



● SEAWATER

Seawater Pump Station PHE Biofouling Treatment Hong Kong

HydroFLOW® reduced macrofouling and biofilm in PHE02, leaving its seawater channel substantially clearer and maintaining higher flow than untreated PHE01.



Macro-Fouling Reduced



Water Channel Unblocked



Thinner Biofilm on Treated PHE

14-18%

Higher Seawater Flow

⇒ BEFORE & AFTER

● BEFORE

- Water channel blocked up to 3 ft
- Thick biofilm covered plate surfaces
- Macro-fouling restricted the water channel

● AFTER

- ✓ Water channel not seriously blocked
- ✓ Biofilm was much thinner
- ✓ Higher seawater flow was maintained



BEFORE

PHE01: water channel blocked up to 3 ft



AFTER

PHE02: water channel largely unblocked

OVERVIEW

A seawater pump station supplies four plate heat exchangers(PHE) through intake screens and travelling band screens. Chlorine is added by an electro-chlorinator, but discharge limits restrict residual chlorine concentration. Macro-fouling from mussels and barnacles continued to block water channels, while biofilm formed across plate surfaces, increasing pumping, chiller and maintenance demands.

CHALLENGE

Existing screening and controlled chlorination reduced fouling but did not stop recurring blockage of the plate heat exchangers

- Mussels and barnacles restricted seawater channels
- Biofilm impaired heat rejection across PHE plates
- Higher differential pressure increased pumping demand
- Frequent PHE cleaning increased maintenance requirements

SOLUTION

A *HydroFLOW*® unit was first fitted to PHE02. After upstream fouling was identified, a *HydroFLOW*® custom 24" unit was repositioned to extend treatment across the affected pipework.

TREATMENT UNIT

HydroFLOW® custom 24"

FINAL POSITION

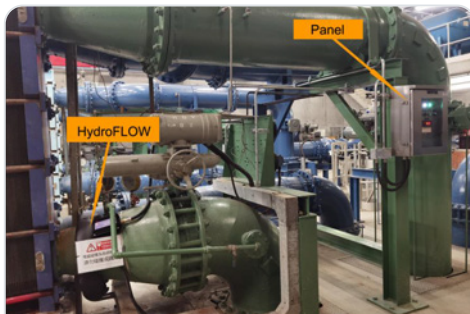
Header-pipe outlet to PHE02

COMPARATOR

Untreated PHE01

EVALUATION PERIOD

22 February to 30 August 2023



INSTALLATION

Original HydroFLOW® position at PHE02 inlet



INSTALLATION

24" unit at the header outlet to PHE02

RESULTS

Macrofouling Substantially Reduced

Final inspection found far less serious water-channel blockage in treated PHE02.

Much Thinner Biofilm

After six months, biofilm on treated PHE02 was visibly thinner than on PHE01.

Water Channel Largely Unblocked

PHE02 remained largely open while untreated PHE01 was blocked to a depth of 3 ft.

14–18% Higher Seawater Flow

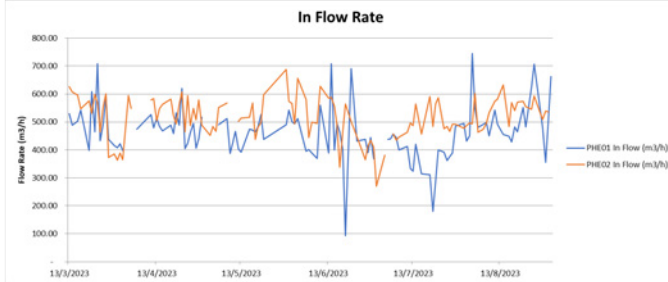
Treated PHE02 maintained higher seawater flow than untreated PHE01.

Lower Differential Pressure

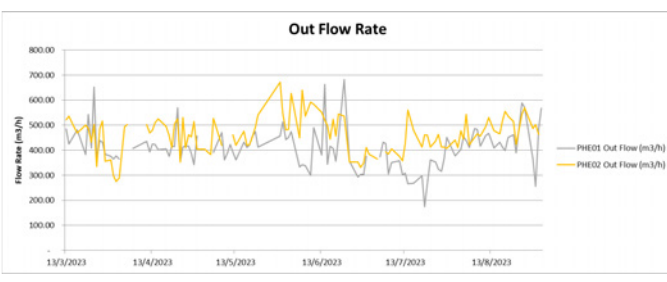
PHE02 recorded lower differential pressure than the untreated comparator.

Performance Sustained for Six Month

Reduced fouling and higher flow were maintained through the six-month evaluation.



PHE02 generally maintained higher inlet flow than untreated PHE01.



PHE02 generally maintained higher outlet flow than untreated PHE01.

KEY TAKEAWAY
Seawater Pump Station Evaluation Summary

HydroFLOW® custom 24" was evaluated on PHE02 against untreated PHE01. After six months, PHE02 remained largely unblocked with much thinner biofilm, while PHE01 was blocked up to 3 ft. PHE02 also maintained higher seawater flow.



MACRO-FOULING REDUCED



WATER CHANNEL UNBLOCKED

14-18%

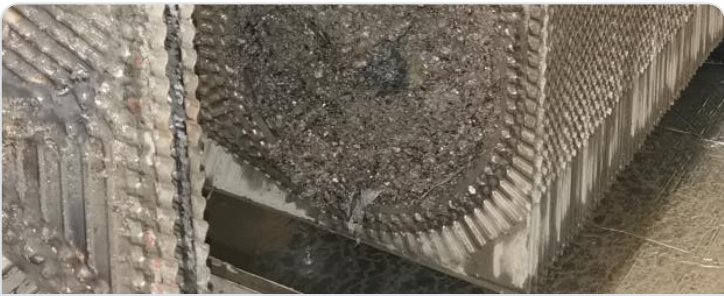
HIGHER SEAWATER FLOW

ADDITIONAL PHOTO EVIDENCE



INSPECTION

PHE01(untreated) inspection showed heavy fouling on 14/11/22



INSPECTION

PHE02(treated) inspection showed similar fouling on 16/11/22



INSPECTION

PHE01 (untreated) showed heavy fouling on 2/05/23



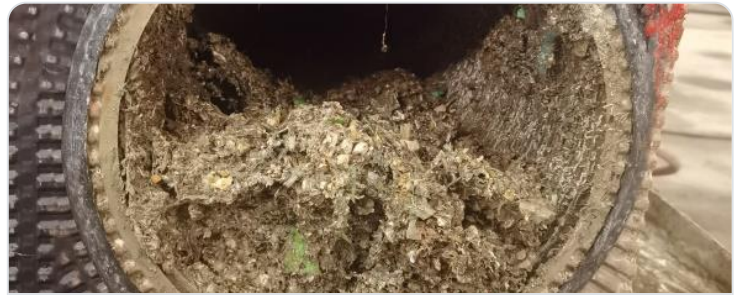
INSPECTION

PHE02 (treated) held more detached shells than PHE01



INSPECTION

PHE01 (untreated) Water channel blocked to 2 ft on 29/06/23



INSPECTION

PHE02 (treated) Water channel largely unblocked on 03/07/23



INSPECTION

PHE01 (untreated) showed Thick biofilm build-up on 05/09/23



INSPECTION

PHE02 (treated) showed thinner biofilm on 30/08/23

RELATED CASE STUDY

Seawater Intake Biofouling Case Study, Chile

Antofagasta, Chile

A HydroFLOW® unit treated severe biofouling and corrosion in a seawater intake system, reducing maintenance, eliminating chemicals, and improving reliability across heat exchangers over a 12-month period.

80% Fewer Openings

System openings reduced, lowering maintenance and downtime across exch

90% Corrosion Reduction

Corrosion tubercles reduced across intake pipelines and system surface

\$57k Annual Savings

Savings achieved from reduced chemicals, maintenance, and downtime



Ready to control fouling in seawater heat exchangers?

Speak to HydroPath about treating macrofouling and biofilm in seawater cooling systems.

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