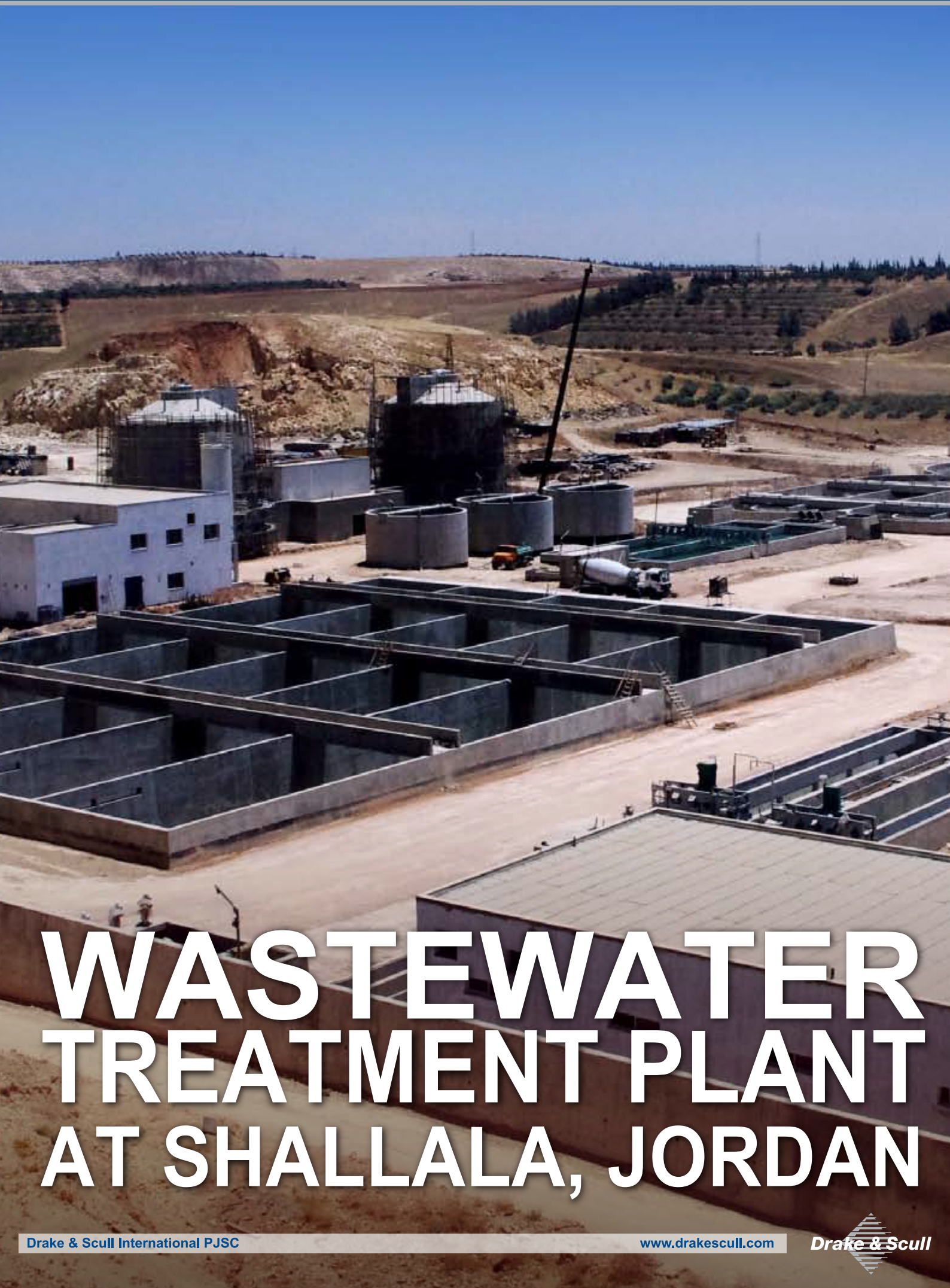

WASTEWATER TREATMENT PLANT AT SHALLALA, JORDAN

PASSAVANT
Energy & Environment

Project Case Study
Wastewater Treatment Plant
at Shallala, Jordan

Concept & Location

Irbid known in ancient times as Arabella or Arbela, is the capital and largest city of the Irbid Governorate, in Jordan. It also has the second largest metropolitan population in Jordan after Amman, with a population of around 660,000, and is located about 70 km north of Amman on the northern ridge of the Gilead, equidistant from Pella, Beit Ras (Capitolias), and Umm Qais. It has the highest population density in the kingdom, due to its nature of being a major ground transportation hub between Amman, Syria to the north, and Mafraq to the east and also for being home to several colleges and universities.

The growth in population had put a strain on Irbid's infrastructure, and the Government of Jordan decided to install a Wastewater Treatment Plant (WWTP), to recycle it for irrigation and energy generation. The WWTP was designed to serve a population equivalent of 163,000 with a daily flow of 14,000 m³ and a peak flow of 1,600 m³.

The project was flagged off and financed by the German Development Bank (KFW). Passavant Energy and Environment was invited to provide the process design, the electrical and mechanical equipment, while a local partner undertook responsibility for the civil works and the underground piping.

Scope of Work

PR was originally invited to complete the construction and installation of the WWTP in a span of 2 years. The company had to be responsible for the Design and Build of WWTP, Effluent pump Station, Transmission Lines to reservoir and Central Irbid WWTP, Transmission Lines, Sludge Dewatering at Wadi Arab WWTP, with 6 months of Operation & Maintenance.

Passavant Energy and Environment did a complete breakdown analysis of the previous design of the WWTP and was able to indentify several areas of concern and shortcoming, in keeping with their strong experience of Wastewater treatment plants all over the world. Passavant Energy and Environment performed a complete redesign of the whole plant and shared their findings with the client, who approved and appreciated the pro-active approach of the company.

Passavant Energy and Environment mobilized nearly 200 personnel, including engineers for design and contract management, Site Engineer, commercial experts for shipping and purchasing, civil & installation workers as well as engineers.

Passavant Energy and Environment has been working non-stop on site since 2009 and has been able to cope with the complete overhaul of the initial design, without significantly affecting the intended launch date. Their strong familiarity with the geography of the region, and their expertise with wastewater treatment plants across the world have meant that the WWTP Shallala is well on its way to serving the recycling and waste treatment needs of the Irbid region and is a significant achievement for Passavant Energy and Environment in the Middle East.

Plant Features

The Wastewater Treatment Plant at Shallala is designed to be a biological WWTP with mechanical pre-treatment, sludge thickening, sludge digestion and sludge dewatering. The treated wastewater will be used for irrigation and a combined heating and power plant would use the digester gas for power supply.

Passavant Energy and Environment has worked on site to develop the wastewater treatment plant in the following stages: The mechanical, biological treatment stage, effluent pumping station, sludge treatment plant and biogas utilisation plant.

The mechanical stage consists of a coarse screening, stormwater storage, fine screening plant and aerated grit and grease removal chamber as well as primary sedimentation. The biological stage includes the biological tank as well as the final sedimentation tanks and the activated sludge pumping station. The purified effluent flows to the effluent pumping station and is then pumped to either the storage tank or to the discharge pressure line.

The sludge treatment employed at the site is Passavant Energy and Environment's patented anaerobic sludge digestion. The surplus activated sludge is thickened mechanically with the aid of polymers. The primary sludge from the primary sedimentation tanks is diverted from the primary sludge storage tank to the digesters. Past this stage, anaerobic stabilised sludge handling is implemented via two digesters, as the digested sludge is displaced into the digested sludge storage tank.

The sludge is passed through sludge dewatering machines including a polymer dosing station. Lime is mixed into the dewatered sludge before the stabilised and dewatered sludge is stored in containers. The filtrate from the mechanical thickening and the sludge dewatering units are subsequently flown to the filtrate and centrate pumping station and then pumped to the primary sedimentation tank.

Passavant Energy and Environment installed a gas treatment stage comprising of a gravel filter for coarse gas cleaning, gas torch as security unit, desulphiesers, and pressure-less gas tanks, a ceramic filters as well as a boiler and CHP-stations. Beyond this, Passavant Energy and Environment will also erect a bio- filtration unit for odour treatment and a booster pumping station to provide processed water in the screening plants and in the sludge treatment stages.

Passavant Energy and Environment designed the Stormwater storage tanks in such a way that they utilise gravity to flow the stormwater into the storage tanks. Following this, the stored water is pumped back to the front of the grit chambers. The company also designed and installed a faecal sludge reception plant in which septage is dosed into the inlet of the grit chambers.

Passavant Energy and Environment also ensured that the new wastewater treatment plant was equipped with a new SCADA system where all plant units were centrally linked to easily monitor the overall functioning of the plant.