settle for approximately 10 to 15 minutes. The treated wastewater and solids are then pumped and filtered (Figure 4) to a holding tank where the treated water is stored for future pressure washing needs. The filtering of 485 gallons of wastewater and solids dewatering takes approximately 20 to 30 minutes.

After chemical treatment, the wastewater and solids are filtered (Figures 5 & 6) and dewatered resulting in a 25 – 35 percent solid with no free liquid. The filter has reusable filter chambers and the life of the filter being used at Merri-Mar is estimated to be 4 – 5 years of continued normal use. The filter is capable of removing all treated