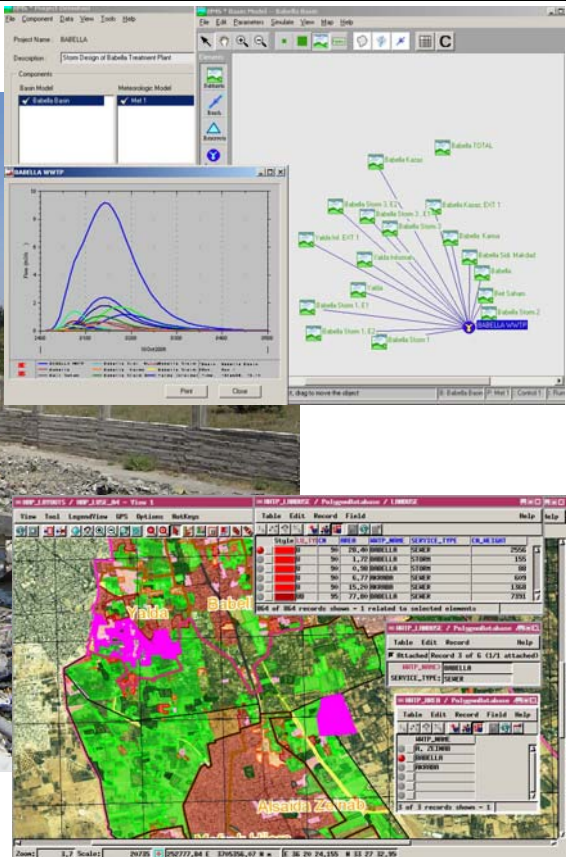




SYRIA

WATER SECTOR PROGRAMME BARADA BASIN DAMASCUS RIF GOVERNORATE



Client	General Establishment of Drinking Water and Sewerage in the Rural Province of Damascus (GEDWSRPD), Harasta
Financing	Kreditanstalt fuer Wiederaufbau (KfW)
Duration of Services	2005-2007 (Hydrological Study Jan.- Feb. 06)
Cost of Implementation	1.1 Mio. EUR (Study) 70 Mio. EUR (Project)

Scope of Services

- Preparation of hydromet. Database
- Hydro meteorological data assessment regarding homogeneity and reliability of time series
- Trend analyses and assessment of climatic variations
- Elaboration of rainfall Intensity Duration Frequency (IDF) curves
- GIS based land use mapping from IKONOS satellite images
- Proposal of Design parameters for storm runoff and outline of urban drainage concept
- Rainfall runoff modelling for storm runoff from service areas of 3 WWTPs

Brief Project Description

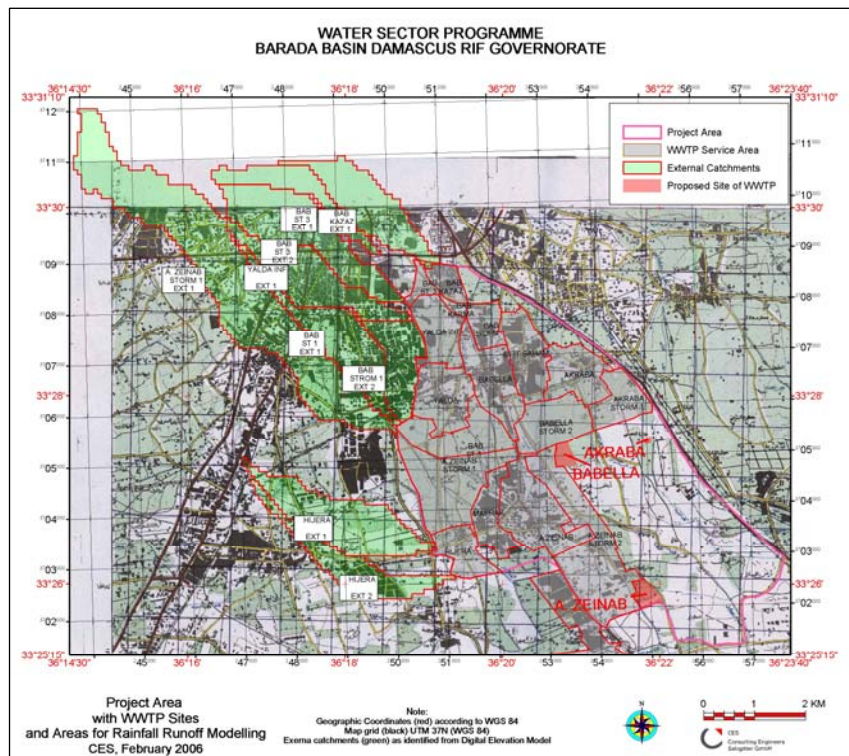
The 31 km² Project Area comprises 11 selected towns (Alsaïda Zeinab, Yalda, Babella, Beit Saham, Akraha, Jaramana, Almleha, Deir Alassafer, Zebdeen, Yabroud and Kara) in the Damascus Ghouta (oasis), with a total population of ca. 0.9 Mio. inhabitants. The area's hydraulic network comprises a mostly diffuse system of canals and trenches. Formerly these supported agricultural irrigation and drainage; nowadays they often convey sewerage water.

A proper concept for storm- and wastewater drainage did not exist for most parts of the urban zone and its adjacent rural areas.

The existing water supply and sewage networks were designed for small rural communities some 40 years ago but have been extended and strengthened in a haphazard manner to keep pace with the increasing demand. Wastewater is not treated but directly discharged to irrigation and drainage canals. The untreated wastewater is therefore either used for irrigation or is infiltrated into the underground.

Three waste water treatment plans (WWTPs) are proposed to improve the existing conditions in combination with appropriate sewerage networks.

The overall study verifies the background and the technical and economic feasibility of the project proposals, as well as their social viability and the environmental impacts. Individual studies on network and WWTP design, reuse of sludge, leak detection, geohydrology and hydrology form the technical basis of the project.



The components of the Hydrological Study include:

- Analysis of rainfall data for establishment of characteristic IDF curves;
- Definition of service areas for the proposed WWTPs of Akraha, Babella and Alsaïde Zeinab;
- Set up of digital elevation model from SRTM data to identify natural flow paths;
- GIS based analysis of high resolution IKONOS satellite images and elaboration of hydrologically relevant maps for land use within the WWTP service areas and of the existing surface drainage system;
- Estimate of water import from the Barada river for irrigation purposes;
- Set up of stormwater runoff models for each of the three service areas for the assessment of peak discharges as basic parameter for the layout of the combined network; and
- Elaboration of a sustainable urban drainage- and stormwater concept