

# water reuse

## As Samra WWTP

### one of the world most sustainable WWTP



Population growth, water scarcity and increases in energy cost are a challenge for Jordan. To face these constraints, local authorities know they need to produce high-quality treated water for irrigation and to optimize energy consumption. The As Samra WWTP is part of a global strategy aimed to support the development of Jordan's economy.



**10%**  
of water consumption in  
**AGRICULTURE**  
in Jordan come from  
the WWTP

## Context

Yet, Jordan is fully using all of its limited water resources. Per the Water for Life Strategy, Jordan's Water Strategy for 2008-2022, about 4 million Jordanian people (63% of the population) are served by sewerage systems producing about 100 Million m<sup>3</sup> of effluent per year that is being reused primarily in agriculture. A growing population which is expected to exceed 7.8 million by 2022 implies increasing water use and hence wastewater quantities.

## Client issue

In 2009, the Government of Jordan decided to expand the As Samra WWTP to improve environmental conditions in Jordan, by:

- increasing the capacity to treat growing volumes of wastewater
- increasing the amount of treated water released into the Zarqa River, providing an additional source of irrigation water
- contribute to restore the environmental integrity of the river, which has been severely degraded by industrial and other activities.

## Solution implemented

Jordan's Ministry of Water and Irrigation (MWWI) signed a 25 year concession with the Samra Wastewater Treatment Plant Company Limited (SPC), a private company whose investors include Morganti, SUEZ, Arab Bank, arranged a syndicate of nine local and international financial institutions to provide a loan with a term of up to 20 years.

**364,000 m<sup>3</sup>/day**

the largest wastewater treatment plant in Jordan

The design implements technically advanced solutions:

- **activated sludge and primary settling** for wastewater treatment
- **digestion and composting** for sludge treatment

in order to meet the regional needs of Amman and Zarqa through 2025.

With this expansion, more than 3 million individuals in Amman and Zarqa will benefit from additional supplies of

freshwater. This project make larger volumes of treated wastewater available for substitution in agricultural applications in the Jordan Valley. The area includes approximately 46,000 people, who are expected to benefit from consistent supplies of high-quality treated wastewater that can be used for irrigation.

## MUNICIPAL usages

- Agriculture irrigation
- Environmental enhancement

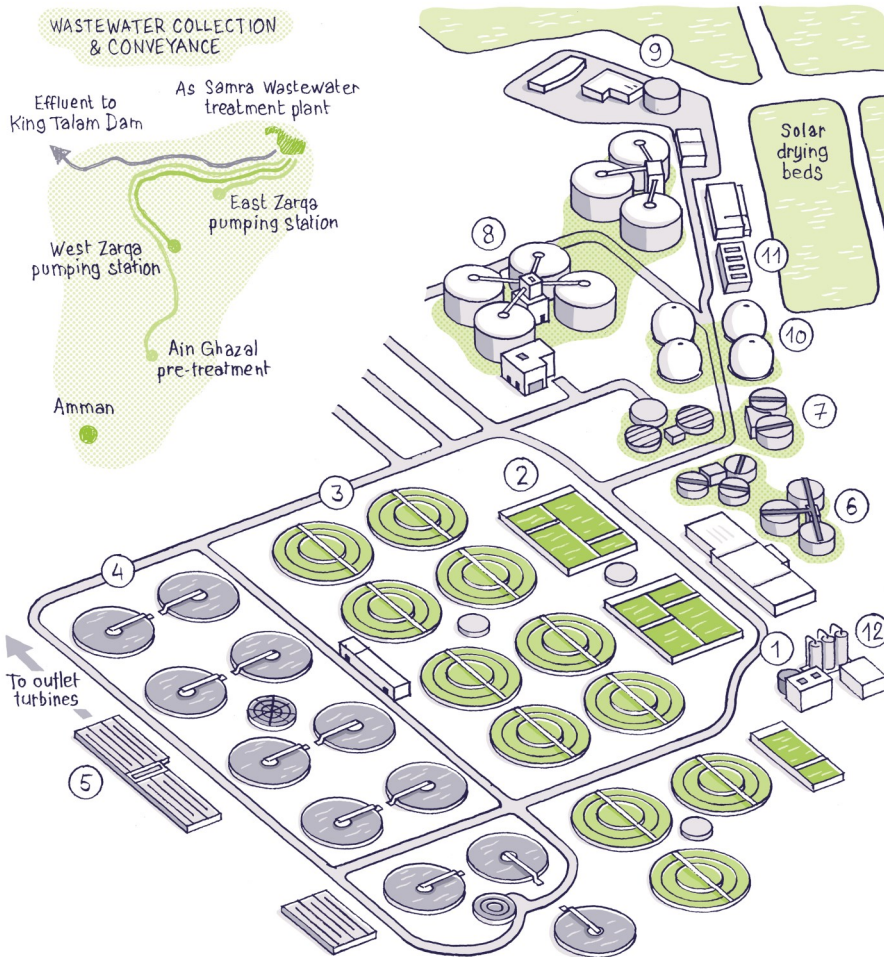
In addition to producing cleaner water, the treatment plant will produce 12.8 megawatts of renewable energy, through biogas and hydropower.

**133**  
million m<sup>3</sup>/year of  
HIGH-QUALITY  
WATER produced

**80 %**  
ENERGY  
self sufficiency



# the PLANT



- 1- Raw water inlet
- 2- Primary settling
- 3- Biological treatment
- 4- Clarification
- 5- Final disinfection
- 6- Primary sludge thickening
- 7- Activated sludge flotation
- 8- Anaerobic digestion
- 9- Mechanical dewatering system
- 10- Biogas holders
- 11- Gas power generation
- 12- Odor control

WATER QUALITY			
Inlet		Outlet	
DBO <sub>5</sub>	637 mg/l	DBO <sub>5</sub>	5-30 mg/l
TSS	649 mg/l	TSS	15-30 mg/l
TN	100 mg/l	TN	15-30 mg/l

## restoration of the Zarqa River

a top priority for Jordan's Ministry of Environment and a key element of the country's long-term water resource management strategy.

The Zarqa river quality was significantly improved since the commissioning of the As Samra WWTP. The plant has a positive effect on the irrigation practices and on the enhancement of wildlife and its habitats. Now fish is back! which is as a sign of water quality improvement.

## BOT financial model

With the build-operate-transfer (BOT) financing model, a form of public-private partnership, the government delegates the responsibilities of financing, designing, building, operating, and maintaining facilities for a certain period to a private sector entity. The Government of Jordan benefits from having the private sector both raise the needed construction financing and guarantee the high-quality construction, operation and maintenance of the facility. At the end of the concession period in 2037, the facility will be transferred to the Government of Jordan at no additional cost. Through the As-Samra Wastewater Treatment Plant project, MCC enabled the Government of Jordan to invest more public funds in the water sector and allowed high-quality treated wastewater to be used in irrigation, giving Jordan more than one use out of each drop of water.

### ► key stakeholders

- **Client**  
Government of Jordan represented by the Ministry of Water and Irrigation
- **Project companies**  
Samra Wastewater Treatment Plant Company and Samra Plant Operation and Maintenance Company
- **Sponsors**  
SUEZ and the Morganti Group – Consolidated Company
- **Donors**  
USAID: the lead U.S. Government agency that works to end extreme global poverty and enable resilient, democratic societies to realize their potential. Millennium Challenge Corporation (MCC): an innovative and independent US foreign aid agency that is helping lead the fight against global poverty.
- **Lenders**  
Lender syndicate of ten local banks led by Arab Bank

## a success story at a glance

### As Samra WWTP Phase I

- 25-year BOT contract signed in 2003 with the Government of Jordan
- Plant capacity 267,000 m<sup>3</sup>/day
- Construction completed in 2008

### As Samra expansion (Phase II)

- Extension contract signed in 2012
- **Water line capacity increased by 37%:** bringing the total capacity at 364,000m<sup>3</sup>/d
- **Sludge line capacity increased by 80%** + mechanical dewatering for phase I & II
- Extend its operation

### Awards

The project has won several international awards, including:

- the Water and Energy Exchange International Award for Innovative Financing in February 2013
- the Best Water Project Award by World Finances Magazine in June 2013