

Case Study

British Virgin Islands Water-as-a-Service®



SEVEN SEAS WATER GROUP
Water-as-a-Service®



Project Details

Location: British Virgin Islands

Customer: Government of the Virgin Islands (GVI)

Technology: Seawater & Brackish Water Reverse Osmosis (SWRO & BWRO)

Capacity: 2.3 MIGD

Market: Municipal

Overview

Similar to other island economies, the Government of the Virgin Islands has faced significant challenges in upgrading public infrastructure and services to meet the demands of a growing population. In 2014, a 2.3 million imperial gallons per day (MIGD) plant was commissioned to address water rate and supply issues for an estimated population of 23,000. Despite these efforts, high water rates continued, and the facility struggled to meet its design capacity. In 2015, Seven Seas Water Group acquired the plant and stepped in as the water supply provider to help operate the plant efficiently and allow for reductions in the water rate. In addition, Seven Seas is dedicated to helping GVI achieve its Sustainable Development Goals by providing safe and affordable drinking water to all areas and enhancing the island's desalination capacity.

Design and Operational Improvements

Upon acquisition of the Paraquita Bay SWRO plant, Seven Seas initiated a comprehensive enhancement and upgrade project. Seven Seas meticulously reviewed every instrument, valve, and mechanical component of the plant as well as all operating conditions, safety systems, electrical systems, and control systems, to identify areas for the improvement of the plant's long-term reliability and water production efficiency. Based on the findings, Seven Seas invested approximately \$3 million into facility enhancements, and all upgrades were implemented with no disruption to the plant's operations.

Specific upgrades included:

- Installation of variable frequency drives (VFDs) on intake pumps to control feed pressure into the SWRO system, replacing inadequate manual control and pressure regulating valves
- Installation of an additional cartridge filter (CF) to improve filtration quality and membrane longevity
- Addition of a 4th calcium carbonate tank improving flexibility in meeting product water specifications



- Installation of an additional second pass BWRO unit to add redundancy and ensure continuous production
- Implementation of an N+1 system at the intake, enabling all five intake pumps to operate simultaneously, increasing the intake flow from 4,000 GPM to 4,500 GPM
- Replacement of the high-pressure pumps with Seven Seas' standard model, ensuring availability of spare parts since the original pumps were no longer being manufactured
- Addition of a clean in place mix tank to safely add chemicals and improve operational safety
- Replacement of butterfly valves on multimedia filter units to replace inadequately rated valves
- Commissioning of airburst system for intake screen cleaning to reduce the need for divers to clean intake screens

Several other miscellaneous upgrades were performed, including camera installations for better monitoring, remote control system upgrades, flowmeter and instrumentation upgrades, and various support and structural improvements, bringing the Paraquita Bay facility up to Seven Seas' performance and safety standards.

Flexible Financial Solutions

Seven Seas proactively identified an opportunity to decouple non-water related costs from the original water rate formula, resulting in a more favorable headline water rate for GVI. By addressing this issue, Seven Seas was able to protect its returns while ensuring GVI benefited from a more accurate and fair rate structure. This collaborative effort, which involved negotiations with external financiers, not only resolved the issue but also led to substantial annual savings for GVI.



Sustained Reliable Performance

Since completing the initial upgrades in 2015, the Paraquita Bay facility has consistently demonstrated excellent availability and production metrics. Due to the design enhancements and redundancies introduced, Seven Seas has achieved an industry leading availability of 98.7%, meaning the plant is offline for maintenance only 1.3% of the time. Additionally, these upgrades have ensured that the plant can meet its design capacity of 2.3 million imperial gallons per day (MIGD). Seven Seas remains committed to producing a constant reliable supply despite limited storage on the island and other distribution challenges.

Cooperative Solutions

The water journey in the British Virgin Islands illustrates the complexities and challenges of large-scale public infrastructure projects within a small island economy. GVI has made substantial investments to guarantee a reliable water supply amid a highly dynamic and challenging infrastructure system. Seven Seas has been a dependable provider, consistently ensuring efficient water production and maintaining peak performance at the Paraquita Bay plant. Together, GVI and Seven Seas work around the clock to deliver high-quality municipal water to the people of the Virgin Islands.

Meeting National Objectives

In accordance with GVI's Sustainable Development Goals, the Paraquita Bay facility plays a key role in the sustainable and efficient use of water resources by:

- Producing safe drinking water, tested daily
- Developing local expertise in water resource management
- Building and maintaining a fully local operations team
- Providing support to other Seven Seas facilities in the region

With Water-as-a-Service®, Seven Seas takes on all the duties of water and wastewater treatment without upfront investment, charging customers only for delivered water under performance-based contracts. We offer variable-year arrangements and acquire and upgrade existing infrastructure.