

**JET**
FILTER**Maintainable Weep Hole System**

Geotextile Drainage & Erosion Control

Relieving Water Pressure with Weep Hole Filters

Location: Lake Park Marina, Lake Park, Florida

The Situation: Failing Sidewalks & Dangerous Potholes Lead to Concrete Seawall Repair

Lake Park Marina was built in the early 1990s. It is situated on the Atlantic Coast with high ground water table. Palm Beach County experiences numerous storms and receives 66" of average annual rainfall per year.

By 2013, the marina was in need of extensive concrete seawall repair. The marina had been experiencing severe soil loss behind the seawall which caused the beautiful paver-covered sidewalks to become buckled and uneven, with many locations showing total fallout. It got so bad, the city placed plywood, wrapped in artificial turf, over the walkways to prevent slip, trip and fall accidents. They knew that they had a problem that was rapidly deteriorating. In 2013, the city called in several professional teams to investigate.

The Cause: Hydrostatic pressure caused by a lack of proper drainage

Teams thoroughly inspected the nearly 1600 feet of wall by probing the soils on the landward side of the wall as well as inspecting the panel/pile attachments on the water side. After removing some of the paver sidewalk, very weak soils and voided areas were found on the landward side. Additionally, many seawall panels were found to be off-set and not properly attached to the pilings. A lack of proper drainage from rainfall, storm events and runoff from the surrounding pavement caused the erosion.



When it rains in this area, the water has nowhere to properly drain with the exception of penetrating the brick paver areas around the marina. The water build-up behind the seawall panels will look for an exit through a weak panel/pile attachment joint, or worst yet, under the driven panels themselves.

In this case, hydrostatic water pressure moved the panels to allow the water a path to the sea all the while taking the supporting soils with it.



Hydrostatic pressure develops when groundwater “stacks up” behind the seawall. This groundwater is trying to seek a level with the existing water table and will do so taking the path of least resistance. If it wasn’t for the panel joint issues, it may go under the driven panel (creating even more problems) or if the hydrostatic pressure becomes great enough, could crack the concrete panel horizontally to create its own leak.

SOLUTION: Installing JET Filter Weep Hole Filters

After repairing the wall failures, filling the voids and finishing the concrete, it was discovered that the drainage system behind the wall was inadequate to properly drain the hydrostatic water pressure from behind the wall. The city knew their new walls were still at risk of failure.

The only way to properly address the issue is to vent the wall right above the normal barnacle line to give the water a defined, easier path to drain and to seal the panel joint failures! Mounting the filters in this area of the panel totally eliminates future hydrostatic pressure, and creates the new, *easiest* path of least resistance for water exfiltration.



In November 2014, Jet Filter System and Alon Beilis from Sea Me Dive were brought in to assess and fix the drainage issue. They installed 147 stainless steel, 4” weep hole filters manufactured by Jet Filter Systems of Casey, IL. Four-inch core holes were drilled through the center of the 10’ panels. If any steel rebar was exposed during drilling, it was treated with an epoxy sealant prior to filter installation.

Lake Park Marina’s seawalls are now draining properly. Two years after the repair, [engineers](#) were brought in to test the results. Small holes were drilled through the new sidewalks and penetrometer readings were randomly taken around the repair area only to find original repair soil compaction readings with zero voids and no soil settlement.

RESULTS:

Jet Filter’s unique design made them the perfect choice because they:

- Are easy to install & maintain
- Extend the life-span of a seawall
- Let ground water out & control erosion



JET Filter System
14 N. Central Ave
PO Box 31
Casey, IL 62420
800-475-2029

Sea Me Dive
Alon Beilis
www.seamedive.net
954-471-9597

David Heilman
Chief Executive Officer

David Gentry
President, Sales

JET Filter Europe
Staffordshire, UK
+44-845-519-5197

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