



## Arab Republic of Egypt

Ministry of Housing, Utilities and Urban Communities

European

Investment

Bank



L'Agence Française de Développement (AFD)



Construction Authority for Potable Water & Wastewater **CAPW**



**Helwan Wastewater Collection & Treatment Project**

## Non-Technical Summary

## Environmental and Social Impact Assessment (ESIA) Report

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## Non - Technical Summary

### 1- Introduction

In Egypt, the gap between water and sanitation coverage has grown, with access to drinking water reaching 96.6% based on CENSUS 2006 for Egypt overall (99.5% in Greater Cairo and 92.9% in rural areas) and access to sanitation reaching 50.5% (94.7% in Greater Cairo and 24.3% in rural areas) according to the Central Agency for Public Mobilization and Statistics (CAPMAS).

The main objective of the Project is to contribute to the improvement of the country's wastewater treatment services in one of the major treatment plants in Cairo that has already exceeded its design capacity and to improve the sanitation service level in South of Cairo at Helwan area.

The Project for the 'Expansion and Upgrade of the Arab Abo Sa'ed (Helwan) Wastewater Treatment Plant' in South Cairo will be implemented in line with the objective of the Egyptian Government to improve the sanitation conditions of Southern Cairo, de-pollute the Al Saff Irrigation Canal and improve the water quality in the canal to suit the agriculture purposes. This project has been identified as a top priority by the Government of Egypt (GoE).

The Project will promote efficient and sustainable wastewater treatment in South Cairo and expand the reclaimed agriculture lands by upgrading Helwan Wastewater Treatment Plant (WWTP) from secondary treatment of 550,000 m<sup>3</sup>/day to advanced treatment as well as expanding the total capacity of the plant to 800,000 m<sup>3</sup>/day (additional capacity of 250,000 m<sup>3</sup>/day).

The project will discharge the 800,000 m<sup>3</sup>/day advanced treated water to Al-Saff Canal to be utilized in irrigation and supplement the water deficit in the region. After completing the treatment of wastewater in WWTP in Abu Sa'ed, the treated effluent is discharged by gravity to the irrigation station located in the WWTP's site, which in turn lifts the water to the source of "Al Saff" Canal, located 3.5 km away from WWTP.

## 2- ESIA Objectives and Purpose of the Report

Assessment of the environmental and social impacts is a prerequisite for implementing developmental projects both by the Egyptian Environmental Affairs Agency (EEAA) and the project financiers - the European Investment Bank (EIB) and Agence Française de Développement (AFD).

Accordingly, this Environmental and Social Impact Assessment (ESIA) study has been prepared to provide a detailed analysis of the anticipated environmental and social safeguard issues associated with the Helwan WWTP extension project; and to develop an environmental management and monitoring plan to be implemented during the construction and operation of the project.

The report includes the identification and evaluation of the potential environmental impacts due to the construction and operation of different components of the project. It also includes proposed mitigation and monitoring measures to control/minimize the effects of the identified negative impacts.

The detailed findings included in the ESIA study will provide decision makers with the necessary needed information in order to minimize the unfavorable impacts and maximize the positive impacts.

## 3- Legal Framework

According to the EIA guidelines and procedures manual published by the Ministry of Environment – EEAA January 2009 (amended in October 2010), the proposed project falls under “Category C” projects, thus required full ESIA study. This ESIA report has been compiled as part of the EIA process in accordance with Egyptian environmental Law number 4 for the year 1994 amended by law number 9 for the year 2009 and Law 105 for the year 2015. It has taken into account the environmental regulations and requirements of funding institutions. The ESIA report will be submitted to the Egyptian Environmental Affairs Agency (EEAA) after review and approval from

the Construction Authority for Potable Water & Wastewater (CAPW) and the funding institutions in order to seek environmental approval for the proposed project.

#### 4- Project Location

The proposed project is located about 30km southern Cairo in Helwan. Components of Helwan WWTP extension project extend from Pump Station no. 4 heading to the south nearby Autostrad main road up to the existing Helwan WWTP as shown in Figure (1).

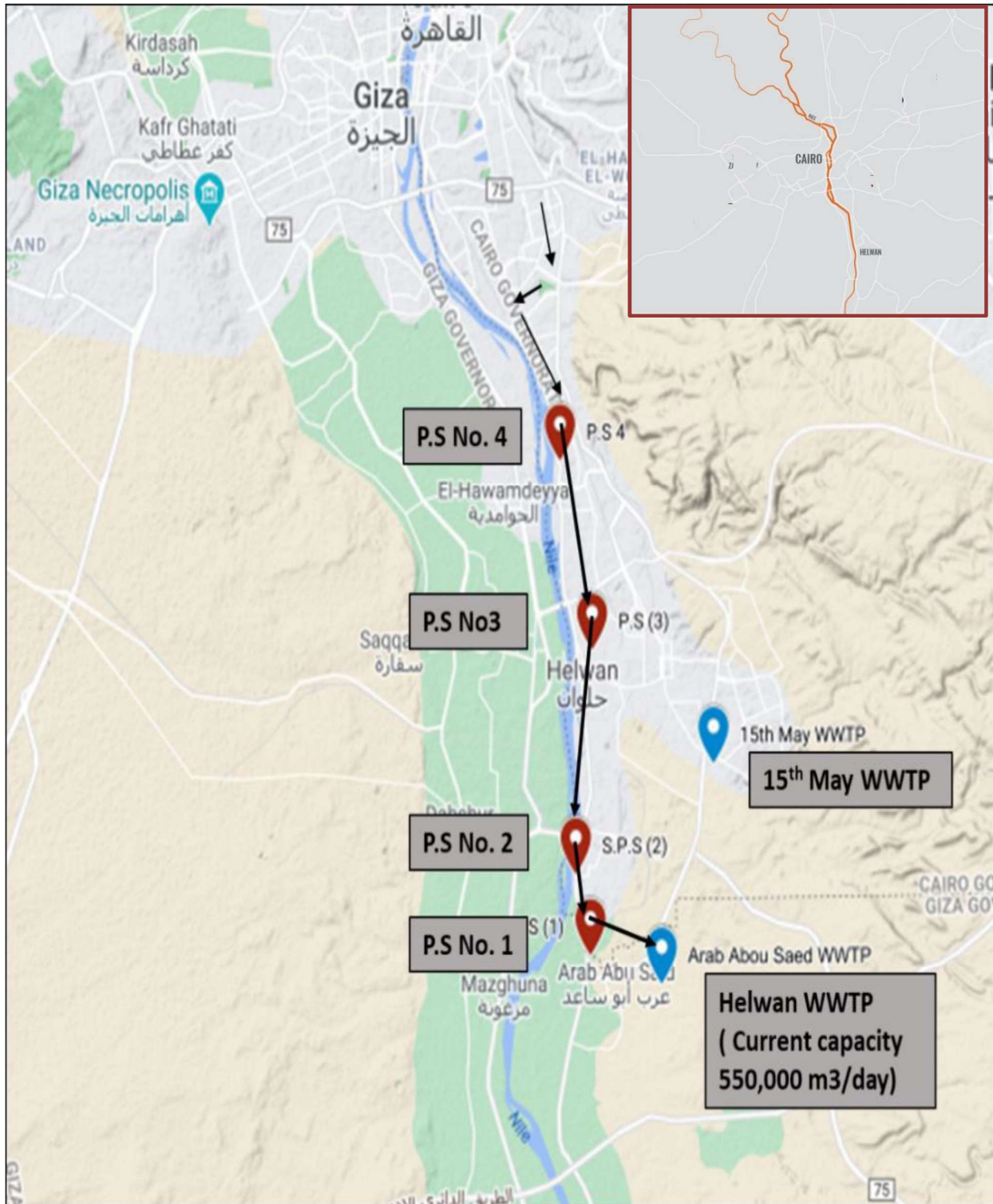


Figure (1) - Locations of Helwan WWTP extension project

## 5- Project Justification

The proposed project of upgrade and extension of Helwan WWTP is included as one of the projects in the National Action Plan of Egypt (NAP) 2015 and is a top priority of the Government of Egypt. It contributes towards an efficient and sustainable water resources management in Egypt as well as to the Egyptian climate protection efforts.

The proposed project of the upgrade and extension of Helwan (Arab Abo Sa'ed) WWTP from 550,000 m<sup>3</sup>/day second treatment to 800,000 m<sup>3</sup>/day advanced treatment shall:

- Stop the untreated wastewater disposal into Al-Saff Canal,
- Significantly reduce the current pollution levels in the first reach of Al-Saff canal and improve the water quality in Al-Saff Canal,
- Present advanced treated water quality to the farmers in the first reach of the canal,
- Provide more excellent quality water in the canal which shall reduce the abstraction of fresh water from the Nile River.
- Efficiently treat and utilize the sludge with anaerobic digestion to produce electricity to cover up to half of the electricity consumption of the WWTP.
- Utilize the stabilized treated sludge in agricultural and farming purposes.
- Reduce the greenhouse gases emissions from the wastewater and sludge treatment which shall reduce the impact on climate change.

The project will support the depollution of Southern region of Greater Cairo and Al-Saff Canal and provide an additional source of water and thus improve the economic situation for agriculture. The project will improve the health and environmental situation of the people living in the Governorate of Cairo. The project will contribute to the environmentally sound disposal/utilization of effluent and sludge as well as energetically optimized and environmental sound sludge treatment.

If the project is not implemented, Helwan WWTP will not be able to receive and handle the expected future flows. The high level of pollution due to improper level of treatment of wastewater received by the WWTP as well as the current sludge treatment and handling will increase and consequently the level of pollution reaching the Al-Saff Canal and ultimately reaching the land and farmers will also increase. This level of pollution will affect human health as well as the limited available water resources.

Considering the serious environmental and socio-economic currently attributed to the poor treatment efficiency of the WWTP, the upgrade and extension project is essential, especially with view of improvements in human health, water resources and energy efficiency.

## 6- Project Description

This proposed project was designed to redistribute the wastewater flows to decrease discharges from existing collectors and divert them to the WWTP in Arab Abo Sa'ed through the construction of a new collector, pump stations, and force-mains as follows:

- Areas East and West of AUTOSTORAD main road which include (Al Maadi Al Gedida, 70 Feddan (Al Hadabah Al Wosta), Sobhi Hessien, Maadi Al Sarayat Al Sharqia, and Zahraa Al Maadi) will be diverted to Ahmed Zaki collector in Cairo project with force-main of diameter 1200 mm by CAPW. This modification will lead to decrease discharges on the collector of contract No. (4) of diameter 2000/2150 mm (horse shape) and decrease discharges on the existing screw pump station No. (4) (Maasarah).
- A new collector will be constructed to divert some discharges from the Helwan zone to a new pump station No. (3A) in existing land near from the existing station No. (3), and a force-main to 15th May pump station No. (2A).
- The wastewater flows from 15th of May City will be diverted directly to the WWTP by a force-main from new pump station No. (2A) in the same location of the non-working WWTP in 15th of May City in addition to receive the flows from the new pumping station No. (3A).
- Construction of new booster pumping station (1A) in the midway from the 15th of May City pumping station to the new WWTP in El-Kurimat and will serve in future the extension of 15th of May City that is currently planned.
- Construction of new force-mains to deliver discharges from 15th of May P.S No. (2A) directly to the Arab Abo Sa'ed WWTP (phase 1), and another new force-mains to deliver future wastewater discharges from 15th of May P.S No. (2A) to a new booster pump station No.(1A), then directly to El-Kurimat WWTP (phase 2).
- An expansion of 250,000 m<sup>3</sup>/day in the same site as the existing Arab Abo Sa'ed WWTP.



- Upgrade of the Abo Sa'ed WWTP to advanced treatment to allow the safe irrigation reuse in the El-Saff irrigation canal to substitute the fresh water extracted from the River Nile Pumping Stations, Ghamaza I at km 25 and Ghamaza II at km 50 of the El-Saff irrigation canal.
- These modifications will lead to decrease discharges on the existing collectors, screw pump stations, and force-mains from existing screw pump No. (3) down to P.S. No. (1), and force-mains to the Arab Abo Sa'ed WWTP and relieve these collectors to allow the start of cleaning process for the sediments to restore to the original cross section and design capacity.

**Error! Not a valid bookmark self-reference.**) provides a schematic of the proposed project components.



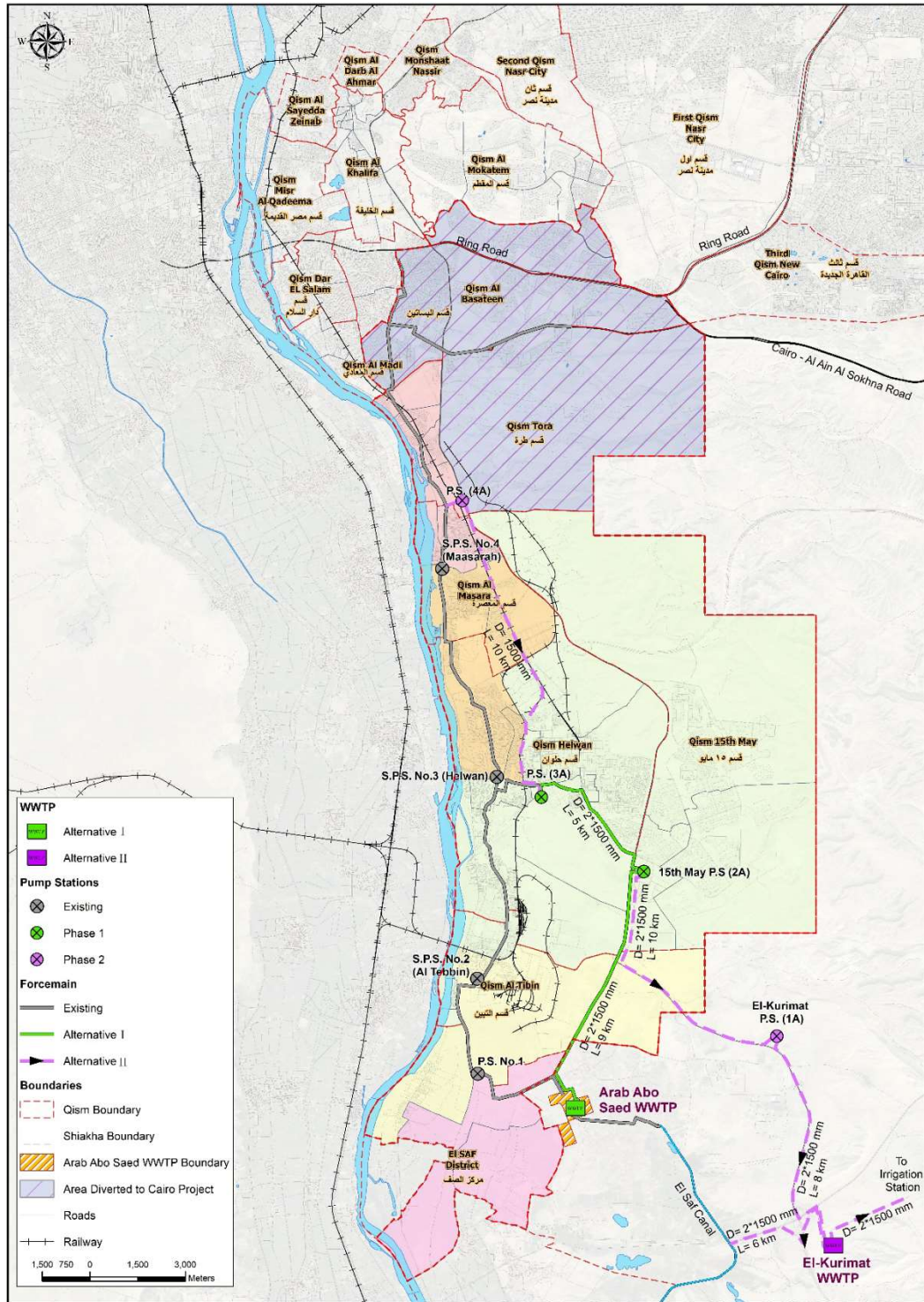


Figure (2) - Helwan WWTP extension project components.

## 7- Baseline Conditions

The Environmental and Social Baseline conditions were studied in the project different areas. The following sections provide the main characteristics of the environmental and social conditions.

### 7-1- Topography and Soil Permeability

The topography of the region varies from one location to another, as it consists of non-flat plateaus and semi-mountainous areas whose levels descend west towards the Nile from about 80 meters above sea level in the east to about 30 meters above sea level in the west where the ancient agricultural lands then descend towards the west until the river. The Nile basin has irregular slopes, and there are some internal depressions and ponds in the region. The most important of these ponds are the reef and steel plant pool and the national company pool.

There is no impermeable layer at depths of more than 10 meters below the soil surface. According to its levels, the impermeable layer descends from the south towards the north.

### 7-2- Water Supply and Sanitation facilities

The Helwan WWTP project has been designed and implemented to serve the southern part of Greater Cairo that starts from Al-Maadi and extends southwards for a distance of 30 km serving residential areas. Industrial areas, including iron and steel factories, coke factories, forgings, cement factories, the Nasr Company for Cars, many military factories in the region, in addition to the residential areas and industrial areas are covered by the plant. It also serves Helwan University and many military and security sites, including Helwan Airport, Tora Prisons, security forces in Tora, Police Trustees Institute in Tora, Helwan Air Force Secondary School, entertainment and commercial areas. (Source: Feasibility study report for Helwan, 2015; Pre-feasibility study for Helwan, 2020).

There are main five water treatment plants are in operation serving the project catchment including Tebben, Kafr El Alo, North Helwan, Maadi, and Fusttat with total capacity of around

1.97 million m<sup>3</sup>/day. No shortage of water is reported from the served area over the year except few hours for maintenance and for repairing broken or leaking water supply pipelines.

Helwan (Arab Abo Sa'ed) WWTP is currently serving a population of about 1.6 million capita. The data for population was obtained from the official Egyptian source of Statistics, Central Agency for Public Mobilization and Statistics, CAPMAS 2017. The population is expected to increase to reach 2,368,584 capita by year 2037 and 3,328,645 capita by year 2052.

### 7-3- Demography

The Helwan Zone includes Helwan city, with its three districts: Ain Helwan, El-Maasara and 15th of May; El-Maady City, with its two districts: El-Maady and Tourah; Markas Atfieh; Markaz Es-Saff; Tebbin City. The total area of the Helwan area covers 903.471 km<sup>2</sup>, representing 0.09% of the Egyptian Republic's area.

The area encompasses 2 marakez, 4 cities, 34 districts, 11 rural local units annexed by 43 villages, and 106 Kafrs & Ezbets. According to the preliminary results of the 20016 census, is 70.6% of the population lives in urban areas, and 29.4% in rural areas and population natural growth rate has reached 19.3 per thousand. Besides being an agricultural area, Helwan is also considered an industrial one as it hosts many industries such as: Iron & Steel, Cement, basic metals, engineering and electronics, as well as mining. Moreover, the project area hosts three industrial zones; one of them is located in Tebbin and has big industrial companies. The other two zones are located at Maady and Helwan. In addition to that, the area hosts many new projects such as the under construction new Tebbin power plant of capacity 2x350 MWe.

### 7-4- Employment and the Labor Market

The labor force of Helwan is around 448,362, i.e. 26.17% of total population, with unemployment, including job losers, at around 10% in 2009.

This labor pool is comprised of employees of industrial activities (chemicals, building and construction, Iron & Steel, Cement, textiles, basic metals products, wood, wooden products &

upholstery, spinning, weaving, garments & leather, paper products and food products), employees of small industry and small business operators. Around 58% of the total labor pool can be categorized as skilled, having been trained as industrial technicians.

The proposals outlined in the Giza & the Helwan Region Master Scheme 2015, which corresponds to the Government of Egypt's development program for the country, are likely to offer thousands of employment opportunities through the construction and operation of the proposed businesses as well as industrial and commercial developments in the entire area.

#### 7-5- Education

The educational status of the Helwan population is partially classified. The educational facilities (governmental) available within the Helwan include 8,332 classrooms for Nursery (ages under 6), Elementary schools (age 6-12) for both boys and girls, Preparatory (ages 12-15) and Secondary (ages 15-18) schools, in addition to 12 Vocational Education Centers.

#### 7-6- Health

Main medical facilities in the Helwan consist of 8 public and central hospitals, 2 hospitals belong to the Ministry of Health, One University Hospital, 4 Police and Prison Hospitals and one specialized hospital. The hospitals collectively support approximately 2,368 beds, they are well equipped for most types of surgery and convalescence and are staffed by more than 889 physicians, 261 dentists and 1,495 nurses covering all medical specializations. Many other private hospitals, clinics, kidney washing facilities and physical therapy units are distributed over the Helwan area. Additional health care services in the Helwan include, also, 63 private sector hospitals, 46 emergency centers and points, 44 ambulances, 39 urban health units, 57 health care units, 80 family planning units/centers, 37 child care centers and 15 health outreach offices.

#### 7-7- Climate

In Helwan area, the summers are long, hot, humid, arid, and clear and the winters are short, cool, dry, and mostly clear. Over the course of the year, the temperature typically varies from 10°C to

35°C and is rarely below 8°C or above 39°C, figure (3) shows a climate summary for Helwan along the year.

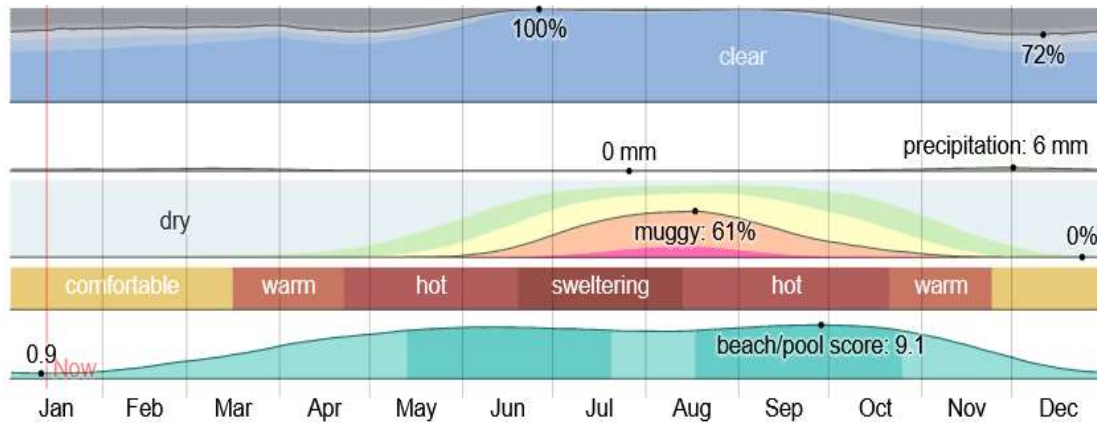


Figure 3: Climate summary in Helwan

## 8- Environmental and Social Impact Assessment

Environmental impacts of the different components of the Helwan WWTP extension project in Arab Abu Sa'ed during both the construction and operation phases covers components including:

1. Extension of existed Helwan WWTP;
2. New pumping stations 2A and 3A.
3. Force Mains
4. El Saff canal

The construction and operation of some/all of the components of the project listed above will also create additional activities/processes such as:

1. Solid hazardous and non-hazardous waste generation during both construction and operation phases.
2. Liquid waste generation during construction and treated effluent discharge during operation.
3. Sludge generation, handling, storage and disposal/reuse, during operation of WWTPs.



4. Development of on-site workers/staff workshops, offices and housing units during construction.

The key receptors have considered include:

- Air (air quality and ambient noise);
- Soil (soil quality, erosion, landscape);
- Water (water quality and resource consumption);
- Biological environment (Flora and Fauna);
- Human environment (Occupational health & safety, Community safety, Visual impacts, traffic impacts and the Socio-economic and Health impacts).

### 8-1- Environmental and social impact during construction phase

#### Positive Impacts

- Creating job opportunities for skilled and unskilled during construction of the project different components (around 600 Labourers Staff and 150 Technical & Administration Staff).
- Creating opportunities for companies working in contracting and construction of sewage networks.
- Reviving economic activities for shops supplying construction materials in the area, due to selling necessary construction material.

#### Negative impacts:

- Dust generated during excavation may have some health impacts especially on individuals who suffer from allergies.
- Noise generated during construction may have an inconvenient impact on the surrounding populations, especially that some plots are located near some sensitive

receptors such as primary schools, youth centres and mosques as well as other residential areas.

- Storing of construction materials and excavation waste on the streets may affect the traffic.
- Risks that accidents may occur as a result of failure to adhere to the safety and occupational health requirements among workers
- Traffic jams in force mains routes areas.

## 8-2- Environmental and Social impact during operation phase

### Positive Impacts

- Improve living conditions and sanitation facilities within project area severed.
- Creating job opportunities for some engineers, labours and skilled workers at the PSs and WWTP.
- Stop the untreated wastewater disposal into Al-Saff Canal.
- Significantly reduce the current pollution levels in the first reach of Al-Saff canal and improve the water quality in Al-Saff Canal, shown in table 1.

**Table 1: Pollutants reduction loads in effluent before and after the extension of Helwan WWTP**

Parameters	Before extension	After extension	Pollutants load reduction %
<b>BOD (ton/day)</b>	129.5	48.0	62.9%
<b>COD (ton/day)</b>	207.5	64.0	69.2%
<b>TSS (ton/day)</b>	148.0	40.0	73.0%

- Presents advanced treated water quality to the farmers in the first reach of the canal.
- Reduce health risk of residents, famers and crop consumers.
- Provide more good quality water in the canal that will reduce the pressure on fresh water from the Nile River (about 800,000 m<sup>3</sup>/day).
- Efficiently treat and utilize the sludge with anaerobic digestion to produce electricity to cover up to half of the electricity consumption of the WWTP.



- Utilize the stabilized treated sludge for agricultural and farming purposes.
- Reduce the greenhouse gases emissions from the wastewater and sludge treatment reducing the impact on climate change.

One important positive impact of this project is the improvement potential in the carbon footprint of Helwan WWT system

The project has a very strong potential when it comes to climate change adaptation as, all the proposed project outputs and components may be considered to reduce the vulnerability to climate change as the project will:

- Increase the wastewater conveyance network capacity, which will help contain more intense rainfall and storms/floods.
- Supply unrestricted irrigation water quality with additional 800,000 m<sup>3</sup>/day, which would have otherwise been extracted from the Nile. This will help compact droughts and shortage of water resources and agricultural water stress.
- Will improve wastewater treatment quality to compact the climate change impacts.
- Compact the damage and halt in service due to power cutoffs by depending less on the national grid by utilizing energy recovery in sludge digestion.
- Decreasing the carbon footprint per capita served by utilizing energy recovery and tertiary treatment.
- Increasing the WWTP capacity along with upgrading to tertiary treatment will allow for more containment to the peak average daily water consumption increase as temperatures increase.

#### Negative impacts:

- Spread of some foul odours to the surrounding residential areas
- Noise related to the operation of the PSs
- Hydraulic capacity of al Saff canal should be increased to accommodate the new WWTP effluent of 800,000 m<sup>3</sup>/day.

## 9- Public Consultations

Consultation has been carried out with local communities and local government representatives to identify any community concerns or opportunities associated with the project. Several stakeholders were identified and included community stakeholders who may potentially be affected by the project, whether directly or indirectly, as well as other interested parties, such NGOs and institutional stakeholder who may be involved in one way or another in the construction or subsequent operation of the Project.

A first Consultation was carried out during the scoping stage with members of Arab Abu Sa'ed community. In addition, a second stakeholders Consultation was carried out in (January - February 2021), including various stakeholders and persons from the communities in the project areas.

The local residents and land and business owners within the project area showed high social acceptability of the project and appreciate the benefits coming out from the project mostly in terms of:

- Improvement of Al-Saff water quality.
- Provision of more treated water that can meet the demand for downstream reach of Al-Saff Canal.
- Provision of proper and comprehensive sewerage system of the project area and prevention of overflow from manholes of some zones within the served area.

## 10- Environmental and Social Management Plan

The Environmental and Social Management Plan (ESMP) prepared as part of the ESIA reflects the implementation procedures and mechanisms as well as the roles and responsibilities for the implementation of the mitigation measures and monitoring activities for the expected impacts.

The effectiveness of the proposed mitigation measures and environmental management plan will be monitored throughout the construction and operation phases of the project. Monitoring will be performed using calibrated equipment (where relevant) and standard techniques in order to ensure accuracy of the results. These results will be stored in an easy to access database and will be analysed and corrective/additional actions shall be undertaken as necessary.