AFRICAN DEVELOPMENT BANK

INTEGRATED RURAL SANITATION IN UPPER EGYPT LUXOR – IRSUE-LUXOR
(Result Based Finance Programme- RBF)

STARTEGIC ENVIRONMENTAL AND SOCIAL ASSESSMENT (SESA)

EGYPT

FINAL REPORT

November 2019

Abbreviation

CDAs	Community Development Authority
CES	Climate, Environmental, and social
CMS	Complain management System
CSS	Climate Screening System
EEAA	Egyptian Environmental Affairs agency
EMP	Environmental Management Plan
ESIA	**Environmental and Social Impact Assessment**
GoE	Government of Egypt
GRM	Grievance Redress Mechanism
HCWW	Holding Company for Water and Wastewater
H&S	Health and Safety
IRSP	Integrated Rural Sanitation Program
IRSUE-LUXOR	Integrated Rural Sanitation in Upper Egypt Luxor
ISC	**Implementation Supervision Consultants**
ISS	**Integrated Safeguards system**
IVA	**Independent Verification agency**
Land SOP	**standard operating procedures for land acquisition**
LGUs	legal Government units
LWSC	Luxor Water and Sanitation Company
MDGs	Millennium Development Goals
MHUUC	Ministry of Housing, Utilities, and Urban Communities
MWRI	Ministry of Water Resources and Irrigation
NOPWASD	National Organization for Potable Water and Sanitary Drainage
NRSP	National Rural Sanitation Program
PAP	Project Action Plan
PforR	Payment for Result
PIAP	Performance Improvement Action Plan
PIU	Project Implementation Unit
PMCF	Project Management Consulting Firm
PMU	Project Management Unit
RBF	Results-Based Financing
SESA	Strategic environmental and social assessment
SRSSP	Sustainable Rural Sanitation Services Programme
WGP	World Bank Water Global Practice
WSP	Water and Sanitation Programme
WWTP	Wastewater Treatment Plant

Chapter 1- Introduction

1.1Rational

Provision of adequate water and wastewater services throughout Egypt is one of the Government's highest priorities. In the densely populated Nile Valley and Delta, this is essential for a sustainable environment, public health and hygiene.

The Government of Egypt (GoE) has ambitious plans for economic development to improve living standards in the country. The Introduction to the Sixth Five Year Plan (Preface to Sixth Five Year Plan, Ministry of Economic Development , Government of Egypt website) specifies the "prioritizing of public policies and investments and channeling them into two venues": (a) intensifying investments in infrastructure projects, where investments on potable water and sanitation would exceed a quarter of total investments; and (b) achieving regional balance by allocating 42 percent of local public investments to fostering development in Upper Egypt Governorates as part of the national program for the region's development.

Egypt achieved the Millennium Development Goals (MDGs) target for safe sanitation ahead of 2015, with access to improved sanitation as high as 95 percent nationally (99.9 percent in urban areas and 93 percent in rural areas). These figures however include sanitation trenches used as septic tanks in rural areas, which are not considered as improved services in Egypt and represent a source of increasing pollution as well as a health hazard.

The rural areas are in desperate need to implement appropriate wastewater collection works to relief the burden of discharging septic tanks contents that becomes more frequent with high groundwater table. These rural areas may not have the possibility of constructing individual treatment plants to treat their collected wastewater due to constraints of land, small amount of collected flows compared with larger cities. This fact led the government to initiate pioneering Programs for setting up different strategies for rural sanitation in order to plan and construct sewerage systems based on clustering / grouping villages to reduce (the overall number of wastewater treatment plants (WWTPs) to be implemented.

The coverage of sanitation with the necessary wastewater treatment plans in Upper Egypt is considerably low. Since the establishment of the Holding Company for Water and Wastewater (HCWW), efforts have been made to achieve balance at the level of its subsidiaries and the equitable distribution of services with a clear framework and strategy for the development and management of drinking water and sanitation services according to a general vision for all sectors. Therefore, there was a need to prepare modern master plans based on hypotheses that harmonize current and future variables and cover the needs of drinking water and sanitation for the Program area up to the objective year 2060.

The Government of Egypt has recognized the urgency of these challenges to provide universal access to rural sanitation services as part of a series of Presidential Programs, aimed at reducing poverty and enhancing prosperity. The National Rural Sanitation Program (NRSP) is the overarching program for the rural sanitation sector, which aims to foster sustainable access to rural sanitation services and achieve 100 percent sanitation coverage of 4,700 villages and 27,000 "satellites", with a population estimated at 45 million, through access to sanitation services, as well as the discontinuation of the practice of discharging untreated sewage into irrigation drains and canals, with an estimated investment needs at USD 11.3 billion. The NRSP also seeks to reinforce a series of performance improvement measures to strengthen decision-making and capacities at local-utility level and improve the overall accountability framework, whilst supporting national initiatives to address persistent sector challenges. Efforts towards

greater decentralization have been further enshrined in the 2014 Constitution, which stipulates a transfer of service delivery powers to local administrations by 2020.

The proposed project aligned with the Bank's High Fives Agenda and the Bank's Ten Year Strategy through development of critical infrastructure and contribution to green growth, focusing on the High 5s: mainly on improving quality of life of people and Feed Africa. It also fits well with the Bank's IWRM policy as it aims to enhance the availability of good quality of water for environmental sustainability and productive purposes.

African Development Bank Country Strategy Paper (2015 – 2019) Pillar 1: Infrastructure for private sector competitiveness: sustainable and inclusive growth recognized the urgent need for the Bank to support the GOE priority in filling the gap in the sanitation sector with emphasis on the wastewater sub-sector. The Country Strategy Paper identified the "improvement of sanitation facilities in rural areas" as one of the priorities, with more emphasis on Upper Egypt governorates characterized by very low rural sanitation coverage. The project will improve environmental sustainability and the quality of life of people in Upper Egypt (Luxor) and will increase available water resources by enhancing water quality (re-use of treated wastewater in agriculture).

African Development Bank is preparing an integrated sanitation program in the Upper Egypt. The program aims at designing integrated sanitation systems of "clusters" by collecting and treating wastewater generated from some rural areas in Upper Egypt, thereby contributing to increased coverage of improved sanitation and clean environment for the populations living in these areas. The Program focuses on one Company for Water and Wastewater (WSC) operating in the Governorates of Luxor (Luxor Company for Water and Wastewater, LWSC) which is one of the most highly populated in Upper Egypt. It consists of five administrative localities (Districts and Major Cities); Luxor, Teba, Aramant, Esna and El Karna shown. Two clusters will be served under the current program. These are Keman El Matana Cluster and Al-Tod/El-Dabayba Cluster under Esna and Al-Tod Districts.

1.2 AfDB Results-Based Financing instrument and Environmental and Social Assessment procedure

AfDB Group is intending to support the Government of Egypt through the Results-Based Financing (RBF) instrument. The primary distinction between RBF and the other Bank instruments is that disbursement is effected against the achievement of tangible and independently verifiable results (called Disbursement-linked indicators – DLIs) and the Bank may only disburse against DLIs met by the Borrower.

The Bank will use RBF to advance the sustainability agenda by looking, beyond project technicalities, at ways of improving the capacity of countries and agencies to properly manage climate, environment and social (CES) considerations. Safeguards assessments and improvements, guided by a thorough benchmarking against the ISS in terms, of equivalence and acceptability, will help adapt program systems to the country context and improve country and agency systems.

One of the key guiding principles of the proposed RBF instrument is to focus on identifying and strengthening the institutional capacity needed for an RBF-supported program to achieve its desired results including positive results with respect to the management of CES risks.

Therefore, the RBF instrument will rely on the Strategic Environmental and Social Assessment (SESA) tool to emphasize system and capacity diagnosis and improvement. Key weaknesses will either be selected as DLIs that will be tied to disbursements upon achievement or included in the Program Action Plan for implementation by government, and to be monitored by the Bank during implementation. (Bank group policy on results-based financing)

To ensure compliance with the Bank's Safeguards Integrated system (ISS) and the Bank's policy on Result Based Financing instrument, a strategic Environmental and Social Assessment Study (SESA) shall be conducted for the Program. The SESA focus on the country system and environmental and social procedure (especially related to the land acquisition) to determine whether the existing laws, regulations and procedures are sufficient and adequate to manage and mitigate the impacts of the project and/or identify areas for improvement. Findings of this SESA study will be subsequently factored into the overall integrated risk assessment and actions included in the Program Action Plan.

Chapter2 Program description

IRSP overall Program Objectives are aligned to the National Rural Sanitation Program (NRSP) and continuing the Sustainable Rural Sanitation Services Program (SRSSP)-WB that aims at expansion of sanitation services from 60% at 2022 to 100% at 2030.

Specifically, the IRSP objective is to provide integrated sanitation systems of "clusters" by collecting and treating wastewater generated rural areas in Upper Egypt, thus contributing to increased coverage of improved sanitation and clean environment for the populations living in these areas.

The IRSP will be implemented in rural Upper Egypt, known to be amongst the poorest and less served areas of Egypt in the governorate of Luxor in which sanitation coverage remains limited at a rate of 34% in urban areas and 5% in rural areas and is thus significantly below national average.

The duration of the Program is 5 years starting January 2020 till December 2024. The project will be funded as follow. The bulk of the Program financing will be used to finance Results Area 1 on Improved Sanitation Access, the remainder of the resources will be used for strengthening the performance and institutional capacities of WSCs (Results Area 2), and for strengthening the national institutional framework (Results Area 3).

Total Projected Program (IRSUE-Luxor) Financing - RBF Finance (million USD)		
Source	Amount	% of Total
Government	136.1	50.95%
Bank (ADB)	110.00	41.18%
Other Donors (RWSSI TF)	1.00	0.37%
Other Donors (USAID)	20.00	7.49%
Total Program Financing	278.77	100%

Table (2-1) Total Projected Program (IRSUE-Luxor) Financing - RBF Finance (million USD)

2.1 Program scope and DLIs

The Government of Egypt (GoE) in MEGA Rural Sanitation Program has identified three main results areas to achieve universal coverage. These areas, which will be adopted by the IRSP are as follow:

- Results Area 1: Improved Access to Rural Sanitation and Infrastructure Delivery (provide with access to improved sanitation facilities under the program, new functioning household connections made to working sanitation systems);

- Results Area 2: Improved Operational Systems and Practices of LCWW (Annual Performance Assessments for LCWW implemented, Procurement and financial management systems improved);

- Results Area 3: Strengthening National Sector Framework and inclusion under the main national rural sanitation program.

Following the Bank's RBF policy, a total of six Disbursement Linked Indicators (DLIs) extracted from the Results Frame, have been selected amongst the described indicators for leading the project disbursements (see table 2-1 below). DLIs are harmonized with NRSP indicators, and are similar to the ones used by the WB in their RforP project in Delta Egypt. DLIs are considered key milestones and essential achievements for the success of the project. Selected DLIs ensure a convenient cash flow during the project implementation to facilitate its implementation, as well as they are achievable during the given time frame.

3		Extensible (Yes/No)	Indicative amount allocated in million EUR
Results area 1 : Increasing access to integrated and improved sanitation system			
DLI# 1: At least 25,000 HH with new access to an improved working sanitation service in the area of intervention, of which at least 10% HH are in satellite villages	**DLI#1.1:** Approval of the Procurement Procedures Manual (PPM) by the LWSC's Board (Prior Result)	No	8
	DLI# 1.2- 1.4, 1.7-1.8: At least 25,000 HH in the area of intervention connected to sanitation service	Yes	50
	DLI# 1.5-1.6: At least 02 new WWTP operating in the area of intervention in compliance with Egyptian Law #48	Yes	16
DLI#2: Annual Performance-based Capital Transfer (PBCT) from MHUCC to LWSC		Yes	20
Results area 2 : Building capacities for improved operational system and practices of LWSC			
DLI#3: LWSC Annual Performance Assessments successfully scored above required threshold	**DLI#3.1** Performance Improvement Action Plans (PIAPs) prepared for LWSC (Luxor)	Yes	4
	DLI #3.2: The LWSC has achieved the minimum threshold APA scores.	Yes	12
Total Result Area 1&2			110
Results area 3: Strengthening National Sector institutional Framework			
Indirectly linked to NRSP		NO	-

Table (2-2)- List of Disbursement Linked Indicators

2.2 Program components

The IRSP will include physical infrastructure and institutional and capacity building components:

- the infrastructure component will be based on an integrated sanitation approach system that includes transmission lines, pumping stations, treatment plants, and house connections,
- The institutional strengthening component is aimed at improving performance and sustainability of the system.
- In addition to infrastructure, the IRSP will also help the Government to leverage resources from the on-going collaboration between the WSC and Non-Governmental Organization to cover for the poorest households their connection.

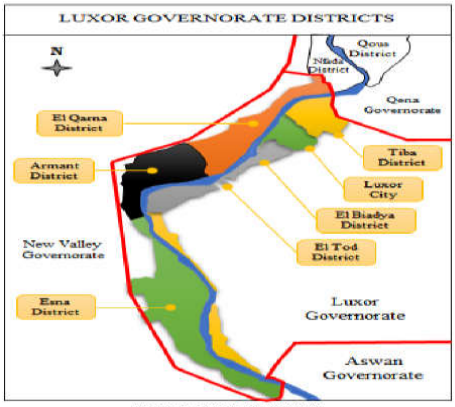

Figure 2-1 Luxor Governorate

Figure (2-1) Luxor Governorate Districts

With regard to the physical infrastructures, the Program will focus on providing services of the integrated sanitation system in the Luxor Governorate. Luxor governorate is located along the Nile Valley and its desert fringe in Upper Egypt. It is surrounded from the North with Qena governorate, at the South is Aswan governorate, at the West is El-Wadi El Gadeed governorate and Red Sea governorate at the East. Luxor is located 635 km south of Cairo. It covers an area of about 416 km². It consists of five administrative localities (Districts and major cities); Luxor, Teba, Aramant, Esna and El Karna shown in the figure.

The idea of clusters is to connect several villages to a "regional" wastewater treatment plant among these clusters. It will be centralized systems that include house connections, transmission lines, pumping stations and treatment plants. These clusters were pre-selected based on a comprehensive set of technical and socioeconomic factors that include:

- Presence of existing sewers.
- Structural constraints such as existing canals/Nile or drains, contribution to protecting the main canals in each of the governorates.
- Population density.
- Water quality.
- Prevalence of health conditions linked to contaminated water.
- Water consumption rates.
- Availability of land for new WWTPs or excess capacity/expansion, and possibility in existing WWTPs.

Applying these technical and socio-economic factors, mainly in Esna and El-Tod Districts, two clusters have been selected with coverage under this operation with total of 11 main villages and and their related satellites, whereby satellite villages refers to a gathering of few houses in remote areas. It is important to note that Esna is the most populated district in the governorate of Luxor. The intended operation is planned to provide services to around 171,000 (2019) people in the clusters of Keman El Matana & El Dabayba/El Tod.

The program result areas and geographic scope are as follow:

• Results Area 1: Increasing access to integrated and improved sanitation system: The activities under this component will involve collecting, transporting, treating and disposal of wastewater from household level to discharge level.

• GoE vision for the sector put special emphasis in the access to basic infrastructure for the poorest. The Bank's, through the RWSSI Fund, will contribute to establish a pilot mechanism to facilitate access to sanitation sewerage to the identified 1,500 poorest households (5-7) % of the total households (about 1500 households).

• Results area 2: Building capacities for improved operational system and practices of Luxor WSCs (LWSC). The activities under this result area aims to strengthen the capacities and improving existing mechanisms to increase the Bank's program project sustainability and maximize its impacts. It involves a series of activities interconnected that enhance the technical, environmental, financial and social sustainability of the intervention. A capacity development plan will be designed and implemented, benefitting LWSC staff, including women.

• Results area 3: Strengthening National Sector Institutional Framework. A technical assistance program is considered to help the PMU, which will be also strengthened with Bank's program-dedicated staff, to overcome identified gaps in planning, procurement, program management, engineering and E&S. Feasibility studies, supported in part by RWSSI TF, will be conducted to target additional rural population in the Governorate.

EXPECTED RESULTS	**GEOGRAPHIC SCOPE**
Results Area 1: Increased access to integrated and improved sanitation system	
At least 25,000 HH with new access to an improved working sanitation service in the area of intervention, of which at least 10% HH are in satellite villages	Rural areas in Luxor Governorate of which 11 villages and 65 satellites localities, served by sewerage network, and 75 satellites villages, served by trucks and its related satellites.
About 1,500 poor households connected to the sewerage system	Rural areas in Luxor Governorate
60% of Luxor rural population connected to sanitation systems	Rural areas in Luxor Governorate
02 WWTPs designed and constructed	Rural areas in Luxor Governorate
Results Area 2: Capacity built for improved operational system and practices of Luxor WSC	
Capacity building plan (benefiting at least 30% of women) implemented	Rural areas in Luxor Governorate
100% of procurement under the programme follow established procurement procedures as per revised and approved PPM	Luxor Governorate
Annual Transfer of Performance-based Capital Grants (PBCG) by MHUUC to LWSC	Luxor Governorate
Standard set of Environmental and social clauses for construction activities developed	Luxor Governorate
LWSC Citizen engagement & Corporate Social Responsibility platform established and active	Luxor Governorate
Gender informed public and environmental health awareness programs to strengthen community engagement conducted	15 villages in the Luxor Governorate
Results Area 3: Strengthened National Sector Institutional Framework	
PIU operational and provided with appropriate staff	LWSC

Approval of the Procurement Procedures Manual (PPM) by the Luxor WSC's Board.	LWSC
sludge management plan for Luxor governorate	LWSC
Improved enabling environment for more sustainable rural sanitation services	LWSC

Table (2-3) : Result Areas and Geographic scope

NO.	GOVERN.	DISTRICT	CLUSTER	VILLAGE
1	Luxor	Esna	Keman El Matana	**Keman El Matana**
2				**El Ghoraira**
3				**Tafnees**
4				**Asfon**
5				**Halfa**
6			El Dabayba	**El Dabayba**
7				**El Shaghb**
8				**El Maala**
9		El Tod		**El Odysat Bahary**
10				**El Odysat Qeply**
11				**El Tod Gharb**

Table (2-4): Villages included in the Result area 1 scope

2.3 Program physical interventions (sub-projects)

The project will be operated by Luxor Water and Wastewater Company and it will involve providing sewerage collection and treatment services for two clusters [1]:

- First cluster keman el-matana includes 5 villages (keman el-matana – Asfon – Tafnes – El-ghoraira – Halfa).
- Second cluster El-dbabya/El-Tod includes 6 villages (el-dbabya – el-shaghab – el-tod gharb – el-odysat bahary – el-maala –el-odysat qebly).

Sewage is collected in two clusters through a network of gravity sewers which ends at the pump station (PS). The collected sewage is pumped through the force-mains (FMs) - pressurized pipeline – to Keman el-matana WWTP & El-tod WWTP.

2.3.1 Wastewater Treatment Plants (WWTP)

The collected wastewater from keman el-matana cluster will be pumped to the keman el-matana WWTP with available total area of 250 Feddan (105 ha) and with total capacity in 2040 of 22,000 m^3/day.

[1] List subject to changes after negotiation

The collected wastewater from El-Dbabya cluster will be pumped to the El-Tod WWTP with available total area of 375 Feddan (157,5 ha) and with total capacity on 2040 of 13,000 m^3/day.

Both WWTP lands are owned by the governorate and are retained for the WWTPs construction.

Due to the availability of large areas of desert land in Upper Egypt governorates, in addition to the lack of skilled workers with experience in operating and maintaining other technologies, the oxidation ponds could be the best solution for treatment in the villages under study. However, due to the potential of high algae concentration in oxidation ponds effluent in the project zone, using one of the mechanical treatment plant such as activated sludge process or biological filter can be another option. System selection can be decided later by the PMCF in collaboration with PMU.

The treated effluent from Keman El-matana WWTP will be drainage to the El-Qatea drain and the treated effluent from El-Tod WWTP will be drainage to the El-Salamya drain.

The construction activities of the WWTP will involve conventional activities related to the construction of reinforced concrete components. The activities will involve excavation to the required level, isolate the ponds by polyethylene sheets, construction of needed service buildings, and other needed civic works. The activities will also involve the installment of pipelines and pumps, special pieces and valves, connection welding, and completing all the electrical work needed. The construction activities will be located within the allocated site.

During the operational phase, the sludge is expected to be collected from the anaerobic ponds every 3-5 years. The sludge shall be left in the sun until it is dry and then loaded into containers and transported to the nearest landfill or can be used in agriculture lands if sludge analysis showed that it is safe and free from pathogenic bacteria.

2.3.2 Pump Stations and Force Mains

The project will involve the construction and operation of 9 PSs in cluster El-dbabya/El-Tod & 7 PSs in cluster Keman el-matana.

The proposed PS site comprise the following components:

- The inlet pipeline, which collecting the sewage from the villages' houses to the wet well of the pump station from where the inlet sewage is discharged and pumped.
- The force main line output, which transfers the sewage to the following village within the cluster of concern.
- The Flow measuring devices.
- A generator unit supplied with a fuel storage tank, a guard room and a warehouse, and is surrounded with a fence of a height of around 2m above ground.

The construction activities of the PSs will involve conventional activities related to the construction of reinforced concrete components. The construction activities will be located within the allocated site. Most of the lands are owned by householders and first agreements have been signed between the governorate and the land owners on land donation for pump stations.

Pump station	Available area (m2)	Pump station	Available area (m^2)
El – Tod Gharb	625	El – Maala Sharq	400
El – Odysat Bahry	900	Keman El-matana Main	1575
El – Odysat Qebly	600	Keman El-matana Secondary	750
El – Maala Gharb	1225	Tafnes Main	400
El – Dbabya Gharb	621	Tafnes Secondary	625
El – Shaghab Gharb	625	Halfa	1500
El – Dabyba Sharq	360	Asfon	975
El – Shaghab Sharq	800	El-Ghoraira	385

Table (2-5): Available area for each proposed pump station location

2.3.3 Gravity Sewers and House Connection System

The gravity sewers and house collection system is a network of pipelines, which connects individual houses to transfer the raw sewage to the village's PS. From there the force-mains (FMs) will transfer the collected amount to the next village and/or to the central WWTP. The operation of the gravity sewers involves the movement of sewage by gravity under its own weight starting at the individual houses and ending at the PSs. Regular Maintenance activities are expected for the manholes in order to prevent blocking and in order to increase the efficiency of the gravity sewers. The construction activities of the gravity sewers will involve excavation, placing pipelines, connecting pipelines, and then surfacing. The construction site will be mainly within the road network.

2.4 Institutional framework in place

In the Program context, the main institutional players in the water and sanitation sector are:

- The Ministry of Housing, Utilities and Urban Development (MOHUUD) is in charge of the water and sanitation sector and is primarily responsible of policy and strategy formulation for water and wastewater and oversees a number of publicly-owned entities responsible for works planning and implementation:
- The National Organization for Potable Water and Sanitary Drainage (NOPWASD) is the government agency under MOHUUD responsible for the planning, design and implementation of water and wastewater infrastructure throughout the country, with the exception of Greater Cairo and Alexandria.

- The Holding Company for Water and Wastewater (HCWW) is the owner of the 25 subsidiary WSC. It was established by a Presidential Decree to purify, desalinate, distribute and sell drinking water, and collect, treat and safely dispose of wastewater.
- Water and Sanitation Companies (WSC) are responsible for service delivery of water and wastewater in their respective Governorates, including construction of water and wastewater networks and operation and maintenance (O&M) of water supply and wastewater facilities.
- The Cairo and Alexandria Water and Wastewater Projects Organisations (CAPWO) is responsible for planning and implementation in Cairo and Alexandria;
- New Urban Communities Authority (NUCA) responsible for infrastructure development in the new cities.
- The Egyptian Water and Wastewater Regulatory Agency (EWRA) responsible to regulate potable water, wastewater and ensure consumer protection.

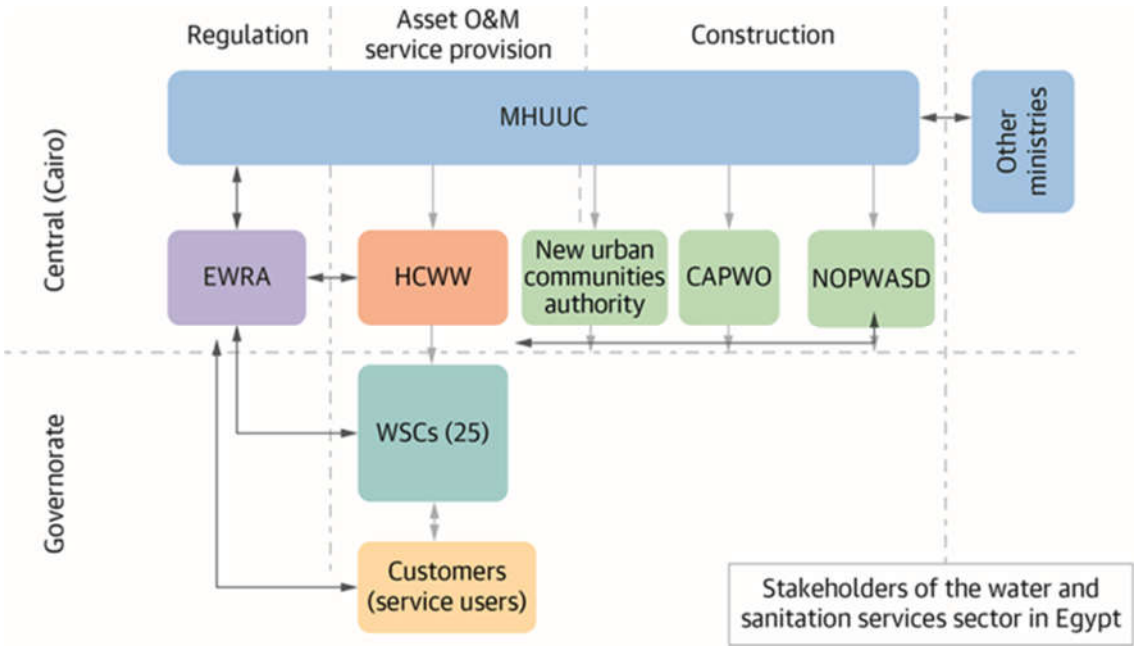

Figure (2-2) Egypt's Water and Sanitation Institutional set up

Function	Institution
Policy and strategy formulation	Ministry of Housing, Utilities and Urban Communities (MHUUC)
Planning	Ministry of Housing, Utilities and Urban Communities (MHUUC)
Implementation	National Organization for Potable Water and Sanitary Drainage (NOPWASD)
Service provision	Water and Sanitation Companies (WSC), supported by Holding Company for Water and Wastewater (HCWW)
Regulation	Egyptian Water Regulatory Authority (EWRA)
Monitoring	WSC, HCWW, EWRA, Ministry of Health

Table: (2-6) List of Key institutions

The institutional arrangement set up under the Mega Program (SRSSP) include a PMU at the MHUUC, and LWSC. The current arrangement is as follow:

- A Sector Coordination Inter-ministerial Steering Committee, with major stakeholders (the Holding Company for Water and Wastewater, Ministry of Health, Ministry of Water Resources and Irrigation, Ministry of Environment, Ministry of International Cooperation, and Ministry of Finance) provides an overall guidance on the Program.
- The Program Management Unit (PMU) of The Ministry of Housing, Utilities, and Urban Communities (MHUUC), established in 2015 are representing the Executive Agency , oversight and coordinating functions as well as strategic and policy guidance to the SRPP.

2.4.1 Country Water Program achievements and challenges

The sanitation situation is of particular concern in Egypt due to high population density, shallow groundwater levels, and the discharge of untreated sewage directly into the water system. As a result of the high water table and the discharge of untreated wastewater, Egypt's scarce freshwater resources are increasingly polluted, putting the health of millions at risk.

Despite significant Government and donor financing for rural sanitation service improvements, progress has been far below expectations between 2007 and 2015.

Total Investments was USD 4.6 billion have been directed at sanitation infrastructure and whilst these have made some progress, they have generally suffered from slow implementation, inflated construction costs and poor quality and poor coordination, whilst the use of technologies have resulted in high operating and maintenance costs relative to service needs. The limited success of past investments can be attributed to the following limitations: (*Assessment of country-level outcomes for World Bank Water Global Practice (April 2018)*

- The separation of responsibilities for investment planning and implementation (NOPWASD) from O&M of assets (WSCs) resulting in inappropriate choice of investment projects with limited attention paid to maintenance and limited accountability on the part of WSCs, in terms of utilizing investments to enhance the quality and efficiency of sanitation services.
- Weak accountability to customers, due to the combination of i) limited autonomy of service providers to undertake the necessary investment and operational decisions to meet service needs, ii) inadequate tariff structure with limited ability to protect the needs of the poor whilst providing sufficient revenue, iii) limited alignment between government transfers to service providers and well-defined performance criteria, iv) insufficient direct mechanisms for engaging customers in the

improvement of services through feedback mechanisms such as citizen report cards and direct partnerships with communities in service provision; v) limited provision of verifiable performance information to the public as a basis for determining comparative, overall performance and improvements.

- Low water and wastewater tariffs have jeopardized the financial sustainability of the sector and have had an impact on the performance of WSCs. With water tariffs among the lowest in the world, water and sanitation operations and investments are funded entirely through the Government budget. Low tariffs and inadequate financial incentives for reducing operational and maintenance costs and capital expenditure prevent the financial sustainability of the WSCs' services and the sporadic tariff increases implemented since 2004 have been marginal and on a very low base.
- Insufficient formal mechanisms for assessing the quality of service in the water and sanitation sector have further sustained the poor performance of the sector. EWRA has Ad hoc partnerships with communities and civil society groups in meeting service needs.
- Between 2015 and 2017, Water and Sanitation Programme -funding was invested in laying the groundwork required to reform institutions before implementation could take off. Activities focused on the development of country systems in three selected priority areas, agreed between the WB and the GoE: citizen engagement, procurement and Monitoring and Evaluation (M&E) and achieved a number of significant results, to date the following achievements are to be noted:

✓ Procurement: the support focused on improving the regulatory framework and led to the development of a Procurement Procedures Manual, a complete set of standard bidding documents a bidders' complain management system and training of core teams of procurement practitioners, all of which have operated a cultural change in the outlook for both bidders and the contracting authorities towards procurement.

✓ Citizen engagement: the support sought to improve the WSCs mechanisms to engage citizens and strengthen direct beneficiary feedback and led to the development of standard operating procedures for land acquisition (Land SOP), a Ministerial decree establishing an inter-Ministerial Committee in charge of citizen engagement related activities; project related Grievance Redress Mechanism (GRM) guidelines and community engagement guidelines; which contributed to embedding participatory planning and improve GRM's functioning.

✓ Monitoring and Evaluation: the support sought through the PMU to assess the current M&E systems in place and identify key indicators to gauge SRSSP progress and initiate the development of a unified M&E sector system

SRSSP has been successful in leading the decentralization process towards local utilities and demonstrating their ability to deliver capital programs and handle direct fund transfers. With active support from WSP, the program has strengthened the operational performance of local utilities and the Ministry's ability to coordinate the sector and expand the reform. Given the WSCs mandate in water and sanitation services in both rural and urban areas, the reform went beyond the program's scope to encompass the entire water sector.

It is to be noted that, under the Services Program (SRSSP)-WB the following DLIs related to Results Area 3 on Strengthen National Sector Framework identified under the Services Program (SRSSP)-WB are currently under achievement or achieved :

- Preparation and approval of a new national tariff structure for water and sanitation services by MHUUC to allow for sustainable cost recovery

- Establishment of PMU and approval of a National Rural Sanitation Strategy by MHUUC
- Approval of Standard Operating Procedures for Land Acquisition under NRSP by MHUUC

Chapter 3 -Program Climatic, Environmental and Social Benefits, Risks, and Impacts

3.1 Environmental and social Benefits

The overall impact of the program is expected to be positive. The program will allow for adequately discharging and treating a considerable amount of sewage—according to the standards of Law 48/1982— which was currently being disposed into the soil.

In general, the proposed project has high positive impacts with potential little negative impacts. No sensitive habitats are located within the program areas and the risk on culturally valuable sites is low.

3.1.1 Environmental Benefits

With regard to the environmental sustainability, the program is expected to enhance the sustainability of watercourses by improving their quality, the sustainability of agriculture lands by alleviating the rising groundwater table problems, and improving the quality of irrigation water.

In addition to that, the main environmental benefits in IRSUE-Luxor program are:

- Diminishing the current problems related to sewage especially health problems
- Improving groundwater quality in most of the Bank's program areas through the prevention of sewage leaking into groundwater.
- Creating job opportunities for Labours and technicians.
- Provision of sewage service to a wide sector of the population
- Decreasing the odors and spread of insects significantly in the zone of intervention.

3.1.2 Social Benefits

With respect to the positive impacts, they can be summarized as follows:

- Economic saving at the household level. Significant budget at the household level is being dedicated to emptying tanks, repairing structures, and covering cost of health care treatment. The economic benefits of increasing property value (land and structures) and the savings on the households' expenditure are expected to far outweigh the households' contributions to the project (for example, contribution to land, the households' connection fees, and the surcharge on water consumption).
- Creating job opportunities for labors and technicians.
- Provision of sewage service to a wide sector of the population
- Decreasing the odors and spread of insects significantly in the project area.

Also, the project has several positive impacts on women and marginalized groups,

- The sanitation system will save women effort of carrying water and getting rid of it in the sewage trenches or on the streets.

- The improved health conditions especially among children will relief social burdens imposed upon women in this sense as they take care of sick children and elderly groups.

- Provision of sewage services will benefit mostly the poorest groups who suffer from financial burdens related to sewage trenches discharging. Poorest groups will also feel that the government is keen to improve their access to services.

- Childers will benefit from the project as they can take showers more often without worry of sewage trenches fullness.

3.2 Impact on climate conditions

- The climate screening system analysis of the project activities showed that the physical infrastructure are not vulnerable to climate change given that the project's area is in the desert zone, the category 3 was validated using the CSS (Climate Screening System).

- The preliminary data on the program do not indicate that the planned infrastructure (water sanitation plants, stations, etc.) can change traverse terrain and topography that may be vulnerable to climate change.

- Sewage collection and treatment is unlikely to increase humidity or have any effect on climate change. Changes in climate in such project and in semi-arid climate in country like Egypt are not expected and therefore, such project will not result in changing the natural phenomena, such as, sea-level rise, or changes in precipitation or in elevated sea-surface temperature.

- The main threat facing Egypt's water and sanitation supply is water scarcity, which takes root in a combination of fixed quota for access of Nile Water, growing demand from agriculture and a rising population. Water scarcity is a sensitive issue which is not yet translated in sector planning and design. There is no evidence suggesting that measures are in place to take this risk into account in sector planning and system design. GoE's approach to addressing water scarcity is primarily through increased water production through desalination. Parallel measures are also in place to increase reuse of treated wastewater to increase water availability for the irrigation, therefore, IRSUE-Luxor project will contribute in increasing the clean water availability.

3.3 Overall environmental and social impact screening

The following tables explain the overall screen of the Program's Environmental and Social Impacts that related to some potential risks.

Risk	Environmental impact screening	Social impact screening

Social and Environmental Effects	- The program will be implemented in two clusters in Luxor Governorate.
	- The program area is characterized as being highly populated.
	- PSs and new WWTPs will be constructed in the desert areas, whereas, the PSs will probably be built in the residential areas.
	- The overall impact of the program is expected to be positive. The program will allow for adequately discharging and treating considerable amount of sewage according to the standards of Law 48/82, which was before the program being inadequately collected and discharged to the soil.
	- There are some environmental risks and impacts. The main risks and impacts are:
	  - Change of land use at the footprints of the PSs and WWTPs;
	  - Risks of improper handling of sludge leading to impacts on public health; and contamination of receiving lands
	  - Risks of improper handling of solid wastes of the WWTPs leading to land contamination at receiving sites;
	  - Risk of discharging noncomplying effluent affecting receiving water;
	  - Risks to the safety of workers and neighbors of the WWTPs from handling chlorine, diesel, and lab chemicals;
	  - Risks on structural integrity of structures during dewatering operations;
	  - Risks of improper handling of chance find culturally valuable objects;
	  - Temporary impacts during construction.
	  - The risks of environmental effects are generally medium risks, except for the discharging noncomplying effluent risk which could be rated as major taking the existing situation into
		- The program will be targeting rural areas in the Upper Egypt.
		- The absence of appropriate sanitation systems in the targeting villages is putting tremendous health, economic, and psychological pressure on the rural families. Poor households are more vulnerable to the implications of a poor sewage system.
		- The program has a number of potential positive impacts that will help in improving the health and hygiene conditions of the targeted communities.
		- The program will contribute to better quality of life in the targeted communities and will bring major benefits to the vulnerable groups of women and children.
		- A number of potential negative impacts were detected. The most significant impacts are the ones related to land acquisition and the implications on the livelihoods of the families. In the meantime, a number of social risks were identified by the SESA; most importantly, the risk related to the poor management of land issues, the potential conflict among villages in cases of excluding villages, and the inability of poor families to afford the cost of the connection. However, the good news is that all the PS and WWTP land locations have

	consideration. According to the system assessment and gap identification, a mitigation process has been proposed to minimize the above risks. - Given that the footprint of PS facilities is relatively small, the risk is rated as medium - Underground water in the program area suffers from high pollution pressure. Accordingly, the program will positively impact underground water and the soil in the program areas. - No natural habitats exist in the program area. The program governorate is known for being rich in Historical valuable sites. The risks of affecting such sites are low, as described before. However, measures need to be taken to adequately manage chance finds.	been allocated for the project before starting the project.

Table (3-1): Overall screen of the Program's Environmental and Social Impacts

Risk	Environmental impact screening	Social impact screening
Program Strategy and Sustainability	- The program has been designed according to the National Sanitation Strategy and master plans. The program is considered one of the urgent development needs identified by the GoE in rural areas. - Deprived of adequate sanitation services, where most upstream pollution pressures accumulate, leading to poor groundwater quality and high groundwater levels that cause considerable environmental degradation. The program will explicitly contribute to alleviating these environmental pressures. - The program will help in maintaining the sustainability of groundwater and lands that suffer from a rising groundwater table which will contribute to preserving such resources for future generations. - There are some challenges to ensuring that the highest environmental benefits of the program are achieved—mainly the unserved remote communities. - Generally, these sustainability risks are rated as medium impact	- The sustainability of the program is highly dependent on a sense of ownership and communities' commitment to support the new project. - A number of measures were identified under the DLIs to ensure that communities are engaged in the process. - Guidelines for community engagement and consultation shall be developed and applied. - This will set the standards to allow for an engaging and inclusive system for all stakeholders during various project stages. It will also set the rules related to the various methods for engaging various groups (including the poor, women, and the elderly). - A pro-poor strategy shall be developed to ensure that poor households are well integrated within the program and have equitable access to the benefits. - Gender mainstreaming and engagement of women shall be ensured across the measures. Efforts should always be made to ensure that the measures are designed in a manner that ensure that there is no limitation for women to fully benefit from the program and women are not more vulnerable to negative impacts.

Table (3-2): Overall screen of the Program's Strategy and Sustainability

Risk	Environmental risk screening	Social risk screening
Institutional Complexity and Capacity	- The institutional set-up for the management of environmental issues is already included in the organizational structure of the LWSC through the Laboratories, and Quality Control. - The HCWW Environmental Department is providing support to the LWSC and the PMU will also provide support to the LWSC. All these bodies are within the MoHUUD and the system used to operate without complexity. - Adding the PMU is not expected to add a complexity layer, but rather technical support through the environmental expert of the PMU. - There are also risk of poor quality of work and delays due to risk of long bureaucratic procedures and approval processes at LWSC and due to some capacity limitations with regard to available staff and equipment to monitor environmental performance of the operation. - The result area 2 includes measures to strengthen the capacity of the LWSC to bridge the gaps in the current system through given support by the PMU, HCWW, and PMCF. - The institutional risk, given the existing conditions, is moderate; but the action plan measures shall be designed to minimize those risks.	The LWSC will play a lead role in the implementation of the project. The LWSC have a good role to play in reaching out to communities and in managing complaints related to O&M. However, the current mandates of the LWSC are largely focused on O&M. The LWSC has limitations in capacity when it comes to issues related to consultation, and grievance handling. However, the LWSC has made great effort in the land acquisition of the PS and WWTP even before the project starting. All the land acquisition records for the PSs and WWTPs are shown in the annex.

Table (3 -3): Overall screen of the Program's Institutional Complexity and Capacity

Risk	Environmental risk screening	Social risk screening
Reputational and Political Risks Context	There are no governance or corruption risks associated with the environmental aspects of the program. Rural sanitation is known to be a priority and there is no known environmental controversy about the government program The only political environmental risk is the possibility of modifying the effluent standards and making them more stringent, which might require review of the WWTPs under the program and their improvement to comply with more stringent legal requirements.	

Table (3 -4): Overall screen of the Program's Reputational and Political Risks Context

Risk	Environmental risk screening	Social risk screening
Overall Assessment	The assessment indicates that the program does not include Category-1-type activities. Accordingly, the RBF instrument is suitable for financing the program. The overall environmental risk for the program is medium. The implementation of the recommended mitigation process would effectively minimize the risk.	The program has medium social risks and the implementation of the recommended mitigation process would effectively minimize the risk.

Table (3 -5): Overall Assessment

3.4 Potential Environmental and social risks and mitigation actions

With the respect to environmental aspects of the program, there are no potential for governance or corruption risks associated with the program. The overall environmental risks can be rated as Moderate and the overall social risks can be rated as Moderate as well.

The implementation of the program will help in alleviating the negative impacts by providing sanitation services which are in high demand by the poor rural communities of the targeted areas in Esna district, Luxor governorate. The program is expected to help local communities attain a number of benefits and positive returns.

The project will entail land acquisition for constructing the PSs and the WWTPs. While the WWTPs lands are state owned areas, most of the PSs lands in the project are still in the process to be as state owned areas. If not handled carefully, land acquisition may have serious impacts on landowners and land users. At this stage, the LWSC staff is working closely with the community members to finalize this issue, and the methods to mitigate the impacts. The main related risks identified are:

1. *Limited capacities of the WSCs to manage land issues.* The LWSC probably does not have sufficient experience and capacity to manage land acquisition.
2. *Potential delay in the construction works as a result of land acquisition.* Securing land has proved to be a key bottleneck for a majority of the infrastructure projects. Sanitation projects are not exempt from the challenge and risk of securing land. Sometimes the process of land acquisition for the treatment plants and the PSs involves lengthy steps that usually take longer than expected.
3. Risk of poor management of the temporary impacts related to setting up construction camps and other potential activities that likely result in temporary disturbance to the use of land (for example, occupying land temporarily) or damage to land-based assets (for example, damaging crops). The common practice of the WSCs is to assign the responsibility of handling such impacts to the contractors. In several cases, the poor quality of the contractors' performance along with weak supervision from the WSC increase the potential risk of leaving affected persons from these impacts without fair compensation.
4. Risk of damages associated with construction activities. The operations of digging machinery in narrow streets of villages may result in substantial risk to the fragile houses and other structures. In the cases where the measures are not explicitly indicated in the contract and in cases of weaknesses in the supervisory role over the contactor, the potential risk from such cases may escalate.
5. Risk of social tensions as a result of exclusion of certain villages especially small ones (ezba or Naga). For multiple technical and financial reasons, certain villages might be left behind without benefiting from the project. The risk emerges if the excluded villages are located near other villages that will be receiving the service. The previous experience (such as in ISSIP 1 project) demonstrated the risk of leaving communities behind and how this risk might escalate to create social unrest and to affect the targeted villages (for example, by preventing the contractors from work). Weak communication with those unserved communities, including communicating the selection criteria, contributes to a deeper sense of anger. The risk in such cases can affect the time schedule of the contractors working on the ground in other villages and resulted in drastic delay in the project delivery. In the IRSUE-Luxor program, the villages that are not included in the program will need to involve the community consultation group with the people in these villages to have their satisfaction in the program and to explain their involvement in any future project in the area and to show them that the sewage system in the current program is designed based on their involvement in the future (in phase 2 period). Also, the people in these villages shall be explained that the priority of the workforce in the current project will be sourced from local communities including them.

On the impacts side, the construction phase is expected to generate a number of local job opportunities for the villagers who can engage with contractors in various activities associated with the construction phase.

Actions to Address Identified Social Risks and Gaps

- Developing a Standardized Approach for Land Acquisition which was already prepared and published in the mega project.
- Enhancing the System for ongoing consultation with stakeholders and for Engaging with Communities and Addressing Social Risks.
- Training and capacity building will be key prerequisites to enable the assigned teams of the company to carry out their responsibilities as planned.

E&S categorization of the Program

The program will be categorized 2 (medium impact and it includes civil works) and shall not include any potential category 1 sub-project/component. Within the context of Egypt, the largest WWTP (El Tod WWTP) within the program boundaries is 32,000 m^3 per day on year 2060, which is explicitly small compared to many large WWTPs in the country with capacities reaching 2 million m^3 per day.

3.5 Environmental and Social Impacts During the construction and operation phases

The current section includes the assessment of the social and environmental impacts of the different components of the project in Luxor governorate during the construction and operation phases. The project's components covered in the Environmental assessment include:

1. House connections and gravity sewers.
2. PSs including all sub-components.
3. FMs.
4. Central WWTPs including all sub-components.

3.5.1 Environmental and social impact assessment methodology:

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

1. Solid hazardous and non-hazardous waste generation.
2. Liquid waste generation.
3. Development of on-site worker's/staff workshops, offices and housing units.

The key receptors which the Bank has considered include:

1) Atmosphere (air quality and ambient noise)

2) Soil (soil quality, erosion, landscape)

3) Water (water quality and resource consumption)

4) Biological environment (Flora and Fauna)

5) Human environment (Occupational health & safety, Community safety, Visual impacts, Cultural heritage and Archaeology impacts, and the Socio-economic and Health impacts).

The environmental impact assessment methodology that the Bank has adopted encompasses of a semi-quantitative assessment that considers the following:

- Probability of the impacts.
- Spatial and temporal scale.
- Intensity of the impacts (which encompasses the sensitivity of receptors, pathway of influence and the reversibility nature of the impact).
- The proposed mitigation and monitoring measurements are explained in chapter 10.

The social impacts were assessed on several levels to provide accurate results about the project impacts, available alternatives, appropriate mitigation measures necessary for reducing the negative impacts and maximizing potential positive impacts. These impacts were classified into two types: direct or indirect impacts and short or long-term impacts. Assessment of impacts is divided into impacts during construction and operation phases.

Although it is difficult to calculate socio-economic impacts in a quantitative method, but assessment was conducted based on several indicators that can be monitored as follows:

Project Component	Time of impact	Type of impact	Level of impact	Sensitivity of recipient	Duration of impact	Scope of impact
Impact	During construction	Negative -	Direct	Children	Short term	Limited
				Youth		Moderate
	During operation	Positive +	In direct	Elderly	Long term	High
				Women		

Table (6-6): Impact indicators during the construction and operation

3.5.2 Impacts of the construction phase

3.5.2.1 Environmental Impacts

Positive Impacts

No significant positive environmental impacts are expected during construction. All positive environmental impacts will be fulfilled after the operating the project.

Negative Impacts

Noise Impacts

The construction/installation of the different components of the project (WWTP, FMs, PSs, gravity sewers and house connections) will include the activities listed below:

- Preparation and leveling of the land.
- Excavation works to the required depth for the trenches needed to install the gravity sewers and FMs and also for some of the components of the central WWTP and PSs such as the sumps and ponds/reactors. It should be noted that most of the upper soil layer of the selected roads are composed of compacted silt-clay or sand and that the gravity sewers are a shallow system and will be installed in the middle of the roads.
- Trench preparation following excavation including leveling, constructing the pipe foundation, and welding/connecting the pipes.
- Installation of manholes and catch basins (in the paved streets) for rainwater collection.
- Construction of Reinforced concrete elements and other civil works.
- Installation of cranes, steel bridges, pumps and other electrical equipment.

Sources of noise emissions

Various mechanical/electrical equipment, will be needed during the construction activities. These include bulldozers, trucks, pavers, and other equipment. The operation of this equipment is the main potential source of noise emissions during the construction and decommissioning phases.

The vulnerable groups who are susceptible to the construction noise are the following:

- Onsite Workers; who are the most exposed to the highest noise levels generated from different construction activities due to their proximity to the noise sources.
- Neighboring communities and other sensitive receptors (such as students at schools and other educational institutes, patients at hospitals, etc.).

Noise Impact Significance

Construction of the WWTP : During the construction of the wastewater treatment plant, the level of noise diffused from the station will depend on the source of noise emissions and the most affected sites will be the location of the station itself. But this effect will be intermittent and will change / decrease with progress in construction activities. Furthermore, in addition to the location of the station at least 500 meters from the nearest village, the effect of the noise due to the construction of the plant should be considered of Minor significance.

Construction of the PSs: The noise level diffused from the pump station will depend on the source of the noise emissions and the most affected sites will be the location of the pump station itself and also the nearest receiver of the station. Therefore, the effect will be considerable. But this effect will be intermittent and will change / decrease with progress in construction activities. Furthermore, the effect of noise due to the construction of the pump station should be considered of Moderate significance.

Construction of gravity sewers and FMs : It is expected that the noise generated during the construction of gravity sewers would exceed the allowable 50dB because the construction activities are actually being performed in the middle of the roads opposing the houses (around 10m distance). However, the construction activities for the gravity sewers are expected to last for a short period of time in front of each house and/or school. This impact should be considered of Moderate significance due to the potential high noise levels.

The activities involved in the installation of the FMs are similar to those of the gravity sewers and should also be considered of Moderate significance.

The Table below shows the results of the evaluation of the construction noise impacts of the main project's components (WWTP, PS, Gravity sewers and FMs)

Impact parameters					
Noise Impacts due to the construction of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Gravity sewers and FM	1	1	3	3	**9**
PS	1	3	2	3	**18**
WWTP	**1**	**2**	**1**	**2**	**4**

Table (3-7): construction noise impacts

Air Quality Impacts

Besides the noise generated during the construction of the different components of the project air quality at both the construction site and at the nearest receptors could be affected due to the following:

- Dust emissions.
- Exhaust of power generators and vehicles transferring the raw materials and/or those disposing the excavated soil and construction waste.
- Exhaust of construction equipment.

The following air pollutants are foreseeable for most of the construction activities:

- Fugitive dust emissions (PM10, PM2.5)
- NO_x and SO_x
- CO in case of old motors

Air Quality Impact Significance.

During the construction of gravity sewers and FMs, dust emissions will negatively impact ambient air quality. This is particularly significant during the excavation activities required for installing the gravity sewers and FMs. These activities will be in close proximity to the houses as indicated before (around 10m away). The impact will be therefore disturbing; however, it is of a temporary nature– digging activities are expected to last from one to two days in front of each house. The problem of dust emissions might arise from the storage of spoil until being lifted and transferred to the designated disposal sites.

Exhaust of trucks or equipment will have negligible or very low impact, since using those trucks and equipment will be intermittent and expected to be only during the day.

The air quality impacts due to the construction of gravity sewers and FMs should be considered of Minor significance

During the construction of the central WWTP and PSs, excavation activities will be mainly limited to the site, which will have a lower impact as compared to the excavation required during the construction of gravity sewers and FMs.

The construction of the WWTP will last around 18 months. During this period, trucks bringing raw materials and those transferring spoil and construction waste will be moving to and out of the site on a

regular basis, thus affecting the receptors exposed to the roads leading to the WWTP site. However, this impact will be of temporary and intermittent nature.

The air quality impacts due to the construction of the WWTP and PSs should be also considered of Minor significance.

The Table below shows the evaluation of the air quality impacts.

Impact parameters					
Air Quality Impacts due to the construction of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Gravity sewers and FM	1	1	2	3	**6**
WWTP & PS	**1**	**2**	**1**	**3**	**6**

Table (3-8): air quality impacts

Soil and groundwater Impacts

Typical construction activities may result in soil and groundwater contamination due to the following:

- Uncontrolled disposal of hazardous liquids such as spent oils, paints, or any other chemicals/additives used in concrete making and finishing works.
- Leaching of solid wastes which are randomly disposed of.
- Soil erosion.
- Soil compaction due to heavy machinery use.
- Loss of resources if the excavated soil is not segregated and reused as an alternative to transport and use of additional materials from outside the site.

Soil and groundwater Impact significance

During the construction of gravity sewers and FMs :The top soil layers will be excavated. Groundwater shall be encountered. Normally the excavated soil will be filled back in the trench thus minimizing the level of disturbance and/or the loss of some soil amounts as waste. The quality of the soil and groundwater will also be affected considering the large spatial context of the gravity sewers and FMs network, if special controls related to waste management were not taken into accounts.

In general, the soil and groundwater impacts during the construction of the gravity sewers and FMs should be considered of Moderate significance and will be controlled by applying the mitigation measures related to waste management and by maximizing the reuse of the excavated soil.

During the construction of the WWTPs and PSs : Similar to the construction of the gravity sewers and FMs but only limited to the PS and WWTP sites, the impacts related to the soil and groundwater

quality and loss of resources will take place during the excavation works needed for the construction of some components of the PSs and WWTP

In general, the soil and groundwater impacts during the construction of the WWTP and PSs should be considered of Minor significance and will be controlled by applying the mitigation measures related to waste management and by maximizing the reuse of the excavated soil.

Impact parameters					
Soil and Groundwater Impacts due to the construction of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Gravity sewers and FM	1	1	3	3	**9**
WWTP & PS	**1**	**1**	**2**	**3**	**6**

Table (3-9): Soil and Groundwater Impacts

Water Quality Impacts

During the construction of gravity sewers and FMs : The planned routing for the gravity sewers and FMs will involve several crossings under some canals and drains. Dumping any of the excavated soil and/or construction wastes in the water stream will have a negative impact on the flow as well as the quality of the water. The Water Quality impacts during the construction of the gravity sewers and FMs should be considered of Moderate significance and will be controlled by applying the mitigation measures related to waste management.

During the construction of the WWTPs and PSs:No effects are expected during the pump station construction. But there is a potential risk of contaminating nearby waterways during the construction of the WWTP. Impacts on water quality during the construction of a wastewater treatment plant should be considered of Moderate significance.

Impact parameters					
Water Quality Impacts due to the construction of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Gravity sewers and FM	1	1	3	3	**9**
WWTP	**1**	**1**	**2**	**3**	**6**

Table (3-10): Water Quality Impacts

Flora and Fauna Impacts

The Consultant has conducted baseline surveys in order to assess the presence and distribution of ecologically sensitive species and habitats along the proposed project's sites. Consequently, it was concluded that no endangered faunal or floral species have been recorded at the project's areas. All recorded species are under the "Least Concern" category.

Flora and Fauna Impact significance

Although some faunal species of mammals, birds, reptiles and insects exist at the project's area, faunal impacts are not likely to be significant given the small scale of the development relative to the extent of similar intact habitats in the area. The evaluation of the impacts on fauna is illustrated in the Table below, and should be considered negative with Minor significance.

Flora related Impacts

The flora existing in the proposed sites for the WWTP and PS, as mentioned above, do not belong to the endangered species category. So the impact of the project's construction on the floral species should be considered on Minor significance.

Impact parameters					
Flora and Fauna Impacts due to the construction of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Gravity sewers and FM	1	2	1	4	**8**
WWTP & PS	**1**	**2**	**1**	**4**	**8**

Table (6-11): Flora and Fauna Impacts

Occupational health and safety impacts

Construction sites are considered the most potentially hazardous and accident-prone parts of any working environment. Excessive exposure to these construction site hazards exposes workers to injury and possible death. To prevent this, contractors should be aware of all possible dangers that can be encountered during normal business operations. According to the safety and health standards every employee shall have sound knowledge of their susceptibility to harm or injury in the workplace.

Occupational health and safety impact significance

Listed below are the main six construction site hazards identified by the Occupational Safety and Health Administration (OSHA), all of which will be encountered during the construction of the different components of the project.

1- Excavation and Trenching – OSHA has recognized excavation and trenching as the most hazardous construction site operation.

2- Falls – Falling from scaffolding over six feet or a fixed ladder over twenty feet is the most dangerous and common construction site hazard. The usual cause of this incident is slipping, tripping and using unstable ladders. There are many reasons for fall hazards and to eliminate such risks, employers must have a fall protection program as part of any overall workplace safety and health program.

3- Stairways and Ladder – According to OSHA's construction safety and health standards, stairways and ladders are important sources of injuries and fatalities among construction workers.

4- Scaffolding –The most potential risk of scaffolding is due to moving scaffold components; scaffold failure related to damage to its components; loss of the load; being struck by suspended materials; electrical shock; and improper set-up. Construction workers who assemble and dismantle scaffolding and work platforms at construction sites face the risk of serious injuries due to falls.

5- Use of Heavy Construction Equipment –The main causes of such accidents include: ground workers struck when a vehicle is backing up or changing direction; equipment rollovers that injure the operator; mechanics run over when brakes are not properly set; and ground workers crushed by falling equipment from backhoes, buckets, and other moving construction vehicles.

6- Electrical Hazards - Electricity is one of the greatest hazards to workers on site. Power line workers, electricians and electrical engineers work continuously work with electricity can face exposure to this hazard on a daily basis.

Due to the high probability of occurrence and the high risk involved, the occupational safety and health impacts during the construction of the WWTP should be considered of MAJOR significance and it should be considered of Moderate significance during the construction of PSs, gravity sewers and FMs due to the relatively lower risks involved. The impacts will be controlled to a large extent by applying the mitigation measures listed below.

Community Safety

- Excavation and Trenching – this is recognized as the most hazardous operation during the construction phase for the surrounding community, because most of the excavation will be performed in narrow streets which increase the probability of members of community falling into the trenches. The slurry/mud waste generated from the excavation would slip the passengers, the solid wastes generated would trip them. All these events increase the probability of falling and increase the danger of excavations operations.

The risks of excavation and trenching operation increase when they occur:

- Besides the railway line.
- On both sides of a covered canal.

Excavation and trenching could also affect the structural integrity of the village's houses, since many are old and weak.

- Electrical shock- Electricity is one of the greatest hazards to people passing by the construction site. Power cords will be used which may cause electrical shock if not well maintained and/or they were left hang out freely.

Visual impacts

During the construction of gravity sewers and FMs: Only temporary visual impacts will be caused during the construction of the gravity sewers and force mains, resulting mainly form the over ground storage of excavated spoil and raw materials (i.e. pipes, pipe connections, cement sacks, concrete mixers, construction wastes, etc.). However, due to the short period of exposure and reversibility nature of this impact, it should be considered of Minor significance.

During the construction of the central WWTP and PSs: During the construction of the central WWTP and PSs, the project would gradually change the aesthetics and landscape of the areas where the PSs and WWTP will be constructed. However, with regards to the WWTP it is located in a desert area so no visual impacts are foreseen. With regards to the PSs, The visual impact is low as the expected height of the different components of the PS is comparable with adjacent buildings. The visual impacts due to the construction of the WWTP and PSs should be considered of Minor significance. No mitigation measures are foreseen, expect constructing a temporary fence around the site until the construction of the concrete fence has been achieved.

Traffic Impacts and Difficulty of Access

During the construction of gravity sewers and FMs: The main impact on roads traffic will be during the installation of FMs/gravity sewers along, or crossing main and secondary roads. Longitudinal excavation will cause narrowing of the excavated road for relatively long period, while the lateral crossing of roads may cause blocking of the road, but for relatively short period, possibly few hours. The significance of the impact will be relatively higher with regards to main roads as compared with secondary ones. However, although the traffic density is relatively low, mainly used for pedestrian and field animals, the smaller width of the secondary roads will increase the significance of the impact. The blockage of villages' roads through excavation will cause access problems to pedestrians, and possibly to riders of animals and agriculture tractors. This access difficulty will have more impacts on elderly people, handicapped and children, who may make tedious long cycles before they reach their targeted locations.

The traffic impacts during the construction of the gravity sewers and FMs should be considered of Moderate significance. The EMP includes mitigation measures to be taken during construction to minimize such effects.

During the construction of the central WWTP and PSs :The construction activities will be mainly limited to the site. The traffic impacts might arise from the increase flow of traffic due to the transport of raw materials and/or the disposal the construction wastes. However, this impact is of temporary nature and the timing of said trips could be adjusted to avoid peak hours. The impact should be therefore considered of Minor significance.

Impacts related to Archaeology and cultural heritage

Luxor Governorate is well known by its rich in the archaeology and cultural heritage all over the world, however, the location of the proposed project does not include any archaeological sites, but due to that large area covered by the project may raises small possibilities for chance-finds of antiquity objects during excavation works. Finding such objects may, if not properly managed, risk their loss or damage during handling/storage in construction site.

Furthermore, the identification of antiquity sites by the Supreme Council for Antiquities is an ongoing procedure. Accordingly, there is a possibility that some structures in the project areas could be regarded as antiquity sites during the construction phase. In such case, there is a risk on the integrity of such structures.

Law 117/1983 for the Protection of antiquities has set certain standards that should be followed during excavation works near a registered antiquity site. The Supreme Council for Antiquities emphasizes that collaboration should be established between the Council and the infrastructure developer during construction near an antiquity. These standards and requirements were adhered in the EMP which has defined procedures for chance-finds of antiquity objects, and measures for protection of antiquity sites during construction activities, as listed below.

The impacts on archaeology and culturally valuable sites should be considered of Minor significance and will be fully controlled by the application of the mitigation measures listed below.

Impacts due to hazardous (H) and non-hazardous (NH) waste generation and handling of hazardous chemicals

This section presents an evaluation of the environmental impacts due to H and NH waste generation during the construction phase. The evaluation presented in this section also covers the storage and handling of hazardous chemicals on site.

The following are the types of wastes expected to be generated on site during the construction of WWTP and PSs and also during excavation and installation activities for the gravity sewers and FMs

Non Hazardous wastes

- Food residuals.
- Paper, plastics, and glass.
- Concrete, bricks.
- Steel, metals.
- Wood.
- Excavated soil.
- Water collected during dewatering activities (potentially contaminated with sewage).
- Old cesspit content.
- Sewage and waste resulting from on-site workers.
- Empty Sacks.

Hazardous wastes

- Waste electrical and electronic equipment (WEEE).
- Empty chemical containers.
- Spent chemicals and oils.

Impact Significance of non-Hazardous waste generation

The non-Hazardous wastes generated on site during the construction phase normally have a high recycling potential. If not recycled they would be sent to landfills or randomly dumped and burned, which would be a loss of natural resources.

Random dumping and accumulation of wastes on or around the site would cause a negative visual impact to workers as well as users of the surrounding areas. It could also block the roads, increase the rate of accidents. Accumulated wastes may be burned, a practice commonly found in Egypt, which could emit toxic emissions especially if plastic substances were among the waste streams.

Accumulation and/or uncontrolled disposal of organic wastes (food residuals) would also result in potential impacts on the health and hygiene of both general public and on-site workers by attracting vermin to the site such as birds, rodents or insects which can act as disease vectors. This will result in spread of disease, and disruption of the natural ecosystem. Odor may also be generated following long periods of accumulation due to the decomposition of some organic wastes, which will be an annoyance to both general public and on-site workers.

Leaching to soil may occur in areas where accumulated waste is in direct contact with the soil. This would lead to a direct impact on the groundwater quality.

Liquid wastes may be encountered during the evacuation of existing cesspits, also construction site sewage will need to be evacuated. This waste will be of non-hazardous nature but will have to be properly disposed of in order to prevent potential contamination to soil, groundwater and surface water.

The evaluation of impacts due to non-hazardous waste generation during the construction phase is illustrated in the Table below. Some impacts are considered of MODERATE significance, mainly due to the proximity of receptors. The impact of non-Hazardous waste generation is expected to be fully controlled by implementing the mitigation and monitoring measures listed in the following section.

Evaluation of impacts due to non-hazardous waste generation

Impact parameters					
Non Hazardous Waste Generation Impacts	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Loss of nature resources	1	3	1	1	**3**
Health impact	1	3	2	2	**12**
Soil and ground water	1	3	1	2	**6**
Surface water	1	3	1	2	**6**
Occupational health and safety	1	3	1	1	**3**
Air quality due to open burn	0.5	3	1	2	**6**
Visual impact	**1**	**3**	**1**	**3**	**9**

Table (3-12): impacts due to non-hazardous waste generation

Impact Significance of hazardous waste generation and handling of hazardous substances

Hazardous wastes may also be generated during the construction phase. The storage and disposal of these waste streams have to be carefully performed as to abide by the existing legal framework. In addition to that, these hazardous wastes if not handled, stored and disposed of according to engineering best practice would have major and irreversible effect as follows:

- Mishandling and uncontrolled disposal of hazardous liquid and solid wastes would have major health impacts for on-site workers, inhabitants in the project's area of influence, people who get in contact with waste during transportation and disposal, and flora and fauna exposed to such wastes.
- Uncontrolled disposal of hazardous wastes, in particular in liquid form, would cause soil contamination through direct contact or leaching.
- There is a high probability that random disposal of hazardous waste may affect the quality of groundwater through leachate as the groundwater level would be high in some regions
- Air quality could also be affected since uncontrolled dumping of hazardous and non-hazardous materials would result in most of the cases to open burning and potential release of toxic emissions.

The impacts listed above are evaluated as presented in the Table below. Most of the impacts should be considered of Moderate significance and will be fully controlled by implementing the mitigation and monitoring measures listed in the following section.

Evaluation of impacts due to hazardous waste generation

Impact parameters					
Hazardous Waste Generation Impacts	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Loss of nature resources	1	3	1	1	**3**
Health impact	1	3	2	4	**24**
Soil and ground water	1	3	1	3	**9**
Surface water	1	3	1	3	**9**
Occupational health and safety	1	3	1	4	**12**
Air quality due to open burn	1	3	1	4	**12**
Visual impact	**1**	**3**	**1**	**3**	**9**

Table (3-13): impacts due to hazardous waste generation

Impacts related to the creation of on-site workers and staff office camps

The majority of the workforce will be sourced from local communities and will live locally. No on-site camps will be therefore required except individual accommodation for the guards at the different project's sites.

The management offices will be mainly located at the WWTP site and other interim sewage and potable facilities will be constructed at the PS sites.

Potential impacts include soil, groundwater and health impacts due to unsuitable waste and sewage management, which should be considered of MINOR significance due to the expected low amounts. Waste management mitigation measures should be sufficient to fully control this impact.

3.5.2.2 Social Impacts

Positive Impacts

WWTP and PSs :Positive impacts during construction of the WWTP and pump station can be summarized as follows:

1. Creating job opportunities for companies working in construction of sewage networks.
2. Creating job opportunities in the simple works for local labors living in the project area.
3. Reviving economic activities for shops supplying construction material in the area, due to selling necessary construction material.
4. Reviving some canteens and small shops which sell meals for workers. Especially were workers will be living in the village.

Gravity sewers and FMs:

1. Creating opportunities for companies working in contracting and construction of sewage networks.
2. Creating job opportunities in the simple works for local labors living in the project area.
3. Reviving economic activities for some canteens and workers in the business of selling meals to the workers, especially were workers will be living at the area.

Negative Impacts

WWTP and PSs: Potential temporary inconvenience as result of the construction activities. This could be in the form of accumulation of wastes (both construction and domestic waste in the construction areas, associated odor, air emissions, especially dust as a result of excavation. These impacts are of temporary nature and will be of moderate severity, particularly since in some cases the construction areas may be only 4-5 meters away from residential areas, where the streets are quite narrow.

Gravity sewers and FMs:

1. Impacts on other infrastructure networks, especially drinking water, which may lead to disruption of other services.
2. Impacts on old buildings near the excavation areas, which may cause impacts on the occupants.
3. Impacts on road quality, it is widely known that the contractors do not usually rehabilitate the streets. Subsequently, there is a high probability of street conditions deterioration.
4. Vulnerable groups such as children and elderly groups are more likely to face serious accidents during excavation works. This is a serious threat based on experience from previous projects. It is recommended to impose strict compliance measures for the contractor with the proposed mitigation measures. Mitigation measures include proper signage and providing alternative routes for pedestrians to avoid accidents.

3.5.3 Impacts of the Operation phase

3.5.3.1 Environmental Impacts

Positive Impacts

- Diminishing the current problems related to sewage especially health problems
- Improving the quality of crops, as a result of increasing the quality of surface water
- Improving groundwater quality in most of the project areas through the prevention of sewage leaking into groundwater.
- Improving health conditions among the local population, especially school children
- Decreasing the odors and spread of insects significantly in the project area.

Negative Impacts

Noise Impacts

With regards to noise during the operation and the proximity of sensitive receptors, the most effective component of the project and the integrated infrastructure will be the operation of the pump station and the WWTP.

Evaluation and Significance of Noise Impacts

Operation of WWTP : The potential generated noise will therefore mainly affect the workers on site and with the implementation of the mitigation measures listed below, the impact could be fully controlled. The impact should be therefore considered of Moderate significance.

Operation of the PSs: The potential generated noise during operation will mainly affect the workers on site. The impact should be therefore considered of Moderate significance. Similar to the noise impacts related to the operation of the WWTP, this impact should be fully controlled by applying proper health and safety procedures.

Operation of gravity sewers and FMs :No foreseen impacts during normal operation.

The Table below shows the results of the evaluation of the operation noise impacts of the main project's components (WWTP, and PSs)

	Impact parameters				
Noise Impacts due to the operation of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
PS	1	4	1	2	**8**
WWTP	**1**	**4**	**1**	**3**	**12**

Table (3-14): noise impacts of the main project's components

Air emissions and Odor impacts

The only source of air emissions within the PS and WWTP sites will be the stand-by diesel generators. The impacts of such emissions are considered to be of Minor Significance as the generators will be only turned on during power cut-offs. The compliance of generators emissions with Law 4/1994 standards will be sufficient to safeguard against unacceptable air emissions impacts to the surrounding areas.

Operation of gravity sewers and FMs : Odor is only expected to occur if there is any leakage. This should be temporary and reform must be undertaken immediately. The effect should consider being of Minor Significance.

Operation of the PSs: The generated odor is expected to be simple and the effect should consider being of Minor Significance.

Operation of WWTP: Within the WWTP, odors are expected to be generated near the inlet open channels and screens; anaerobic ponds, and sludge storage areas.

It was found that odor generated from WWTPs could be one of the main problems facing the operation of the WWTPs as identified by neighboring communities and populations. Odors are the products of decomposition of organic matter. The main constituent of these odors is hydrogen sulphide (H_2S) due to its relatively high concentration in wastewater. Following Table indicates the concentration of different chemicals found in wastewater and sludge and their detection threshold by people.

Odorous compound	Detection threshold (ppm volume)	Recognition threshold (ppm volume)
Ammonia	17	**37**
Chlorine	0.08	**0.314**
Dimethyl Sulphide	0.001	**0.001**
Diphenyl Sulphide	0.0001	**0.0021**
Ethyl Mercaptan	0.0003	**0.001**
Hydrogen Sulphide	<0.00021	**0.00047**
Indole	0.0001	**-**
Methyl Amine	4.7	**-**
Methyl Mercaptan	0.0005	**0.001**
Skatole	**0.001**	**0.019**

Table (3-15): Odorous standard

It has been established that such odors are a cause of direct irritation and can also be a health threat through toxicological routes. Irritation could evolve in to psychological stress after prolonged exposure which could lead to loss of appetite, reduced water consumption, impaired respiration, nausea and vomiting. Socioeconomic impacts, which will be discussed in more detail, associated with places of offensive odors have the ability to lower the living standards of the communities, affecting people's dignity and value of life. However, impacts associated with odors are sometimes subjective due to a biological difference from one person to another which allows each person to react to such odors differently. This is why need to mention the level of tolerance that some people develop over time. This is of particular interest to workers at the pump stations and WWTP which will naturally acquire high odor tolerance.

Soil and groundwater Impacts

Operation of gravity sewers and FMs : Potential impacts on soil and groundwater during the operation phase may arise from any leak developing in the system. The impact should be considered of Moderate significance with respect to gravity sewers and Force mains (the impact is more critical with respect to FMs due to the higher pressure and the higher rate of contaminant migration to the surrounding soil and groundwater). The contact with the surrounding soil in all cases will be direct. The probability of the impact occurrence will depend on the quality assurance during the construction works and the impact's duration will depend on the response time to the leak until the repair works start.

Operation of the WWTP and PSs: Potential impacts on soil and groundwater during the operation of the WWTP and PSs will also arise from potential leaks and breaches of oxidation ponds. However, these should be considered of Minor Significance because of the following:

- All the units of the WWTP and PSs are constructed over an impermeable polyethylene sheets base layer which prevents direct contact with the underneath soil and allow for repair time.
- The leaks will be mostly visible as compared with potential leaks in the gravity sewers and force mains which will be hidden underground.

	Impact parameters				
Soil and ground water Impacts due to the operation of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Gravity sewers	0.5	4	2	3	**12**
FMs	0.5	4	4	3	**24**
WWTP & PS	**0.5**	**4**	**1**	**3**	**6**

Table (3-16): Soil and ground water Impacts in the operation phase

Water Quality Impacts

During the operation of gravity sewers and FMs : Impacts on water quality might arise from potential leaks in the canal/drain crossing areas. This will directly affect the surface water quality. The impact should be Temporary until repair action are implemented and will have low probability of occurrence. Also, all sewage pipelines crossing shall be under the canal/drain by at least 1.5 m from the bed of the canal/drain as per MWRI requirement. This reduces dramatically any effect of pipeline leakage on the canal/drain. The impact should be considered of Moderate significance.

During the operation of the central WWTP and PSs : The key impact on the surface water during the operation of the WWTP will result from the disposal of the sludge which will be covered under the sludge management section. Big impact on the surface water quality would be expected during the operation of the WWTP when bypass channel is used to dispose the wastewater without treatment. This can be happened during heavy rain and when the plant is overloaded. No impacts are expected during the operation of the PSs. The impact should therefore be considered of MAJOR significance. The impact will be controlled if mitigation measures related to waste and sludge management are being implemented.

Impact parameters					
Water quality Impacts due to the operation of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**

Gravity sewers & FMs	0.5	4	3	3	**18**
PS	0.5	1	1	1	**1**
WWTP	**1**	**4**	**3**	**3**	**36**

Table (3-17): Water quality Impacts due to the operation

Flora and Fauna Impacts

The Consultant has conducted baseline surveys in order to assess the presence and distribution of ecologically sensitive species and habitats along the proposed project's sites. Consequently, it was concluded that no endangered faunal or floral species have been recorded at the project's areas. All recorded species are under the "Least Concern" category.

Fauna Impact significance

Although some faunal species of mammals, birds, reptiles and insects exist at the project's area, faunal impacts are not likely to be significant given the small scale of the development relative to the extent of similar intact habitats in the area. The evaluation of the impacts on fauna is illustrated in the Table below, and should be considered negative with Minor significance yet this impact can be reduced/ eliminated if appropriate mitigation measures are implemented.

Flora Impact significance

The flora existing in the proposed sites for the WWTP and PS, as mentioned above, do not belong to the endangered species category. So the impact of the project's operation on the floral species should be considered on Minor significance.

	Impact parameters				
Flora and Fauna Impacts due to the operation of	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Gravity sewers and FM	1	2	1	4	**8**
WWTP & PS	**1**	**4**	**2**	**4**	**8**

Table (3-18): Flora and Fauna Impacts due to the operation

Occupational Health and Safety

Workers are often exposed to dangerous conditions during tank opening and venting; manual pumping and stripping; breaking or dismantling components and piping; and pressure washing, mucking, and scaling.

A dangerous atmosphere may expose workers to the risk of death, incapacitation, injury, chronic or acute illness, or impaired ability to escape unaided from a confined or enclosed space. When working on the maintenance of sewage systems, special attention should be given to good hygiene practices, proper use of personal protective equipment and safe confined space entry procedures.

The workers may be exposed to the known and unknown dangers of handling treated or untreated sewage and gray water tanks during pipelines, equipment and tank opening, entry, cleaning and related operations. Related components/operations include: piping, aeration, vacuuming, settling, treatment tanks and apparatus, sewage-contaminated water tanks or waste oil tanks, bilges, or sumps, and valves, pumps, grinders, macerators and other contaminated equipment.

Atmospheric hazards

Atmospheric hazards include oxygen-deficiency and flammable or toxic gases such as methane and hydrogen sulfide. Methane gas is colorless, odorless and tasteless, but is highly flammable and is considered anasphyxiate. Hydrogen sulfide (H2S) is also colorless and flammable, but it is highly odorous and extremely toxic to humans. At high concentration of H_2S, the olfactory nerve is paralyzed after a few breaths. Within a very short time, the sense of smell disappears, giving a false sense that the harmful gas has gone away. These gases are detectable only using proper instruments.

Physical hazards

Physical hazards include slips, trips, and falls on slippery and sloping surfaces; limited access and egress; corroded ladder rungs; and obstructions by piping and other structures. There is also the risk of receiving punctures and cuts from sharp edges and/or may wall collapses.

Biological hazards

Biological hazards include pathogens (e.g., viruses, bacteria, protozoa, parasitic worms, fungi) and other infectious microorganisms that can cause illnesses such as hepatitis, typhoid fever, dysentery and cholera. Inhaling or ingesting contaminated mists may result in serious illnesses.

Chemical hazards

Chemical hazards include exposure to ammonium compounds, formaldehyde, chlorine products, sodium hydroxide, odorous compounds, sodium hydroxide, odor-control and sewage-biodegrading enzymes, sanitizers, biocides, cleaning agents, pharmaceutical drugs, hormones and heavy metals.

Due to the potential severity of the occupational health and safety accidents, the impacts should be considered of MAJOR significance. They should be controlled to a large extent by the implementation of the mitigation measures listed in chapter 10.

Community Safety

Potential impacts during the operation phase:

- Falling in open manholes:

The hazard start when the manholes' cover is; a) left opened; b) Not properly fixed; and/or Brocken

- Engulfment:

This hazard has two scenarios, the first occurs when the sewage water flows out the pipeline network; the second is the risk of falling in the hidden manholes or deep pits under the waste water.

Visual impacts

During the operation of gravity sewers and FMs : No foreseen impacts

During the operation of the central WWTP and PSs : During the operation of the central WWTP and PSs, the project would change the aesthetics and landscape of the areas where the PSs and WWTP will be constructed. However, with regards to the WWTP, it is located in a desert area so no visual impacts are foreseen. With regards to the PSs, the visual impact is low as the expected height of the different components of the PS is comparable with adjacent buildings. The visual impacts due to the operation of the WWTP and PSs should be considered of MINOR significance. No mitigation measures are foreseen, expect maintaining a suitable landscape around the site.

Impacts Related to Archaeology and Cultural Heritage

There are no foreseen impacts on culturally valuable sites during the operation phase of the project

Risks associated with disposal and/or reuse of final treated effluent : Water pollution risk during normal operating procedures / Designed for wastewater treatment plant

Anaerobic ponds, a process of physical separation of large particles of wastewater, are no longer acceptable as a treatment method if applied alone. Therefore, Facultative ponds are necessary to ensure that the risk of wastewater is reduced. The sewage and infrastructure project proposes Maturation ponds, followed by effluent filtration as tertiary treatment step at wastewater treatment plants. Sewage is introduced into the treatment plant and treatment begins based on biological processes. Finally, the effluent water will pass through sand filter so that the tertiary treatment is done and the treated water is discharged to the drains. This tertiary treatment is essential for the drains that are connected to the river Nile at distance less than 8 km from the disposal point of effluent treated wastewater.

According to the above, wastewater treatment plants were designed to generate treated wastewater and comply with the legal standards set forth in Law No. 48 of 1982 in normal case and comply with the legal standards set for tertiary treatment quality for the drains connected to Nile river within small stretch (8 km). Bad impact can be only happened when bypass pipe is used to pass the wastewater to the drain without proper treatment and consequently will have detrimental effect on the drain as was described before. Also, potential pollution due to high COD concentration in the effluent water due to High contents of Algae in the stabilisation ponds could be expected in arid areas such as Upper Egypt. Tertiary treatment units could reduce this risk. However, sand filtration can be blocked rapidly due to that.

Due to the potential detrimental effect on the drain and potential soil contamination, this impact should be considered of MAJOR significance. The mitigation measures in the EMP have concentrated on reducing these possibilities to the minimum.

Environmental impacts due to Sludge management

One of the main significant impacts on environment and citizen health is the WWTP's sludge and faecal sludge handling and disposal. Most of the WWTPs in Egypt do not treat sludge but only dewater the sludge (15- 25% is the dry solids content). Unsafe disposal of such untreated sludge in agricultural lands could threaten the health of people and animals. The main problem in sludge handling in most WWTPs is the absence of a mechanism to dispose of the sludge in a safe manner, where the untreated non-stabilized sludge is sold to the contractor to use it as a fertilizer in the agricultural lands. Untreated sludge could contain viruses, pathogens, and germs.

The design of WWTP (working with oxidation ponds technology), results in the generation of sludge at a lower rate as compared with other treatment technologies (i.e. Activated sludge process; SBR; etc), and pauses relatively lower environmental and health impacts. Potential sludge management options include the following:

- Disposal in landfills/dumpsites
- Use in agricultural lands
- Use as Refuse Derived Fuel for the cement industry

Using one or more of the options listed above would depend on the quality of the sludge and the approval of Ministry of Agriculture for using the sludge for agricultural land applications, which could not be identified/ performed at the time of producing the study. All potential options shall be therefore assessed for their potential environmental impacts.

Sludge contains nitrogen and phosphorus, which are beneficial constituents to soil. Law 93/1962, as well as Sewage Sludge Directive 86/278/EEC both encourage the use of sewage sludge in agriculture. However, they regulate its use in such a way as to prevent harmful effects on water, air, soil, vegetation, animals and humans. However, the sludge could also include high amount of heavy metals, pathogens and bacteria which could have negative impacts and health hazards and render it a hazardous waste.

Also, faecal sludge comes from onsite sanitation technologies, and has not been transported through a sewer. Majority of population now use cesspit tanks where the householder emptied the tank every few days and mostly the faecal sludge are discharging directly to drain or in the desert. These disposals contaminate the environment and have negative impact on the citizen health.

Identification of potential impacts

- Impacts associated with sludge handling, drying and treatment within the WWTP premises
- Impacts due to sludge transport
- Impacts associated with sludge disposal
- Impacts associated with sludge applications on agricultural lands

Impact Significance and evaluation

Impacts associated with sludge handling, drying and treatment within the WWTP premises : In accordance with the proposed WWTP design, sludge handling is expected to generate odor, mostly near sludge storage areas. The significance of this impact is reduced since the plant is located in the desert.

Air quality and odor impacts due to the WWTP processes (including sludge management) have been covered in details in previous sections. Based on the quality of the sludge generated, which will be confirmed through chemical analysis of collected samples, sludge may possess hazardous characteristics

(i.e. be classified as a hazardous waste). Handling should therefore in all cases be performed with care, as the sludge represents a high negative health risk due to its pathogens content.

Impacts due to sludge transport : Transportation of sludge from the WWTP to the nearest landfill or transporting it to nearby agricultural lands will require the use of trucks to accommodate the amount of sludge generated. These vehicles are a source of emissions that would affect the air quality. Motor vehicle emissions were found to contain NOx, volatile organic compounds, carbon monoxide, and carbon dioxide. These compounds contribute to air pollution and the creation of smog, there is a potential soil contamination and odor emissions risk if vehicles were not completely sealed during transport.

Upon assessing the impacts of emissions from the transportation vehicles, it was found that the impact would be intermittent. The spatial impacts would be limited to hundred meters around the WWTP. In terms of the impact intensity on the environment, the air emissions could cause environmental changes that result in damage to the separate environmental components, however, the natural environment remains self-recoverable. Overall, air emissions due to sludge transport should be considered of Moderate significance.

Noise impacts are also expected to take place due to the transportation of sludge. However, due to the intermittent nature and average noise level expected, the noise impacts due to sludge transport should be considered of Moderate significance.

	Impact parameters				
Sludge transport Impact	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Air quality	1	3	1	2	**6**
noise	**1**	**3**	**1**	**2**	**6**

Table (6-19): Sludge transport Impact

Impacts associated with sludge disposal : Based on the sludge analysis, the landfill category, either hazardous or non-hazardous, will be identified. If found non-hazardous, it will be sent to the nearest dumpsite/landfill. If hazardous, it will have to be sent to the Nassreya Centre in Alexandria or, if not reuse, the hazarded sludge can be disposed into a special prepared landfill that can be constructed nearby. Landfill disposal of sludge shall be practiced by licensed waste contractors; however, the landfill disposal of sludge has the following risks/negative environmental impacts:

- Loss of resources.
- Waste directives in many parts of the world prohibit the disposal of organic wastes (or place an upper limit of around 5% of total organic carbon in the waste for it to be accepted for disposal). The potential of applying similar laws in Egypt during the life cycle of the project exit and this puts a risk on the sustainability of the landfill disposal option.

Impact parameters					
Sludge application to agricultural lands Impact	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Soil and agricultural land contamination due to application of untreated sludge	0.5	3	3	3	**13.5**
Human health issues and diseases	**0.5**	**3**	**4**	**4**	**24**

Table (3-20): Sludge application to agricultural lands Impact

- Although the waste contractor could be monitored, random/illegal dumping of the sludge on agricultural lands or water streams still remains possible. Impacts of sludge on water include eutrophication, potentially leading to hypoxia which causes reduction in specific fish and aquatic animals' populations. Also, sludge leakage back to canals and drains will offset positive environmental impacts of the WWTP.

The overall assessment indicates that the impacts due to landfill disposal of sludge should be considered moderate significance due to the relatively low amount expected to be generated and hence a low probability of contaminating soil and surface water. An alternative and preferred disposal method such as the reuse in cement industry is good alternative and have fewer environmental risks as compared with the application on agricultural lands.

Impacts associated with use sludge on agricultural lands : If sludge is sufficiently dried and treated/stabilized, prior to being reused (i.e. applied to land), there is no foreseen environmental and health impacts upon condition that sample analysis proves that sludge does not possess hazardous characteristics.

The main environmental and health risks arise from incomplete/absence of sludge stabilization. In such case, there is an increased risk that the sludge might contain a high pathogen content. Potential health hazards to human and animal health could arise from the application of sludge to agricultural crops because dumping raw sludge on agricultural lands could lead to the production of contaminated crops, especially if applied directly to plants. The consumption of these crops, their handling by vendors, and any contact with soil by farmers may also have biological and health impacts. These are also considered some of the main form of human exposure to agricultural sludge contaminants.

Studies have shown that fluid bio solids found in sludge, treated or untreated, adhere to forage crops. The effects of such compounds and pollutants on humans are dependent on the amount of soil and crops ingested by livestock. Due to the high health risks involved and the direct contact with soil which could occur, the impacts associated with sludge application on agricultural lands should be considered of Moderate to high significance with respect to both soil and health, as illustrated in the Table.

Use Sludge on agricultural lands: It is very important to ensure that sludge is of adequate quality for reuse. The quality of the sludge has to fulfill the quality standards for heavy metals according to the

Executive Regulations of Law 93/1962, and the US EPA threshold concentrations of heavy metals of sludge to be applied on agricultural land (whichever is lower).

Egyptian and USEPA standards for use sludge on agricultural lands

Parameter	Concentration limit (Law 93/1962)	Concentration limit (USEPA Part 503.13)
Zinc	2,800 mg/kg	**2,800 mg/kg**
Copper	1,500 mg/kg	**1,500 mg/kg**
Nickel	420 mg/kg	**420 mg/kg**
Cadmium	39 mg/kg	**39 mg/kg**
Lead	300 mg/kg	**300 mg/kg**
Mercury	17 mg/kg	**17 mg/kg**
Molybdenum	18 mg/kg	**Deleted in 1994**
Selenium	36 mg/kg	**100 mg/kg**
Arsenic	**41 mg/kg**	**41 mg/kg**

Table (3-21): Egyptian and USEPA standards for use sludge on agricultural lands

- Sludge must not be applied to soil in which fruit and vegetable crops are being grown, or less than ten months before fruit and vegetable crops are to be harvested.
- Grazing animals must not be allowed access to grassland or forage land less than three weeks after the application of sludge.
- Treated Sludge shall not be used as fertilizer unless it has been tested and approved by (i) the competent administrative authority within the Ministry of Housing, (ii) the Ministry of Health and (iii) EEAA after preparing an EIA for the production, distribution, utilization and disposal process, if necessary.
- Health precautions and buffer zones should be respected and indicate that the application of sludge should be within the following ranges according to soil type (law 93/1962): 8-14 m^3/feddan/year for thick soil, 10-16m^3/feddan/year for medium soil and 12-20m^3/feddan/year for light soil

Sludge Use in cement industry (if proven feasible by PIU):

- Dried sludge could be sent to cement factories as RDF according to a contractual agreement between HCWW and Cement Companies. In that case the need for lime treatment should be reconsidered if it will affect the calorific value/properties of the sludge.
- If the sludge was found hazardous (based on the sludge sampling results), it shall be handled by workers wearing protection cloths and transported by a licensed contractor to a cement factory licensed to incinerate hazardous wastes.

Sludge disposal in landfill : If sludge cannot be reused, the right landfill category must be determined. Based on the chemical analysis of the sludge, it should be sent to the respective landfill (HW landfill or non HW landfill).

Impacts due to handling and disposal of non-hazardous wastes

Non-hazardous wastes are expected to be generated during the operation of the PS and WWTP. These will result from the cleaning and scrubbing of inlet screen (contaminated solid particles), as well as from the daily activities of workers. The latter will comprise of a mix of food residual, plastic and paper

packages. The first potential impact would be the contamination of soil, groundwater and/or surface water due to the uncontrolled disposal of contaminated solid wastes. Another potential impact would be the loss of natural resources (for recyclables) if recycling has not been implemented. Other impacts would include negative visual impacts if waste is accumulated in front or around the PSs and the WWTP. Burning of the accumulated wastes would impact the air quality around the PS and the WWTP sites, and could emit toxic emissions especially if plastic substances were among the waste streams.

Accumulation and/or uncontrolled disposal of organic wastes (food residuals) would also result in potential impacts on the health and hygiene of both general public and on-site workers by attracting vermin to the site such as birds, rodents or insects which can act as disease vectors. This will result in spread of disease, and disruption of the natural ecosystem. Odor may also be generated following long periods of accumulation due to the decomposition of some organic wastes, which will be an annoyance to both general public and on-site workers.

The evaluation of impacts due to non-hazardous waste generation during the operation phase is illustrated in the Table below. Most of the impacts should be considered of Moderate significance, which is mainly due to the proximity of receptors (with respect to the PSs). The negative impact of non-hazardous waste generation is expected to be fully controlled by implementing the mitigation and monitoring measures listed in the following section.

	Impact parameters				
Non Hazardous Waste Generation Impacts	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Loss of nature resources	1	4	1	1	**4**
Health impact	1	4	2	2	**16**
Soil and ground water	1	4	1	2	**8**
Surface water	0.5	4	2	2	**8**
Air quality due to open burn	0.5	4	1	2	**4**
Visual impact	**1**	**4**	**1**	**3**	**12**

Table (3-22): Non Hazardous Waste Generation Impacts

Impacts due to handling and disposal of hazardous substances and hazardous wastes

As mentioned in the chapter of the project description some of the hazardous substances required for operation processes include diesel for standby generators, lubricating oils and laboratory chemicals.

Diesel and lubricating oils will be used and usually have some hazardous and toxic properties. However, the workers handling them are expected to have high awareness regarding their risks. The higher risk in this regard will be that associated with the necessary disposal of empty containers. Impacts on soil (and groundwater) quality could result from fuel storage tank leakage. Secondary containment shall be therefore incorporated in the design as to ensure a minimum of 110% external volume.

Laboratory chemicals comprise of many hazardous substances and liquids. The health risks due to the handling of hazardous substances should be considered of Major Significance However, implementing safety induction classes, operational health and safety procedures in addition to implementing the normal laboratory operating procedures including the preparation of COSSH forms and wearing protection cloths ensure that the impact's significance is reduced.

Impact evaluation due to handling of hazardous wastes

Hazardous wastes may also be generated during the operation phase such as spent oils and empty chemical containers. The storage and disposal of these waste streams have to be carefully performed as to abide by the national legal framework, in addition to that, these hazardous wastes if not handled, stored and disposed of according to engineering best practice would have major and irreversible effect as follows:

- Mishandling and uncontrolled disposal of hazardous liquid and solid wastes have major health impacts for on-site workers, inhabitants in the project's area of influence, people who get in contact with waste during transportation and disposal, and flora and fauna exposed to such wastes.
- Uncontrolled disposal of hazardous wastes, in particular in liquid form, would cause soil contamination through direct contact or leaching.
- There is a high possibility that uncontrolled disposal of hazardous wastes may affect the groundwater quality.
- Air quality could also be highly affected since uncontrolled dumping of hazardous and non-hazardous materials would result in most of the cases in open burning and potential release of toxic emissions.

The impacts listed above are evaluated as presented in Table below. Most of the impacts should be considered of Moderate significance and will be fully controlled by implementing the mitigation and monitoring measures listed in the following section.

	Impact parameters				
Hazardous Waste Generation Impacts	Probability of Occurrence (P)	Temporal Scale (A)	Spatial Scale (B)	Intensity (C)	**P*(A)*(B)*(C) Overall Score**
Loss of nature resources	1	4	1	1	**4**
Health impact	1	4	2	3	**24**
Soil and ground water	1	4	1	3	**12**
Air quality due to open burn	1	4	1	4	**16**
Visual impact	**2**	**1**	**4**	**1**	**8**

Table (3-23): Hazardous Waste Generation Impacts

6.5.2.3 Social Impacts

Positive Impacts

WWTP and PSs : Creating job opportunities for engineers, technicians and non-skilled workers at the pump stations and WWTPs.

Gravity sewers and FMs :

1. Provision of sewage services to wide sector of the community.
2. Ending the current problems related to sewage and sanitation.
3. Provision of sewage services will decrease the demand on evacuation cars, leading to improving evacuation services at other villages.
4. Increasing the value of houses after connecting to the sewage network.
5. Improving the health conditions of the population especially school children who are currently suffering
6. Improving the socio-economic conditions of families by saving the amounts paid currently for evacuation services. This was posing a lot of economic burden upon families.
8. Improving the quality of the groundwater, as a result of stopping leakage from septic tanks to the ground aquifer.

From a Gender perspective, women suffer more from the current sewage situation; the project will lead to the following positive impacts:

1. Relieving the financial burden for female headed families related to evacuation of cesspit tanks. Women who support their families suffer more from the recurrent evacuation cost.
2. Improving the quality of life for women who bear the household responsibilities. They are the ones who stay more at home and suffer from the odours of the cesspit tanks.
3. Women will no longer have to carry used water outside of the house in order to dispose of it.
4. Improving the health conditions of the families will lower the burden that mothers face in cases of child sickness.

Positive Impacts on vulnerable groups : The project has several positive impacts on women, since it will ease the burden of carrying water to throw it away in the septic tank or the street. Improving the living conditions of community members especially children, which reduces the risk of illness. Mothers have to care for sick children at the house. Besides, the program will be providing sanitation services for free for the poorest groups. This will make poorest groups feel that the government cares for them and is concerned with their welfare.

School children will benefit from the project. Awareness raising seminars can be held at schools.

Negative Impacts

1. Lack of efficient maintenance for networks may cause several problems to the surrounding area, including overflow of wastewater.

2. Illegal household connections to the system may cause over flooding to the sewage network

Chapter 4 Consultations

The Bank assessment used various approaches to review the environmental and social systems that are relevant to the program. The work included a review of legislation and guidelines, existing Water and Sanitation Company (WSC) procedures, and relevant documentation; review of similar projects; field visits to existing sanitation facilities in the program area; and analysis of different effects.

The Project Team began by preparing an overview of the environmental and socio-economic challenges in project area. The key effects of potential pollutions then were narrowed down through a scoping process involving key stakeholders. The overview and scoping exercise were then used as the basis for a strategic assessment of the priority social and environmental issues that are likely to arise during the implementation of the physical infrastructure of the IRSP.

In line with the Bank's integrated Safeguard system, the preparation of the SESA involved a series of consultation activities that targeted a wide range of stakeholders related to the sanitation sector. In addition to the consultation with the LWSC, a number of consultations were arranged with local stakeholders including villagers in the villages where the program is going to be implemented.

The information collected and analyzed focused on the social and environmental aspects in order to assess the benefits, consequences, and risks/impacts associated with a variety of policy and program options. The analytical work included a risk assessment of the IRSP, a validation of the use of the RBF instrument, an assessment of the existing systems and policies applicable to the program and the identified DLIs, an Assessment of Program Performance Capacity and Gap Identification and identification of the risks mitigation actions to be included in the Program Action Plan (PAP).

4.1 Summary of the Consultation Activities

Timeline and Approach to Consultations

The preparation of the SESA involved a series of consultation activities that targeted a wide range of stakeholders related to the sanitation sector in both clusters. In addition to the consultation with the WSC in Luxor which took the form of meetings in Luxor governorate and the concerned *Markaz.* A number of consultations were arranged with local stakeholders in the villages, including villagers, where the program is going to be implemented.

Figure 4-1. Selected Pictures for the Conducted Consultations

Consultations with local communities and village-level stakeholders were conducted through focus group discussions and public meetings. To ensure convenience to the local communities and allow for participation from women, village-level consultations took place in the villages reaching out to the targeted unserved communities. Consultations took place in the communities' Hosting halls, *non-Governmental organization*, and Local Governorate Units (LGUs). The team also conducted a number of transact walks and short interviews with key informants from the visited villages.

Figure 4-2 Selected Pictures for the Conducted Consultations

The table below summarizes the main consultation events during the process of the SESA preparation. It also presents the consultations timeline including the dates of the key conducted activities and the number of participants including a breakdown for women representation.

Date	Objectives of consultation meeting	Targeted participants of consultation	# of Participants	#of Women	Location(s)
Tuesday 4th December 2018	Consultation for the SESA to overview the current situation and make a field plan for different interviews and consultations	Luxor WSC representatives from different departments in the Luxor company (Awareness, Community participation, public relation, Hot line and Planning/GIS)	11	4	**WSC in Luxor**
Tuesday 4th December 2018	Focus group on the current sanitation system and overview on the social statues of the villages	Representatives from three villages (Dbabiya cluster) Shaghab, Dbabiya and Maala and El Hanady village administratively located under El Dier Local unit + local unit staff from different departments	20	3	**Shaghab local unit Esina District**
Tuesday 4th December 2018	Focus group on the current sanitation system and overview on the social statues of the villages	All the concerned staff of the local unit covered six villages (Keman cluster) Keman, Asfoun ,. Ghariera, Tafnees, Halfa3 and Zieniqaa especially Information center employee	17	-	**Keman el mataana local unit Esina District**
Tuesday 5th December 2018	Open discussion with head of the local unit and staff + Preparation for the consultation meeting with villages.	All the concerned staff of the local unit especially Information center employee	5	1	**Edesat Bahri Local unit**

Tuesday 5th December 2018	Open discussion with head of the local unit and staff + Preparation for the consultation meeting with villages.	All the concerned staff of the local unit especially Information center employee	7	-	**Edesat Qebli local unit**
Tuesday 5th December 2018	Preparation for the consultation meeting with villages.	Head of local unit and 2 employee	3	-	**Toud local unit**
Tuesday 5th December 2018	Open discussion with local unit staff + Preparation for the consultation meeting with villages.	All the concerned staff of the local unit especially Information center employee + representatives from the village	12	5	**Asfoun local unit**
Monday 10th December 2018	Presentation from the consultant and the company was delivered and a questions and answers session was facilitated among participants.	all the target areas of the cluster villages (7 villages) representing 5 local units in Toud and Esina districts in Luxor governorate + public relations and awareness departments in LCWW	106 person	17	**El Shaghab local unit meeting room**
Tuesday11th December 2018	**Presentation from the consultant and the company was delivered and a questions and answers session was facilitated among participants.**	**all the target areas of the cluster villages (7 villages) representing 1 local unit in Esina districts in Luxor governorate**	**88**	**16**	**Asfoun Community Development association meeting room**

Table(4-1): Main consultations events

4.2 Outcomes of the consultation

Consultative meetings with the Government bodies and stakeholders

Meetings and small workshops with the relevant departments in the targeted governorate, were organized and included the Public Awareness and Customer Service Department, Customer Service Department, The Citizens' Service and Hotline Department ,Sanitation Sector; Quality Sector; and Occupational Health and Safety Department. Through discussions, information were collected on the following :

- The current system, resources, and mechanisms for acquiring land, community engagement, handling grievance and complaints, effluent quality control, H&S procedures, and interaction with other stakeholders.
- The shortfalls in the existing systems
- The proposed actions and recommendations to improve the existing system.

The consultation team met with local community members and stakeholders within the served communities to discuss the following:

- The impacts of the implemented projects at the households' level (domestic activities, health, and households' expenditure).
- The impact of this situation at the households' level (including expenditure, health, and impacts on women, children, and the elderly).
- Willingness to contribute to new sanitation projects, including contribution with land.
- Land-related issues including availability of land for the PSs and treatment plants, willingness of local communities to contribute with land, and the potential anticipated impacts related to land acquisition.

Figure (4-3) Field Visit For Land Availability

Chapter 5: Assessment of the country Policy and Legislation

A core governmental role is to formulate policies, through which the government can delimit the activities of all sanitation and water management stakeholder groups, including itself. Policies lead to the development of laws and rules and regulation designed to achieve policy goals. Good law for sustainable sanitation and water management acknowledges existing uses and rights, including international norms. At the same time, it is flexible enough to permit reform in response to technological change and socio-economic need.

Laws and decrees have been issued including guidelines for mixing drainage water with fresh water, regulations for sewage and industrial effluents, wastewater reuse, cropping patterns, and health protection measures & standards specifications.

During recent years, the methodology for managing the reuse of wastewater has shifted from conventional disposal strategies into value added products. With the increase of wastewater reuse for different purposes, concerns over the environmental and health implications of this reuse have also increased.

Egypt has adopted a policy of wastewater reclamation and reuse in irrigated agricultural land to alleviate the pressure imposed by increasing demands on freshwater resources. It is becoming part of integrated water resources management policy.

5.1 Institutional and Legal Framework of Water Quality Management in Egypt

The purpose of this section is to provide a brief overview of the current organizational structure and regulatory and legislative framework for water quality management in Egypt.

Present Institutions for Water Quality Management

In Egypt, as in many developing countries, the organizational structure for water quality management is extremely complex, mainly because of the large number of government agencies with related responsibilities for water quality management activities. The subsequent paragraphs describe the functional responsibilities of the most important agencies in Egypt.

Ministry of water resources and irrigation (MWRI):

The MWRI has sole legal responsibility for the planning and management of water resources in Egypt. In its Charter, the MWRI is responsible for providing water of suitable quality to all users. To accomplish this goal, the Ministry has to ensure that appropriate measures are undertaken to protect both the quantity and the quality of Egypt's water resources. In practice, little attention has been given to water quality management, which represents a relatively small portion of the overall activities, although priorities are now being reassessed. Law 48, for the protection of the Nile and its waterways, assigns to MWRI legal responsibility over the following functions:

- Issue and cancellation of discharge permits into Egyptian waterways, which include the Nile, canal and drainage networks, lakes, and groundwater reservoirs.
- Inspection of wastewater treatment facilities.
- Monitoring of intake sites for potable water treatment plants as well as municipal and industrial discharges.
- Ensuring that proper samples and analyses of discharges are carried out by the Ministry of Health.
- Levying of fines for non-compliance.

- Setting of regulations and specifications for discharges into water bodies.
- Issue and oversee of licenses for new waste treatment units in floating vessels.
- Issue of licenses for the construction of any establishment that directly discharges into waterways.

The MWRI has delegated the water quality monitoring tasks of both surface and groundwater to the National Water Research Center (NWRC). NWRC, in turn, consists of the following institutes:

• The Drainage Research Institute (DRI). DRI is responsible for monitoring the quality and quantity of drainage water in the Nile system. At present, DRI has installed water quality monitoring stations all along the Nile drainage system. One of DRI's functions is to provide MWRI with information on the availability of drainage water to be reused for agricultural purposes, predominantly for land reclamation projects. DRI has prepared guidelines for the reuse of drainage water for irrigation purposes.

• Nile Research Institute (NRI). NRI is responsible for protecting and developing the Nile River in a sustainable and scientific manner by means of: (i) monitoring water quality in the river channels; (ii) assisting in the enforcement of pollution control laws related to the Nile system; (iii) evaluating and assessing the impact of new developments and interventions in water quality; and (iv) operating and maintaining a database related to water quality. NRI's total network includes 34 water quality monitoring stations along the Nile and 60 observation stations on strategic discharge sites.

• Research Institute for Groundwater (RIGW). This institute is in charge of field investigations for the proper understanding of Egypt's groundwater system. Initially, RIGW's main responsibility was to provide advice to MWRI on the development of groundwater sources for agricultural purposes. Now, RIGW is responsible for the efficient monitoring of groundwater sources in order to ensure availability for irrigation, domestic, and industrial uses.

Ministry of Health and Population (MHP):

The MHP has been given a central role in water quality management, especially in setting standards for the quality of the following:

- Potable water sources (River Nile and canals)
- Drain waters that can be mixed with other waters for drinking water
- Industrial and sewage treatment plant discharges
- Wastes discharged from river vessels
- Besides developing standards, the ministry must sample and analyze all industrial and municipal effluents and all drinking water treatment plant influents and effluents as well, which is considered a significant load of work.

Ministry Of State For Environmental Affairs (MEA):

At the national level, MEA has the portfolio for environment in the Egyptian Cabinet of Ministers. Within the ministry, the Egyptian Environmental Affairs Agency (EEAA) has the responsibility for setting national policy for the environment and coordinating environmental management activities within the government.

The EEAA's functions, as established by law 4/1994, include, among other things, preparing legislation, decrees, and regulations as needed to protect the environment; conducting studies; formulating the national plan for environmental protection; setting requirements for EIAs of projects; monitoring compliance with standards and norms; coordinating enforcement actions; managing natural protectorates; and promoting environmental education.

The EEAA has authorities over industry under Law 4/1994, including the authority to require industries to keep records of the environmental impact of their activities, to collect and analyze samples to ensure that standards are being met, and in the case of a violation, to shut down a facility within 60 days if the violation has not been corrected.

Ministry of Housing, Utilities and Urban Development (MHUUD):

MHUUD has the responsibility for planning, design, and construction of water distribution and sewage collection systems and municipal water and wastewater treatment plants.

Scientific Institutions and Universities:

Scientific Institutions and Universities in terms of supporting institutions, Egypt benefits from having a number of scientific institutes (e.g. the Academy for Scientific Research and Technology, the National Research Center, the National Water Research center, the National Institute for Oceanography and Fisheries Research) with research capabilities and universities (e.g., Ain Shams University, Cairo University, the American University in Cairo, Alexandria University) with good environmental science and engineering programs at both the undergraduate and graduate levels. These institutions carry out basic and applied research on water quality management issues.

5.2 Assessment of the National Rural Sanitation Program and New Water Law

The National Rural Sanitation Program (NRSP) of 2014 is the overarching program for the rural sanitation sector, which aims to foster sustainable access to piped sewerage systems with adequate wastewater treatment for the rural population by 2037 and a development objective to "accelerate access to rural sanitation services and to ensure sustainable service delivery."

The NRSP has identified three areas of intervention: (i) Improved access to rural sanitation and infrastructure delivery, (ii) improved operational systems and practices of Water Sector Companies (WSCs) and (iii) strengthened National Sector Framework. The National Program aims to achieve sustainable access to sanitation in rural areas across Egypt, with a total cost of US$ 11.3 billion.

The government's strategy to overcome limited available funding is to prioritize the connection of unserved villages to nearby plants where excess capacity exists and postpone the construction of new wastewater treatment facilities to a second phase, when resources become available.

The NRSP also seeks to operate a shift in the sector and reinforce a series of performance improvement measures to strengthen decision-making and capacities at local-utility level and improve the overall accountability framework, whilst supporting national initiatives to address persistent sector challenges. Efforts towards greater decentralization have been further enshrined in the 2014 Constitution, which stipulates a transfer of service delivery powers to local administrations by 2020.

NOPWASD is mandated with sector planning and the current NRSP is based on the water and sanitation Governorate-level master plans developed in 2007 to achieve full coverage by 2037 but these only take into account capital costs. In parallel, WSCs develop annual financial plans, which take into account recurrent O&M costs, capital investments and rehabilitation requirements, as well as sales forecasts (water, treatment plants outputs, installation fees, etc.), but these are currently delinked from the national planning process.

In support to the GoE's agenda to enhance the performance of the water and sanitation services and in alignment with the NRSP and the 2014 Constitution, a second wave of reform is taking place with support from WGP. The reform was initiated in 2015 through the Sustainable Rural Sanitation Services Program for Results (SRSSP) and operated a fundamental shift from centralized investments in infrastructure to strengthening of local accountability to achieve improved service delivery. The first phase of the program successfully demonstrated local utilities' ability to deliver capital programs and handle

direct fund transfers (the Program established the first 5,000 household sanitation connections in February 2018) and embed citizen engagement mechanisms throughout the service delivery cycle and laid the ground for rolling out this approach more broadly.

Several Laws, Decrees, Policies and strategies pertaining to water resources, environment, water protection, and reuse are in place, but no Water Law or water and sanitation policy. The Water Policy Paper developed in 2010 as well as the National Rural Sanitation Strategy (NRSS) developed in 2014 were important steps to signal the GoE' s prioritization of rural sanitation and promote an integrated "cluster" approach at the water-basin level, but policy gaps remain, particularly with regard to adopting a water sector strategy and clarifying the regulatory role of EWRA and the private sector contribution.

With the support of several donors (WB in 2009, followed by EU), a new Water Law is under preparation which seeks to clarify roles and responsibilities between national entities, strengthen EWRA's regulatory role and deepen decentralization towards WSCs . The Water Law was submitted to Parliament in January 2018 but was not approved. Revisions are ongoing.

The proposed law was split into seven (7) chapters. These chapters were focusing on the required exercises from the Egyptian Water Regulatory Agency (EWRA); new license requirement for operating or managing any water and sanitation facility services; instruction for service providers; and the set penalties by the law.

The Water Law introduces the requirement for WSCs to purchase a license to operate wastewater systems, which is likely to increase EWRA's financial resources through the collection of license fees and strengthen its role as a regulator. The WB intends to provide direct support to EWRA under SRSSP and implement a capacity building plan, on the basis of the capacity assessment carried out under SRSSP. As the sector decentralizes and moves towards greater financing sustainability, activities will focus on strengthening EWRA's regulatory functions, through i) the establishment and operationalization of a unified M&E system to replace a currently fragmented approach; ii) increase the quantity and quality of data captured; iii) improve accountability through preparation of annual "state of the sector" reports; and iv) increase oversight of the PIAP and APA process currently managed by the Holding Company for Water and Wastewater (HCWW).

Under SRSSP, the WB is implementing decentralized service delivery and supporting WSCs in their operational, administrative and financial management functions as well as the PMU complete the policy framework. This approach will be continued under the new program (integrated sanitation program in the Upper Egypt) and broadened to the development of a water and sanitation sector strategy.

5.3 Description of the national and international environmental laws and regulations

This section lists the national laws and international requirements pertinent to the project. Following an overview of the Egyptian environmental and social regulations and the requirements of international institutions and international conventions, the requirements of Egyptian environmental legislation and standards are compared with the international institutions, and presented in a tabular form and followed by gap analysis between the national and international standards.

5.3.1 Environmental Administrative and Legal Framework

The Egyptian Environmental Affairs Agency (EEAA) is an authorized state body regulating environmental management issues. Egyptian laws identify three main roles of the EEAA:

- It has a regulatory and coordinating role in most activities, as well as an executive role restricted to the management of natural protectorates and pilot projects.

- The agency is responsible for formulating the environmental management (EM) policy framework, setting the required action plans to protect the environment and following-up their execution in coordination with Competent Administrative Authorities (CAAs).

- EEAA is responsible for the review and approval of the environmental impact assessment studies as for new projects/expansions undertaken. Since 2015, EEAA is only responsible for the review and approval of EIA for the wastewater treatment plants and their corresponding collection networks with capacities more than 20,000 m^3/day.

The Environmental Management Unit (EMU) at the governorate and district level is responsible for the environmental performance of all projects/facilities within the governorates premises. The governorate has established EMUs at both the governorate and city/district level. The EMUs are responsible for the protection of the environment within the governorate boundaries and thus are mandated to undertake both environmental planning and operation-oriented activities. The EMU is mandated to:

- Follow-up on the environmental performance of the projects within the governorate during both construction and operations to ensure the project abides by laws and regulations as well as mitigation measures included in its EIA approval. Investigate any environmental complaints filed against projects within the governorate.

- The EMUs are affiliated administratively to the governorate yet technically to EEAA. The EMUs submit monthly reports to EEAA with their achievements and inspection results. On 2015, due to decentralised decision approach, EMUs is responsible for the review and approval of the environmental impact assessment studies for the wastewater treatment plants and their corresponding collection networks with capacities equal or less than 20,000 m^3/day.

- The governorate has a solid waste management unit at the governorate and district level. The units are responsible for the supervision of solid waste management contracts.

Law 4/1994 stipulates that applications for a license from an individual, company, organization or authority, subject to certain conditions, require an assessment of the likely environmental impacts.

The Competent Administrative Authorities (CAAs) are the entities responsible for issuing licenses for project construction and operation. The EIA is considered one of the requirements of licensing. The CAAs are thus responsible for receiving the EIA studies, check the information included in the documents concerning the location, suitability of the location to the project activity and ensure that the activity does not contradict with the surrounding activities and that the location does not contradict with the ministerial decrees related to the activity. The CAA forwards the documents to EEAA for review. They are the main interface with the project proponents in the EIA system. The CAA is mandated to:

- Provide technical assistance to Project Proponents.
- Ensure the approval of the Project Site.
- Receive EIA Documents and forward it to EEAA.
- Follow-up the implementation of the EIA requirements during post construction field investigation (before the operation license).

After submission of an EIA for review, the EEAA or its representatives throughout governorates may request revisions of the EIA report within 30 days, including additional mitigation measures, before issuing the approval of the report. In case of disapproval, NAPWASD will have the right to issue an appeal within 30 days from its receipt of the EEAA's decision.

According to the list of environmental classification projects (A, B, $B_{specific}$, C) subject to environmental impact measures, the wastewater projects have been classified since 2016 to the followings:

Classification A: it requires filling class A list and it is suitable for compact WWTP with capacity less than 100 m^3/day.

Classification B: it requires filling class B list and it is suitable for WWTP with capacity for more than 100 m^3/day up to 20,000 m^3/day.

Classification $B_{specific}$: it requires filling class $B_{specific}$ list and it is suitable for WWTP with capacity for more than 20,000 m^3/day up to 150,000 m^3/day.

Classification C: it requires submission of complete EIA report and it requires consultation meetings and public hearing event(s), and it is suitable for WWTP with capacity for more than 150,000 m^3/day.

EMU at the governorate scale is responsible for reviewing and approval of WWTP projects for classification A and B. Whereas, EEAA is responsible for reviewing and approval of WWTP projects for classification $B_{specific}$ and C.

5.3.2 Summary of the National Legislation Pertinent to the Project

The legislations listed and described below represent the national legislation pertinent to the project:

Egyptian legislation regarding buffer zones:

The Egyptian code for the design and implementation of wastewater treatment plants, issued by Ministerial Decree No. 169 of 1997, states that the distance between a WWTP and the nearest urban area or village is 1 to 3 km

The Ministry of Health Decree No. 27 of 1997 states that the distance between the proposed WWTP site and any residential area should not be less than 500 m.

Egyptian legislation related to social aspects:

- EEAA guidelines related to the Public Consultation; Guidelines of Principles and Procedures for "Environmental Impact Assessment" 2nd Edition January 2009 amended on October 2010:
    - Paragraph 6.4.3 Requirements for Public Consultation
    - Paragraph 6.4.3.1 Scope of Public Consultation
    - Paragraph 6.4.3.2 Methodology of Public Consultation
    - Paragraph 6.4.3.3 Documentation of the Consultation Results
    - Paragraph 7 Requirement and Scope of the Public DisclosureLand acquisition and involuntary resettlement (The project will not result in resettlement activities).
    - Law 94/2003 on the National Council for Human Rights (NCHR)
    - The Constitution (1971, amended in year 1980)
    - Constitutional Declaration 30th of March 2011
    - Law 10/1990 on property expropriation for public benefit
    - Other laws governing expropriation
- Protection of human rights
- Law no. 94/2003 on establishing the National Council for Human Rights

- Unified structure Law No 119 of year 2008
- Presidential Decree No. 135 of year 2004 related to the establishment of HCWW

Egyptian legislation related to protection of Antiquities, archaeology and cultural heritage:

- Law 117/1983

Egyptian legislation related to environmental aspects:

- Egypt's main legal instrument for environment protection is Law 4/1994, amended by Law 9/2009 and law 5/2015 and its Executive Regulations No 338 / 1995 and the amended regulation No 1741 / 2005 amended by decree 1095/2011, 710/2012, 964/2015, 19/2016, 26/2016, and 75/2017 commonly known as the Law on Protection of the Environment. Prime Ministerial Decree 631 of 1982 established the EEAA as the competent body for environmental matters in Egypt. Law 4 also stipulates the role of the EEAA as the main regulatory agency for environmental matters.
- Law No 93 for Year 1962 for discharge on the public sewer network and protection and treatment of wastewater wastes and safe discard methods of the treatment by products, amended with MHUUC's Decree No 44 for Year 2000.
- Law No 48 for Year 1982 for the protection of the Nile River, agricultural drains, ponds and aquifer from pollution, and the ER amended with Decree No 92 for Year 2013.
- Law No 12 for Year 2003 for the protection, occupational health and safety for the workers, which is amending Law 137 for Year 1981 and its executive decrees.
- Law No 102 for Year 1983 for natural habitats.
- Law No 38 for Year 1968 for the public cleanliness, which is amended by Law No 31 for Year 1976.
- Guidelines of Principles and Procedures for "Environmental Impact Assessment" 2nd Edition EEAA, January 2009 and its amended Lists in October 2010.

Treated wastewater and sludge used for land applications and irrigation should also be carried out in manner consistent with the Egyptian code of practice of 501 for year 2015 and the World Health Organization (WHO) Guidelines for the Safe Use of Wastewater, Excreta and Grey water and applicable national requirements. The Project proponent will commit to applying the applicable national requirements or internationally accepted standards and be consistent with the WHO Guidelines for the Safe Use of Wastewater, Excreta and Grey water. Actually the national requirements for using secondary treated wastewater for irrigation are more stringent than the guideline requirements of WHO Guidelines for helminthes eggs and fecal coliforms. The standards for using treated sludge in irrigation are equivalent (1 /1000 g for fecal coliforms).

4.3.3 International Conventions and Agreements

Egypt has signed and ratified a number of international conventions that commit the country to conservation of environmental resources. The following is a list of the key conventions:

- International Plant Protection Convention (Rome 1951).
- African convention on the conservation of nature and natural resources (Algeria 1968).
- UNESCO Convention for the protection of the world cultural and natural heritage (Paris, 16 November 1972).

- Convention on International Trade In Endangered Species Of Wild Fauna And Flora (CITES) (Washington 1973).
- Basel Convention on the control of trans-boundary movements of hazardous wastes and their disposal (1989).
- United Nations framework convention on climate change (New York 1992). The convention covers measures to control greenhouse gas emissions from different sources including transportation.
- United Nations Framework Convention on climate change and Kyoto Protocol (Kyoto 1997).
- Convention on biological diversity (Rio de Janeiro 1992), which covers the Conservation of habitats, animal and plant species, and intraspecific diversity.
- Convention for the protection of the ozone layer (Vienna 1985).
- Convention for the prevention and control of occupational hazards caused by carcinogenic substances and agents (Geneva 1974).
- Convention for the protection of workers against occupational hazards in the working environment due to air pollution, noise and vibration (Geneva 1977).
- ILO core labor standards: core labor standards are to be adhered to/reached during the project implementation. Egypt has been a member state of the ILO since 1936, and has ratified 64 conventions that regulate the labor standards and work conditions. In 1988, Egypt has ratified the Occupational Safety and Health Convention of 1979 (No 152)

5.3.4 Detailed Description of National Legislation Related to Social Aspects

The Table below presents a more detailed description of the Egyptian legislations related to the social aspects

Title of legislation	Summary and how this legislation applies to this project	Year
EEAA ESIA guidelines related to the Public Consultation		
number 4/1994 on Environmental Protection	Consultation of the community people and concerned Parties with the needed information about the project. All Stakeholders should be invited. Paragraph 6.4.3 of Law4/1994 on Environmental Protection provides detailed information on the scope of public consultation, methodology and documentation Paragraph 6.4.3 Requirements for Public Consultation Paragraph 6.4.3.1 Scope of Public Consultation Paragraph 6.4.3.2 Methodology of Public Consultation Paragraph 6.4.3.3 Documentation of the Consultation Results Paragraph 7 Requirement and Scope of the Public Disclosure	**1994**
Land acquisition and involuntary resettlement (The project will not result in resettlement activities)		
Law 10/1990 on property expropriation for public benefit and its amendments by law number 1/2015.	On Property Expropriation for Public Benefit. It describes acquisition procedures as follows: 1. The procedures start with the declaration of public interest pursuant to the presidential decree accompanied with memorandum on the required project and the complete plan for the project and its structures (Law 59/1979 & Law 3/1982 provided that the Prime Minister issues the decree); 2. The decree and the accompanying memorandum must be published in the official newspapers; A copy for the public is placed in the main offices of the concerned local Government unit. This law has specified, through Article 6, the members of the Compensation Assessment Commission. The commission is made at the Governorate level, and consists of a delegate from the concerned Ministry's Surveying Body (as President), a delegate from the Agricultural Directorate, a delegate from the Housing 2. The decree and the accompanying memorandum and Utilities Directorate, and a delegate from the Real Estate Taxes Directorate in the Governorate. The compensation shall be estimated according to the prevailing market prices at the time of the issuance of the Decree for Expropriation.	**1990**
Law 577/1954 about property expropriation for public benefit(cancelled by law10/1990)	Law 577/1954, which was later amended by Law 252/1960 and Law 13/1962, and establishes the provisions pertaining to the expropriation of real estate property for public benefit and improvement.	**1954**
Law 27/ 1956 about property expropriation for public benefit	Law No. 27 of 1956, which stipulates the provisions for expropriation of districts for upgrading, and improvement, and the amended and comprehensive Law No.10 of 1990 on the Expropriation of Real estate for Public Interest. The first article of Law No. 27 of 1956 allows for the expropriation of districts for their improvement, upgrading, re-	**1956**

(cancelled by law10/1990)	planning, and reconstruction. Article 24 of Law 577/1954 also stipulates that in case only partial expropriation of real estate property is required, and the remaining un-expropriated part will not be of benefit to the owner; the owner shall be given the right to submit a request within 30 days (beginning from the date of final disclosure of the list of the expropriated property) for the purchase of the entire area. It should be noted, that the new law has not restricted the right to request the purchase of the remaining un- expropriated portion of real estate regardless whether it is a building or land.	
Civil code131/1948	Articles 802-805 recognize private ownership right. Article 802 states that the owner, pursuant to the Law, has the sole right of using and/or disposing his property. Article 803 defines what is meant by land property Article 805 states that no one may be deprived of his property except in cases prescribed by Law and would take place with an equitable compensation.	**1948**
Protection of communities' human rights law		
Law no. 94/2003 about the establishment of the national council for human rights	The Law on Establishing the National Council for Human Rights (NCHR) aims to promote, ensure respect, set values, raise awareness and ensure observance of human rights. At the forefront of these rights and freedoms are the right to life and security of individuals, freedom of belief and expression, the right to private property, the right to resort to courts of law, and the right to fair investigation and trial when charged with an offence. This Constitution came into force after a public referendum on 11 September 1971 and was amended on 22 May 1980 to introduce the Shoura Council and the press.	**2003**

Table (5-1): Egyptian legislations related to the social aspects

4.3.5 Detailed Description of National Legislation Related to Archaeology and Cultural Heritage

The table (4-2) shows Egyptian legislation related to Archaeology and cultural heritage:

Definition of monuments	
Law 117/1983	Article 1 defines a monument as a building or movable property produced by different civilizations or by art, sciences and literature and religions from prehistoric era and during successive historical eras until a hundred years ago or historical buildings. Article 2 states that any building or movable property that has an historical, scientific, religious, artistic or literary value could be considered as a monument whenever the national interest of the country impose its conservation and maintenance without adherence to the time limit contained in the preceding Article no.1 Article 5 of the law states that the Supreme Council of Antiquities (SCA) Construction license Article 20 states that licenses of construction in archaeological sites or land are not permitted, and it is prohibited to make any installations or landfills or digging channels or constructing roads or agricultural land or for public benefits in the archaeological sites or land within its approved border lines. Also, Article 20 states that a buffer zone around the monument or the site is defined as three kilometers in the uninhabited areas or any distance determined by the SCA to achieve environmental protection of the monument in other areas (article 20-Ch.1).The provisions of this Article (20) applies on land which appears to the SCA - based on conducted studies– that there is a probable existence of monuments in the subsoil. The provisions of this article are also applied on desert and areas where quarrying work is licensed. Article 22 states that: licenses of construction in the immediate vicinity of archaeological sites within populated areas could be delivered by the competent authority, after the approval of SCA. The competent authority must state in the license; the conditions which the SCA emphasizes to guarantee that the building does not have a negative visual impact on the monument and its direct buffer zone that protects the archaeological and historical surroundings. The SCA has to pronounce its verdict on the license demand within 60 days of the date of submission. Otherwise, the elapsing of this period is regarded as a decision of refusal. During Construction Article 23 states that the SCA should take the necessary steps to expropriate land that is found in or kept in place and registered according to the roles of this Law. (Article 23- Ch.1). [These roles are defined in the second chapter of the Law 117 – articles 26-30]. Article 24 states that everyone who finds by chance the part or parts of a fixed monument in its place must promptly inform the nearest administrative authority within forty-eight hours

Table (5-2) Egyptian legislation related to Archaeology and cultural heritage

5.3.6 Detailed Description and Gap Analysis of National and International Environmental Requirements

There are no AfDB standards for air/noise/water pollution limitations. However, AfDB is using the environmental regulations of the World Bank and the international institutions such as WHO and EPA. In the following section, all national regulations that related to the air/noise/ and water pollutions are compared with WB and other international regulations. The gap analysis between the national and international regulations were followed and discussed to show the discrepancy between national and international requirements, However, the environmental standards in the IRSUE program shall be related to the NRSP and therefore shall apply the Egyptian regulations.

5.3.6.1 Air Quality

Regulations

Issue	Requirements of Egyptian legislation		Requirements of World Bank	
Air Quality	Reference	Inflections	Reference	**Inflections**
	Article 34 of Law 4/1994 amended by law 9/2009 and Article 34 of its Executive Regulation (ERs)	Standards for ambient air quality	OP 4.01	**Ensure the environmental sustainability of investment projects**
			IFC General EHS Guidelines	Air Emissions and ambient air quality (Section 1.1, WHO Ambient Air Quality Guidelines)

Table (5-3): Air Quality Requirements of Egyptian legislation and WB

Standard and limits

Requirements of Egyptian legislations					Requirements of WB[(12)] legislations			
Ambient air parameters	Ambient air pollutants Threshold (Egyptian)				**Ambient air pollutants Threshold (According to WHO)**			
Exposure period	1 hr	8 hr	24 hr	1 year	1 hr	8 hr	24 hr	**1 year**
Carbon monoxide CO mg/m³	30	10	N/ A	N/A	N/ A	N/ A	N/ A	**N/ A**
Sulfur dioxide SO2 µg/m³	350	N/A	150	60	N/ A	N/ A	125	**N/ A**
Nitrogen oxides NOx µg/m³	400	N/A	150	N/A	200	N/ A	N/ A	**40**
Particulates PM10 µg/m³	N/A	N/A	70	N/A	N/ A	N/ A	150	**70**
Particulates PM2.5 µg/m³	N/A	N/A	150	60	N/ A	N/ A	75	**35**
TSP µg/m³	N/A	N/A	230	90	N/ A	N/ A	N/ A	**N/ A**
Ozone	**200**	**120**	**N/A**	**N/A**	**N/ A**	**160**	**N/ A**	**N/ A**

Table (5-4): Air Quality Limitations of Egyptian legislation and WB

[2] *reference: Requirements of WB of the IFC General EHS Guidelines*

5.3.6.2 Water Quality

Regulation

Issue	Requirements of Egyptian legislations		Requirements of WB	
	Reference	Inflections	Reference	**Inflections**
Water Quality	Article 51, The Executive Regulations of Law 48 for the year 1982 amended with Ministerial Decree 402 /2009	Standards for Ambient water quality	OP 4.01	Ensure the environmental sustainability of investment projects
	Article 52, The Executive Regulations of Law 48 for the year 1982 amended with Ministerial Decree 402/2009	Maximum limits for discharging processed liquid industrial wastes into freshwater bodies and groundwater reservoirs	WB GENERAL EHS GUIDELINES Table 1.3.1	Discharges of process wastewater, sanitary wastewater, wastewater from utility operations or storm water to surface water should not result in contaminant concentrations in excess of local ambient water quality criteria
	Ministerial Decree No. 44/2000 amending Law 93/1962	Controlling the discharge of wastewater into the sewage system and public network	WB GENERAL EHS GUIDELINES	Discharges of industrial waste water , sanitary wastewater into public or private wastewater treatment systems should meet the pretreatment and monitoring requirements of the sewer treatment system into which it discharges
	Ministerial Decree No. 44/2000 amending Law93/1962	It encompasses this statement "wastewater discharge licenses must be acquired from the concerned authorities during the construction and operation phase"		
	Law 38/1967 and its executive regulations (decree 134/1968)	Concerning cleanliness and sanitation and also regulates the collection, transportation, storage and disposal of solid waste		

Table (5-5): Water Quality Requirements of Egyptian legislation and WB

WB GENERAL (EHS) GUIDELINES

WB GENERAL EHS GUIDELINES[1]		
Table 1.3.1 Indicative Values for Treated Sanitary Sewage Discharge		
Pollutants	Units	**Guideline Values**
pH		**6 - 9**
BOD	mg/l	**30**
COD	mg/l	**125**
Total nitrogen	mg/l	**10**
Total phosphorus	mg/l	**2**
Oil and grease	mg/l	**10**
Total suspended solids	mg/l	**50**
Total coliform bacteria	**MPN / 100 ml**	**400**

(1): reference: Requirements of WB of the IFC General EHS Guidelines

Table (5-6): WB GENERAL (EHS) GUIDELINES

(EPA) Standards for wastewater effluent

Applicable scope		**Effluent characteristics**	**Effluent limits**	**Notes**
Public sewers	Flow rate greater than 250 m^3/day	Total nitrogen	15	Total nitrogen and total phosphorus standards are applicable solely to newly established public sewers used to discharge wastewater or sewage within water source quality and volume protection areas (newly established public sewers refers to sewage systems for which planning had not been completed by November 23, 2001)
		Total phosphorus	2	
		BOD	30	
		COD	100	
		Suspended solids	**30**	

Reference: US Environmental Protection Agency standards for effluent water quality from public sewers

Table (5-7): (EPA) Standards for wastewater effluent

Egyptian Standards and Limits for the reuse of treated wastewater in irrigation

- Egyptian Code for the Reuse of treated Wastewater in Agriculture (501/2005)

The Ministry of Housing, Utilities, and Urban Communities, supported by seven technical committees, issued the Code for the Reuse of Treated Wastewater in Agriculture (hereafter, the Code 501/2005). The Code stipulates exact requirements in planning and approval procedures, responsibilities, permitted use according to effluent quality, and monitoring. The Code regulates only the direct use of wastewater, not the wastewater discharged into drains.

According to the Code, the reuse of treated wastewater—irrespective of the treatment level—is prohibited for the production of vegetables, whether eaten raw or cooked; export-oriented crops (i.e. cotton, rice, onions, potatoes, and medicinal and aromatic plants); as well as citrus fruit trees; and irrigating school gardens.

Restrictions are in place for type of crops, irrigation methods, and health precautions. The existing reuse schemes are operated by public institutions, mainly ministries such as the Ministry of Housing, Utilities, and New Communities; and Ministry of State for Environmental Affairs.

Plants and crops irrigated with treated wastewater are classified into three agricultural crop groups that correspond to three different levels of wastewater treatment. Biological and chemical standards for these three levels of treatment are set as well. The Code further stipulates conditions for irrigation methods and health protection measures for farm workers, consumers, and those living on neighboring farms.

The Code classifies wastewater into three grades (designated A, B, and C) as follows, depending on the level of treatment it has received, and specifies the maximum concentrations of specific contaminants consistent with each grade, and the crops that can, and importantly cannot, be irrigated with each grade of treated wastewater.

Grade A is advanced, or tertiary, treatment that can be attained through upgrading the secondary treatment plants (i.e. Grade B plants) to include sand filtration, disinfection and other processes.

Grade B represents secondary treatment performed at most facilities serving Egyptian cities, townships and villages. It is undertaken by any of the following techniques: activated sludge, oxidation ditches, trickling filters, and stabilization ponds.

Grade C is primary treatment that is limited to sand and oil removal basins and use of sedimentation basins.

Code 501/2005: Degree of Treatment Permitted for Agriculture Use

	Grade A	Grade B	Grade C
BOD Mg/l	<20	<60	**<400**
TSS Mg/l	<20	<50	**<250**
Potential number of the colonic group in 100 cm^3	<1000	<5000	**N/A**
No. of eggs of nematode No./l	**<1**	**<1**	**N/A**

Table (5-8): Degree of Treatment Permitted for Agriculture Use in Code 501/2005

Code 501/2005: Plants and Crops Permitted for Irrigation by Treated Wastewater

Grade	Agricultural Group	Description
A	G1-1: plants and trees grown for greenery at tourist villages and hotels	Grass. Saint Augustin grass. Cetaceous plants. Ornamental plants fencing bushes and trees. wood trees and shade trees
	G2-1: plants and trees grown for greenery inside residential areas at the new cities	Grass. Saint Augustin grass. Cetaceous plants. Ornamental plants fencing bushes and trees. wood trees and shade trees
B	G2-1: Fodder/feed crops	Sorghum
	G2-2: Trees producing fruits with epicarp	On condition that they are produced for processing purposes such as lemon. Mango. Date palm. and almonds
	G2-3: Trees used for green belts around cities and afforestation of highways or roads	Casuarina. Camphor. Athel tamarix (salt tree) oleander. Fruit-producing trees. Date palm and olive trees
	G2-4: Nursery plants	Nursery plants of wood trees. Ornamental plants and fruit trees
	G2-5: Roses and cut flowers	Local rose. Eagle rose. Onions (e.g. gladiolus)
	G2-6: fiber crops	Flax, jute, sisal
	G2-7: Mulberry for the production of silk	Japanese mulberry
C	G3-1: Industrial oil crops	Jujoba. Castor – oil. And Jatrova
	G3-2: Wood trees	Kaya. Camphor. And other wood trees

Table (5-9): Plants and Crops Permitted for Irrigation by Treated Wastewater in Code 501/2005

MHUUC has adopted revised Code of Practice for wastewater reuse (no. 501/ year 2015) rather than reuse code (no. 501/ year 2005) to develop Code for reuse to allow for cultivation of industrial crops & some edible crops that are not eaten raw, taking into consideration the required measures.

The reasons for revising Egyptian code for wastewater reuse (no.501 /2005) are:

- According to the code, no edible crops or export crops can be cultivated and irrigated on wastewater – regardless of the treatment level
- Considered as barrier for wastewater reuse projects with short "Return On Investment" (ROI)
- Too strict comparing to wastewater reuse codes of other countries
- Egypt has to face the water scarcity challenge as 7.6 Billion m3 /Year of wastewater are available
- About 40,000 hectares are available for wastewater reuse projects in different governorates.
- Forestations projects should not the ultimate goal of wastewater reuse projects.

This code (no. 501/ year 2015) takes the approach suggested by WHO in 2006 to reduce health risks to the minimum by using a package of barriers such as:

1. Degree(s) of wastewater treatment (Characteristics)
2. Specifying crops
3. Specifying methods and conditions for irrigation
4. Specifying public health requirements, in relation to the circulation of crops
5. Specifying public health requirements in relation to agricultural workers
6. Specifying monitoring and control systems

The new code for reuse (no. 501/ 2015) has taken the following parameters into consideration:

1. Level of wastewater treatment (four grades of wastewater treatment. These four grades are: grades A; B; C; and D instead of only three grades in code 501/2005-Chapter 4.
2. Types of plantations and crops for which irrigation by treated wastewater is permissible-Chapter 5.
3. Regulations for irrigation and drainage systems-Chapter 6.
4. Regulations to control the extent of direct exposure of workers and the public-Chapter 7
5. Institutional system (responsibility & commitment of concerned agencies, inspection and corrective actions) (Chapter 8)

Code 501/2015: Degree of Treatment Permitted for Agriculture Use

	Grade A	Grade B	Grade C	Grade D
BOD Mg/l	<15	<30	<80	**<350**
TSS Mg/l	<15	<30	<50	**<300**
E.coli / 100 ml	**<20**	**<100**	**<1000**	**N/A**

Table (5-10): Degree of Treatment Permitted for Agriculture Use in Code 501/2015

Code 501/2015: Plants and Crops Permitted for Irrigation by Treated Wastewater

Grade	Agricultural Group	Description
A	**G1-1:** Green landscapes in Educational establishments, public and private parks	All types of grass and fence plants and all kinds of flowers
B	**G2-1** Dry grains crops, cooked & processed vegetables	All Kinds of Vegetables (manufactured) and strategic dry crops of all types such as wheat - corn - barley - rice - beans - lentils – sesame
	G2-2: Fruit Crops	Fruit trees with sustained and deciduous leaves such as: citrus fruits - olive - palm - mango - pecan - pomegranate for the purpose of drying
	G2-3: Medicinal Plants	Anise - hibiscus - Cummins - Marjoram - Ammi - Fenugreek - moat - fennel - Chamomile – sage herb
C	**G3-1:** Dry grain crops, fruits, medicinal plants contained group (B)	Same species in addition to sunflower plant providing that spray irrigation is not used.
	G3-2: Non-food seeds	All seeds of propagation for major food crops such as wheat, corn and all kinds of vegetables' seeds
	G3-3: All types of seedlings, which are then transplanted in permanent fields	Seedlings of Olive - pomegranate - citrus - bananas - palm - figs - mango - apples – pears
	G3-4: Roses and Cut flowers	Roses farmyard – Rosa Canina - bulbs such as Algeladiols, bird of paradise and all kinds of ornamental plants.
	G3-5: Trees suitable for planting in highways and green belts	Alcazurina - camphor - oleander - tamarisk - types of ornamental palms
	G3-6: All types of fiber crops	Such as cotton - linen - Jute - kenaf
	G3-7: Grassy forage crops and leguminous crops	Sorghum types and kinds of shamrock
	G3-8: Mulberry to produce silkworm silk	All kinds of Berries
	G3-9: All plants and ornamental trees nurseries	Such as Ficus décor - Ficus Natda - Ambassndr – Acacia
D	**G4-1:** Solid biomass crops	All crops for the production of bio-diesel fuel and energy oils such as: soybean - rapeseed - Jojoba - and Jatropha - Castor.
	G4-2: Crops to produce cellulose	All non-food crops for the production of glucose and its derivatives like ethanol and acetic acid - ethanol – Generation
	G4-3: Timber trees	All trees for timber production such as Alcaaa - camphor - and mahogany

Table (5-11): Plants and Crops Permitted for Irrigation by Treated Wastewater in Code 501/2015

Standards and Limits for the drains' water quality prior to being transferred to fresh water courses for agricultural purposes only

According to Article 51 of the ER of Law 48/1982 amended by Decree 402/2009

Parameter	Standards &Limits (mg/l)
Total dissolved solids(TDS)	**≤1000**
Temperature	**Maximum difference of 3°C as compared with the receiving watercourse**
Dissolved Oxygen	**5≥**
pH	**min 6.5 andmax8.5**
BOD	**≤30**
COD	**≤50**
Total Nitrogen (TN)	**15**
Total P (TP)	**3**
Oil &Grease	**≤3**
Mercury	**≤0.001**
Fe	**≤3**
Mn	**≤2**
Cu	**≤1**
Zn	**≤2**
Phenol	**≤0.05**
As	**≤0.01**
Cd	**≤0.03**
Cr	**≤0.05**
Free Cyanide	**≤0.01**
Pb	**≤0.1**
Ni	**0.1**
Se	**0.01**
Coliform 100 cm3	**5000**

Table (5-12): Article 51 of the ER of Law 48/1982 amended by Decree 402/2009

Standards and Limits for discharge of effluent wastewater into agricultural drains

This according to Article 52 of the ER for Law 48/1982 amended by Decree 402/2009

Parameter	Standards and Limits (mg/l)
Temperature	Does not exceed the temperature of the receiving receptor by more than 3
pH	6-9
BOD	60
COD	80
Dissolved Oxygen	≥4
Oil & Grease	10
Total Dissolved Solids	Does not exceed 2000
Total Suspended Solids	50
H_2S	1
Free Cyanide	0.1
Phenol	0.05
Mercury	0.01
Pb	0.1
Cd	0.003
Se	0.1
Cr	0.1
Cu	0.5
Ni	0.5
Zn	2
Fe	1
Total Coliform (100cm3)	**1000**

Table (5-13): Article 52 of the ER for Law 48/1982 amended by Decree 402/2009

4.3.6.3 Noise

Regulations

Issue	(Egyptian requirements)		(WB requirements)	
	Article	Inflections	Reference	Inflections
Noise	Article 42 of Law 4/1994 amended by law 9/2009	Maximum allowable limits for ambient noise intensity	OP 4.01	Ensure the environmental sustainability of investment projects
	Article44 of ERs (amended by Decree 1095/2011 amended by Decree 710/2012).	Maximum exposure duration	WBGGENERAL EHS GUIDELINES Table 1.7.1 Table 2.3.1	- Presents Noise Level Guidelines - Identify maximum increase in background noise levels at the Nearest receptor location off-site. - Presents noise limits for different working environments

Table (5-14): Noise Requirements in Egyptian regulations and WB

Table (5-15): Noise Limitations in Egyptian regulations and WB

Issue	Egyptian Law 4 Requirements				Requirements of WB (Table 1.7.1 of the IFC General EHS Guidelines)		
Noise					**Permissible limit for noise intensity decibel**		
	TYPE OF AREA	7 a.m. to 6 p.m.	6 p.m. to 10 p.m.	10 p.m. to 7 a.m.	Receptor	**One hour L_{Aeq} (dBA)**	
						DAY Time 07:00 – 20:00	**NIGHT Time 20:00 – 07:00**
	Sensitive Areas (schools- hospitals- public parks- rural areas)	35 -40	30 -40	25 -35	Residential; Institutional; educational	55	**45**
	Residential areas with limited traffic and public services are available	40 -50	35 -45	30 -40	Industrial; commercial	70	**70**
	Residential areas in the city where commercial activities are available	45 -55	40 -50	35 -45			
	Residential areas located adjacent to roads which width is 12m or more , and workshops or commercial or entertainments activities are found	50 -60	45 -55	40 - 50			
	Areas located adjacent to roads which width is less than 12m, or light industrial areas.	55 -65	50 -60	45 -55			
	Industrial areas (heavy industries)	**60 -70**	**55 -65**	**50 -60**			

Standards and Limits for Noise Levels in the Work Environment

	Egyptian Law 4 Requirements			Requirements of WB (Table 2.3.1 of the WB General EHS Guidelines)		
	TYPE OF PLACE AND ACTIVITY	MAXIMUM PERMISSIBLE NOISE [level equivalent to decibel(A)]	MAXIMUM PERMISSIBLE NOISE [level equivalent to decibel (A)] at the beginning of 2014	Location /activity	Equivalent level LAeq,8h decibel (A)	**Maximum LAmax ,fast decibel (A)]**
Noise	Work place with up to 8 hour shifts and aiming to limit noise hazards on sense of hearing*	90	85	Heavy Industry (no demand for oral communication)	85	**110**
	Hospitals, clinics, public offices, etc	80	80	Light industry (decreasing demand for oral communication)	50-65	**110**
	Administrative offices – control rooms	65	65	Open offices, control rooms, service counters or similar	45-50	**N/A**
	Work rooms for computers, typewriters or similar equipment	70	70	Individual offices (no disturbing noise)	40-45	**N/A**
	Work rooms for activities requiring routine mental concentration	**60**	**60**	**Hospitals**	**30-35**	**40**

Table (5-16): Standards and Limits for Noise Levels in the Work Environment in Egyptian standards and WB

5.3.6.3 Gap Analyses between the Egyptian and international standards:

With regarding to air quality, there are few differences in the pollutants threshold limits between Egyptian and WHO standards. While the only Egyptian standard has limitation for Carbon monoxide and TSP in the air, WHO has more stringent limits in Particulates matters (PM2.5) and Nitrogen oxides (NOx) than Egyptian standards. PM 10 is more stringent in the Egyptian standards.

With regarding to water quality, while Egyptian standards are limiting the pollutants concentrations in the treated wastewater to the type of receiving body (Agricultural drain or reusing in irrigation), both WB and EPA standards do not taking this into consideration. Both international standards use the most critical pollutants limit wherever the receiving body is.

In this analysis, the Egyptian standard for discharge of effluent wastewater into agricultural drains has been used, since the treated water from both WWTPs in the project area is planned to be discharged into the agricultural drains.

One of the biggest concerns on Egyptian Law 48/1982 is that the law does not include phosphorus and nitrogen threshold limits in the treated water while discharging into agricultural drains. Excluding threshold limits for these two important nutrients can lead to eutrophication phenomena that have detrimental effect on the agricultural drains. Both WB and EPA are giving limitation for both nutrients.

While WB and EPA are more stringent in the effluent BOD threshold, the Egyptian standard requires lower threshold limit in the effluent COD compared with the WB and EPA. This tight threshold in COD value sometimes became the reason of failed sample results in the treated water in some of the WWTPs in Egypt. In 2015, Egyptian government did not include COD as influential parameter in the Egyptian code for reuse water in irrigation. This is probably to avoid misleading results of the treated water when intending to use it in the irrigation.

Effluent TSS threshold are the same at all the standards, whereas, WB is more stringent than the Egyptian standards in the total coliform count in the treated water.

With regarding to noise levels, both standards (Egyptian and WB) are almost equal. However, Egyptian limits are defined in wider scope of areas than WB. Also, Egyptian standard has more stringent threshold number in the sensitive areas.

In work environment, the maximum permissible noise in WB is stricter than that of Egyptian standard.

Chapter 6: Assessment of the Environmental and Social Management Procedures

6.1 Organizational Set-up for managing the environmental and social issues in place

The proposed operation of this SESA will be aligned with the current institutional arrangement under the Mega Program. The Integrated Rural Sanitation Program will be implemented using existing national system and structures currently being utilized under Mega Program. The program will use the existing PMU set by other development partner (WB) at Ministry Level (MHUUC-PMU), and a new PIU reform for this program shall be established and manage through LWSC. The existing PIU is for the USAID projects at Luxor Water and Sanitation Company and it is sufficient to operate the current USAID project and cannot be used to operate other projects.

This will ensure continuity that the proposed operations benefits from the structures built under the Mega Program (SRPSS).

- The project will be guided by sector Coordination Inter-ministerial Steering Committee, with major stakeholders (the Holding Company for Water and Wastewater, Ministry of Health, Ministry of Water Resources and Irrigation, Ministry of Environment, Ministry of International Cooperation, and Ministry of Finance).
- The Program Management Unit (PMU) of the Ministry of Housing, Utilities, and Urban Communities (MHUUC), which was established in 2015, will continue to provide an oversight and coordinate the project with other initiatives and provides guidance at strategic and policy levels. Also, the PMU will support the LWSC in measuring progress using a monitoring and evaluation (M&E) system and will collate the results to assess progress in achieving the DLIs. Once satisfied with the accuracy of the reporting, the PMU will present evidence of the DLI achievement to an Independent Verification Agency (IVA) which is tasked with verifying the results.
- Within the current structure of the PMU, a Project Management Team (PMT) with a dedicated staff for the AfDB operation will be established. The PMT will consists of Program Coordinator, Procurement Specialist, Financial Management specialist, Environmental and Safeguards specialist, Social and Community Development specialist, Contract Management and Legal Specialist, and M&E. The main role of the PMT will coordinate and supervise the implementation of the Project, maintain the Project accounts and financial records, process invoices and disbursement requests, and reports regularly in accordance with the requirements of GOE and AfDB.
- A dedicated Project Implementation Unit (PIU) at LWSC will be established for the daily – daily implementation and management of the Project. Under the Technical Engineering Consultant, the following staff will be recruited: Water and Sanitation Engineer, Procurement Specialist, Financial Management specialist, Environmental specialist and social specialist, Health and safety specialist, Community Development specialist, and Contract Management and Legal Specialist.
- A Program Management Consultancy Firm (PMCF) will be attached to the PMU to assist in carrying out its preparation, oversight, coordination, and reporting tasks. For the implementation works, LWSC shall hire ISC (implementation and supervision company) that can work with the PIU in construction work supervision and to assist the LWSC in carrying out construction planning and management and to improve their performance in this area.

6.2 Environmental Licensing and Follow-up Procedures

In general, the local legislations, policies, and guidelines address the environmental and social issues associated with the program.

Environmental assessment for projects is included in Law 4/1994 modified by Law 9/2009 or the 'Law for the Environment' which is the main legislation regulating environmental protection in Egypt. It is being regulated by the Ministry of State for Environmental Affairs (MSEA) and its executive agency, the Egyptian Environmental Affairs Agency (EEAA). Since the law came into effect in 1994, significant improvements have been introduced to the environmental legal system based on the experience gained from implementing the law in the last few years. According to Law 4/1994, the Environmental Impact Assessment (EIA) is a licensing requirement for development projects that are likely to have an impact on the environment. The existing EIA Guidelines (modified in 2009) have detailed requirements for the EIA process, including social assessment and consultation, and are compatible with the Bank Group's environmental assessment requirements.

Regarding the procedures for environmental assessment, the EIA preparation and fulfillment of the EEAA requirements are well defined in the guidelines. Also, the EIA approval is well integrated in the licensing system for new projects—especially the sanitation projects.

For the sanitation sector, the NOPWASD used to take the lead for undertaking the EIAs as it is responsible for new investments. Therefore, the WSCs have limited capacity in conducting an environmental assessment and keeping an environmental register in compliance with Law 4/1994.

Also, some issues such as sludge handling and health, safety, and environment issues require resources that are not readily available in the WSCs.

Regarding IRSP program, the EIA report for Keman El Matana cluster has been prepared in the Egyptian system and approved by EEAA. El Dabayba cluster and after adding the service of some of new villages in this cluster needs to be revaluated by new system design and EIA report. ISC with PIU support will be required to prepare for this EIA during design phase and before tendering process.

6.3 Land Acquisition Procedures

There are three main forms of land ownership in Egypt: public or state land (amlak amiriya), private land (*mulk horr* in Arabic), and waqf land (land held as a trust/endowment for religious or charitable purposes). Article 33 of the 2014 Constitution provides that "the State shall protect ownership with its three types: the public, the private, and the cooperative." Article 35 of the Constitution further provides that "private properties shall be protected, and the right to inheritance thereto is secured." According to the Constitution (article 63), "all types of involuntary relocation using force or excessive violence is banned and whoever violating this article will be brought to court."

Law 10/1990 concerning the expropriation of ownership for public interest was issued to regulate the cases where private land is needed for public interest projects. In addition, expropriation of property is further regulated by Law 59/1979 concerning the establishment of new urban communities and Law 3/1982 concerning urban planning. The term 'public interest' in the context of expropriation has been defined in article 2 of Law 10/1990. Water supply and sewage projects are among the projects identified by this article. Other laws and decrees added to the list of projects are stipulated under article 2 of Law 10/1990.

Law 10/1990 has described the expropriation procedures starting with a declaration of public interest pursuant to a Presidential Decree accompanied with a memorandum on the required project and a complete plan for the project and its buildings (Law 59/1979 and Law 3/1982 provide that the prime minister issues the decree). The decree and the accompanying memorandum must be published in the official gazette. A copy for the public is placed in the main offices of the

concerned local government unit. A number of operational steps take place afterwards until the land is acquired.

At the central level, the governmental agency in charge of the implementation of the expropriation acts issued in public interest is the Egyptian General Authority for Land Survey (ESA), except for projects handled by other entities pursuant to a law to be issued in this respect. As mentioned above, the ESA is charged with the formation of the expropriation and compensation committees. Usually, the executing body could be other ministries (for example, MoHUUD) or the governorate. This executing agency would be responsible for paying the compensation to affected groups through the ESA or under its supervision, offering alternative resettlement options, and implementing the resettlement project. At the local level, several local departments and directorates should be involved in the resettlement program depending on the type of program to be implemented and the nature of land ownership.

Although Law 10/1990 does not clearly specify lessees as entitled to compensation, they implicitly fall within the group of 'rights holders' referred to in the law. It is clear, however, that lessees may not have recourse against the landlord for termination of their lease agreements as a result of the expropriation act. Another important issue that has not been addressed in Egyptian law is the right of squatters to be compensated in cases of displacement or resettlement. The Egyptian legislation framework has not recognized the rights of squatters. However, the Egyptian experiences in dealing with this issue have shown that due to political pressure and social dimension, the government has been forced to provide an alternative for those groups of households whether in terms of alternative shelter, cash liquidity, or other types of in-kind compensation (for example, jobs).

When a rural sanitation project is being planned and land is needed, priority is usually given to obtaining state-owned land as an avoidance strategy to prevent negative resettlement impacts on population. In case of unavailability of state-owned land, there are four other approaches to obtain the land for PSs and the WWTPs, including (a) voluntary land donation; (b) community contribution, which is a common approach for obtaining land for a PS; (c) willing buyer-willing seller; and (d) acquiring land by using eminent domain. The WSCs are not heavily involved in the process of finalizing land purchase (willing buyer-willing seller approach) for the PSs and the WWTPs because the part that relates to investment for the sanitation project is officially mandated to the NOPWASD. Although there is no legal obstacle for the WSCs to complete the process of acquiring land through both purchase and donations, the lack of resources for the WSCs usually limits their chances in land acquisition—specifically the purchase part. Accepting donated land or land obtained through community contribution for a PS is a more common area for the involvement of the WSCs compared to the purchase for the WWTP. The Properties Department under the Legal Department within the WSC is responsible for the land purchase (in the rare cases of the WSC's involvement in land purchase) and for accepting donated land or land obtained through community land contribution for the PSs. For the WWTPs, the lands are obtained mainly through the willing buyer-willing seller approach. The WSCs are reluctant to use eminent domain to acquire land as it may take a longer time.

6.4 Procedures for Grievances Redress

Through the SRSSP (P for R) program, project-level Grievances Redress Manual (GRM) on 2017 has been published and approved by the Ministry of Housing. In IRSUE this GRM needs to be assessed and adopted to the program and then applied and followed during the construction and operation phases.

One of the key formal grievance channels is the Hotline and the one which is meant, by design, to be the single official channel. The HCWW is working to strengthen the Hotline system—

including the call centers within the WSCs—and is aiming, through this strengthening, to enable this channel to be the single official uptake modality. However, in practice, In Luxor-similar to other governorates- most complaints are still being communicated through other informal channels including verbally to laboratory staff, maintenance service staff, security, commercial personnel, or the media.

6.5 Procedures for Engaging with Communities and awareness program

From more than ten years ago, the HCWW was not heavily involved in the planning and preparation of rural sanitation projects. The formal role of the HCWW and the WSCs is more about operation and maintenance (O&M). No structured mechanism is followed to carry out communities' needs assessment for sanitation projects or to engage the communities in the planning of the projects. Recently, in the cases when private land for the PSs or the WWTP is needed, the WSCs play a more technical and legal role. The social aspects related to land are not taken into consideration. During project construction (specifically the construction of the networks), the WSCs play a supervisory role over the contractors. The monitoring of the construction process has a technical orientation by nature. The social issues that may arise (for example, damage in structures) are handled in a reactive manner. Previously, there was no local grievance system and systematic method for consultations with local communities during construction.

Apart from planning and construction phases, and during project O&M, the HCWW and the WSCs have a number of key mandates that involve community engagement in the project O&M. Awareness raising, measuring community satisfaction (which serve in project monitoring), and handling grievance mechanisms are the key relevant fronts for community engagement during project O&M. Water projects are significantly dominate the scope of work for these departments.

This mandate been has changed after involvement of HCWW and WSCs in the planning and construction in the non-government funds projects. WSCs starts to raise the householders awareness even before the construction, however, it is still less than the funders expectation.

6.6 Procedures for handling the environmental and social risks linked to activities of the Program:

6.6.1 Procedures for WWTP construction and operation

The handling procedures of hazardous substances and wastes during the construction and operation phases are described in Law 4/1994 with adequate details. The handling of chlorine cylinders, which are the most common hazardous substances handled within the WWTPs, is further detailed in the Engineering Code for Wastewater Treatment Plants (Decree 169/1997). Also the Engineering Codes for fire protection provides sufficient measures for safeguarding against fire risks. However, with regard to the application, some of the facilities designs do not comply with safety issues arise during operation. The new program shall address this issue by including health and safety (H&S) standards in the tender document for the design works and allowing H&S staff to review and verify the designs.

Solid waste is usually accumulated in the screens of the WWTPs and PSs and removed from grit removal chambers. This separated solid waste should be adequately handled by the facilities. Solid waste management is regulated by specific articles of Law 4/1994 in addition to the General Cleansing Law 38/1967. With regard to application, the WSCs usually do not adequately collect and dispose of solid wastes at the licensed site.

6.6.2 Procedures for Connecting Sewers

According to Law 27/1978, regulating public resources for water and sanitation and covering the cost of the households' connection is the responsibility of the beneficiary. According to the WSCs,

the exact amount that each household is requested to pay depends on the distance of the house from the manhole, the number of houses participating in the communal inspection chambers, and the amount of works and material associated with each item.

Connecting households and other commercial industrial facilities to the sewerage networks is controlled under Law 93/1962 and Decree 44/2000. The law 44/2000 provides standards for wastewater parameters so that industries and commercial establishments generating high load of wastewater install pretreatment units for their wastewater before discharging into the sewer. These standards are frequently monitored and inspected for industrial establishments but rarely inspected for animal barns and farm slurry, which is most relevant to the rural areas covered by the program.

The design and operation of networks and pump stations (PSs) are regulated through the Engineering Codes issued by Decrees 102/2010 and 101/2005, respectively. The codes provide the standards that should be applied during design, construction, and operation of networks and the PSs to avoid blockage, seepage, structural collapse, and hydraulic and electromechanical malfunctioning. Private networks are not allowed except after having received a license from the regulatory authority and after fulfilling the requirement of the Engineering Codes. However, some villages still build private networks through self-initiatives that end up at watercourses without treatment. It is difficult for regulating bodies to prevent these private networks.

6.6.3 Procedures for Handling H&S Risks

The Labor Law (Law 12/2003) is the main legislation regulating H&S issues. The law comprises a chapter on the working environment and H&S issues and also includes a comprehensive annex on the safety standards to minimize physical, dynamic, biological, and chemical risks. Following the law standards would minimize occupational H&S risks.

With regard to application, the H&S departments in the WSCs do not have sufficient manpower to satisfactory audit and follow up on the adherence of sanitation facilities to H&S standards. Also, many construction contractors do not usually comply with H&S requirements and close supervision is required to ensure construction safety.

6.6.4 Procedures for O&M Affecting Water Quality

Nile Protection Law 48/1982 is the main legislation regulating water quality in the River Nile, its two branches, canals, drains, and groundwater aquifers. The effluent standards indicated in Law 48/1982 are not highly stringent when compared to effluent standards in other countries especially in the allowable Nitrogen and phosphorus effluent quality which are missed in the Egyptian law.

The application context in Egypt shows that the law is actually very demanding; it is mainly due to the large uncovered areas with sanitation services and the amount of investments needed to connect those areas to secondary treatment with disinfection.

Some of the existing treatment plants in Egypt comply with Law 48/1982 standards of effluent quality. This is usually verified at the WWTP level by taking daily samples from the influent, effluent, and sometimes from different points in the treatment stream.

On the other hand, there are some WWTPs that are known for being noncompliant with the effluent standards for different reasons. The common reason is that those WWTPs require investments for major repairs or extensions to provide sufficient treatment. Some of the overloaded WWTPs which face operational problems tend to bypass the discharges to the drain if in excess of their effective capacity for maintaining their effluent quality to the extent possible. Furthermore, some WSCs connect villages to the pumping stations (PSs) which are not connected

to the WWTPs (mostly exist in Dakahlia Governorate) due to lack of funding for constructing treatment plants; so these PSs discharge untreated sewage to drains.

6.6.5 Procedures for the Management of Septage

The discharge of septage removed from individual septic tanks and cesspits to freshwater canals or drains is the current normal practice although it is not allowed according to Law 48/1982. Usually, the septage is removed from cesspits in unserved areas by local contractors using tankers and then they discharge the septage in the nearest location in an agriculture drain or even in freshwater canals. Furthermore, most of the WSCs do not allow septage in their sewers and WWTPs as there is no system in place to allow for regulating the septage received. The WSCs afraid to accept septage with high organic loads that would add to the shock loads received in the WWTPs and may affect their performance and the quality of the final effluent. The lack of an official system to handle septage can has detrimental effects on surface water quality. Accordingly, on-site sanitation including an official septage management system that would serve remote and satellite villages shall be considered.

6.6.6 Procedures for the Management of Sludge

The most common scenario for sewage sludge treatment and disposal in most of the existing WWTPs in Egypt is using thickening facilities and drying beds for sludge dewatering. The dried sludge is mainly used for land application or it is rarely dumped into landfills.

It is noted that, this scenario of sewage sludge treatment does not contain facilities for sludge stabilization processes. Moreover, the quality of the produced sludge in most of the WWTPs doesn't fit with the international standards, especially pathogens limits.

Recently, the application of the anaerobic digestion technology for sludge stabilization and power generation in Al Gabel Asfer WWTP and Sakha WWTP and the windrow composting processes in (9N) site and Al Berka WWTP have achieved good results regarding to the produced sludge quality.

The handling of sludge generated at the WWTPs is regulated through decree 254/2003 and the Egyptian Code 501/2005. According to the law, if the dried sludge is to be used as organic fertilizer, it should meet certain standards; otherwise, it should be landfilled or safely incinerated.

These standards are generally equivalent to international sludge standards. However, with regard to application, the WSCs do not monitor the sludge quality as required by decree 254/2003 and the Egyptian Code 501/2005 before selling it as fertilizer for agricultural lands.

Experiences of Egypt in Sewage Sludge Reuse are:

- Use of dried sludge as an energy source for the operation of cement plant furnaces: Alexandria; Beni Suef and other Governorates.
- Using biogas (methane gas) from sludge anaerobic digestion for electricity generation: New project to generate electricity from the treatment of sludge in Sakha plant, Kafr El-Sheikh Governorate. Alexandria Governorate is preparing to implement the largest sludge treatment project at the Eastern Treatment Plant . The produced gas will be used to generate between 35 and 50% of electricity needed in plant operation
- Use of sludge in the production of organic fertilizer: Project in Greater Cairo to convert sludge to organic fertilizer in an area of 30 acres is established. The sludge is from El Berka sewage treatment plant
- Sludge Dewatering Experiments to improve its Properties for Reuse in Agriculture Using Plants: Experiment carried out in the American University in Cairo using aquatic plants such as water hyacinth to speed up sludge drying . This method produces sludge free from harmful

bacteria and parasites, allowing safe use as fertilizer in agricultural land. The experiment still needs more investigation by testing the water hyacinth in existing treatment plants prior to circulation

Chapter 7: Program Performance Assessment and Gap Identification

7.1 Performance with Regard to the legal and regulatory framework on environmental aspects

With regard to current wastewater disposal situation, there are some gaps could be summarized as follows:

Although establishment of private sewers (constructed by the citizens), if exist, that discharge to watercourses without treatment is legal prohibition, no enforcement mechanisms or alternative solutions are available to those installed networks as these "illegal" networks achieve important benefits for the villages.

The program design would allow for connecting those networks with due diligence assessment of their conditions through the PIU and taking feasible measures to improve their condition.

There are no explicit standards against land contamination. This gap would be solved by including site-specific Environmental Impact Assessments (EIAs) to the program. EIA for Keman El Matana cluster has been already prepared and approved by EEAA during the detailed design stage. However, El Dbabiya cluster has not yet EIA study.

Regarding unsewered areas, there is no guidelines that control management against Faecal sludge that comes from onsite sanitation technologies. This management includes storage, collection, transport, treatment and safe end use or disposal.

There is no legal mechanism to dispose of the produced sludge in a safe manner, where the untreated non-stabilized sludge is sold to the contractor to use it as a fertilizer in the agricultural lands. Untreated sludge is contains viruses, pathogens, and germs.

A master plan study for the faecal sludge and WWTP's sludge management and disposal in the project area and the entire Luxor Governorate can give sloutions to this environmental problem.

With regard to implementation of and compliance with the laws and standards, there are some gaps in the system, could be summarized as follows:

- The strict punishment of noncompliant WWTP operators sometimes gives opposite results as they tend to bypass a portion of the received influent for meeting the effluent standards.
- Most of the WWTPs do not correctly handle sludge; solid waste removed by screens, or removed grit, according to law requirements.
- Most of the WWTPs do not keep an updated documented environmental register that is frequently updated according to the requirements of Law 4/1994.
- The safety procedures need to be improved and integrated within the procedures for design, construction, and operation of networks and the WWTPs.

7.2 Performance with Regard to legal and regulatory framework on Land Acquisition

In Voluntary Land Donation, landowners (specifically well-off owners) are willing to donate their land for the various components of the projects. The following are generally the key steps that are normally taken for voluntary land donation:

- Step 1: Identify land donor. When the WSC decides to implement a sanitation scheme in a village, the WSC reaches out to communities using various tools that may involve engaging CDAs, the legal Government units (LGUs), and community leaders or issuing advertisements in local newspapers to call for landowners to willingly donate their land for the project.
- Step 2: Identify the site for a PS based on technical criteria. When the WSC receives a few offers from the willing sellers, they will assign a technical consultant to identify the most technically feasible site for the PS based on technical criteria. When the donation approach is used, the power of choice is, by definition, one key prerequisite. Several locations are usually identified and if the land of the person who is willing to donate proves to be compatible technically, the process of donation moves forward.
- Step 3: Reach agreement with land donor. A person (or a group) offer to donate his/their land for the project with no monetary return. The only return for the donor in this case is receiving a connection to the sewer network. The person who donates the land is normally well-off and the amount of land offered constitutes only a small share of his or her land holding. The person who donates the land may also have non-land-based sources of income.
- Step 4: Sign an initial agreement with the land donor. Once the site for the PS is identified by the technical consultant, the WSC will—through the LGU/ NAPWASD — sign an initial agreement with the landowner to use the land for the PS.
- Step 5: Obtain various approvals. When the PS land is obtained through voluntary land donation as explained above, it is usually the responsibility of the LGU/ NAPWASD to secure the approvals.
- Step 6: Transfer the land title. The donor goes to the Notary Department to issue a waiver that states his or her donation of the land for the interest of the LGU/ NAPWASD. A 'Donation Contract' is signed between the landowner (who voluntarily donated his land) and the LGU/ NAPWASD. The LGU/ NAPWASD then transfer ownership of the land to the WSC by following the relevant legal procedures.

The analysis of the existing institutional arrangement and capacity for handling land acquisition issues in the previous projects showed a number of shortfalls and gaps that need to be addressed to allow for a more standardized approach for land acquisition. This most importantly includes the dominant nature of the technical and legal orientation in handling land acquisition in a way that ignores the social issues related to land acquisition. This could be attributed to a number of factors including the relative limited capacities of the WSCS (particularly in finalizing the willing buyer-willing seller process due to a lack of resources) and shortage in human resources. Also, the absence of the inter-agencies' coordination role to facilitate the process of obtaining approvals is resulting in a huge delay in the process of finalizing land acquisition.

Also land acquisition manual needs to be adapted for the Upper Egypt (Luxor) and operational. i.e LWSC should assign engineers for following up and speed up the procedure of land acquisitions.

7.3 Performance with Regard to the legal and regulatory framework on Grievance Mechanism

The following are the main identified gaps related to the existing grievance mechanism, specifically the hotline:

- Informal channels, including the direct complaints to technicians, are still more largely used than the Hotline;
- The dominant orientation to the O&M and the absence of focus on grievance related to projects planning, design, and construction problem in the monitoring system due to database shortfalls.

  Although GRM manual has been approved and published, grievance mechanism needs to be adapted for the Upper Egypt (Luxor).

7.4 Performance with Regard to the legal and regulatory framework on Community Engagement

From the site visits of AfDB consultant team, LWSC include a General Directorate for Public Relations and Awareness in their structure. This Directorate has three departments which are: Public Relations; Awareness; and community participation (the last is a new department). The first two departments have about 8 employees whereas the third one still has no employee yet. LWSC are handling the community engagement issue through some of Women volunteers.

The conducted institutional assessment for handling community engagement showed that the mechanisms for managing community engagement suffering from limited resources.

Some of the strength in handling the community engagement issue:

- Teams are working under the agreed work plan,
- An M&E system for the performance of the LWSC is in place,
- There are a number of community-based monitoring techniques (for example, surveys),
- Solid awareness and communication guidelines exist and are applied.

In the meantime, a number of institutional gaps were identified. These could be summarized as:

- Limitations in the mandates of the LWSC' scope (for example, absence of planning, design, and construction) from the current mandates and accordingly limitations in the LWSC' capacity to handle community engagement related to these stages.
- Shortage in human resources and lack of staff.
- Lack of a monitoring system to measure the impacts and the efficiency of the implemented community-based activities, including the awareness.

- Lack of resources for publications and brochures. HCWW are supporting them by only publications and brochures for potable water.
- Lack of suitable transportation and cars.
- Inconsistency in the capacities of the assigned teams.

Chapter 8- Safeguards Matrix and action plan

AfDB require that the projects they finance to be in compliance with both the country's national standards as well as their own environmental and social policies. Therefore, in addition to the national regulations, the project aims at complying with the AfDB safeguard policies and guidelines. The policies help to ensure the environmental and social soundness and sustainability of investment projects. Using the Integrated Safeguards system (ISS) as benchmarks, , a diagnostic assessment of applicable and relevant national, program and/or sector level laws, regulations, rules, and procedures for managing and mitigating the CES impacts of the IRSUE-Luxor was carried out.

The assessment has been done to: (i) review CES-related country systems to determine their acceptability with respect to the ISS, (ii) assess if the CES-related country systems can manage and mitigate the impacts of the program; and (iii) identify areas for improvement and agree upon support measures to strengthen the country safeguard systems and include these in an action plan to be monitored during implementation.

The Bank has adopted five Operational Safeguards (OSs), limiting their number to just what is required to achieve the goals and optimal functioning of the ISS, which are:

• Operational Safeguard 1: Environmental and social assessment.

• Operational Safeguard 2: Involuntary resettlement land acquisition, population displacement and compensation.

• Operational Safeguard 3: Biodiversity and ecosystem services.

• Operational Safeguard 4: Pollution prevention and control, hazardous materials and resource efficiency.

• Operational Safeguard 5: Labour conditions, health and safety.

The SESA has developed an operational safeguard matrix and an action plan with respect to the IRSUE-Luxor objectives and components.

Operational Safeguard (OS)	Objectives	Actions already taken or included in the design of the IRSP	Requirements applicable to the IRSUE-LUXOR	Gaps	Proposed Action
OS 1 **Environmental and social assessment**	• To identify and assess the environmental and social impacts (including gender) and climate change vulnerability issues • To avoid or if not possible minimize, mitigate and compensate for adverse impacts on the environment and on affected communities; • To ensure that affected communities have timely access to information in suitable forms about Bank operations and are consulted meaningfully about issues that may affect them	- EIA study has been Conducted for Keman El Matana and approval from EEAA [3]. - Monitoring and follow up procedure during construction phase and operation phase are designated in the approved EIA. - Environmental and Social Safeguards Assessment and the proposed action plan have been conducted. Dissemination plan should be prepared including number of meetings such as (pre-construction meeting - during-construction meeting – after -construction meeting)	• EIA study for Dbabiya cluster need to be prepared and submitted to EEAA. • Screening and exclusion for potential category 1 projects from the scope of IRSUE-Luxor (Based on the Bank's E&S policy) • Application of Environmental law 4/year 1994. • Consultation with communities before and during and after the construction. • Disclosure of the environmental and social studies. • Meeting with the contractors and the ISC after awarding of each contract to discuss the safeguards and their application. • Assign an environment supervisor to ensure implementation of ESMP during civil works.	• *PIU shall be established for the project under the IRSUE-Luxor with environmental and social mandates.* • *Community engagement management is suffering from limited resources (lack of staff; lack of resources for publications and transportation; monitoring system; limitation in mandates; etc.)*	• *Assign environmental, social and health and safety specialists (with minimum 5 years experience) on a full-time basis at the PIU level. The EHS specialists shall be supported by an environmental specialist and social specialist at the PMU level or at PMCF.* • *The PMU and PIU should ensure maintaining of the boundaries of IRSUE-Luxor to the listed identified clusters on ensure that no DLIs under IRSUE-Luxor are linked with any potential category 1 project planned under the overall NRSP.*

[3] Egyptian Environmental Affairs agency

			• Assign Safeguards experts (environmental and social) for training the safeguards officers (environmental and social).		• *The PMU shall ensure that the PIU:* - *Monitor and follow up IRSUE-Luxor implementation* - *Designate an environment supervisor to ensure implementation of ESMP during civil works.* - *Strengthen Community engagement management*
OS 2 **Involuntary resettlement land acquisition, population displacement and compensation**	•To avoid involuntary resettlement where feasible, or minimize resettlement impacts where involuntary resettlement is unavoidable, exploring all viable Bank's program designs; • To ensure that displaced people receive significant resettlement assistance so that their standards of living, and overall means of livelihood are improved beyond pre-Bank's program levels; • To set up a mechanism for monitoring the performance of involuntary resettlement programs in Bank operations and remedying problems as they arise so as to safeguard	• IRSUE-Luxor land acquisition for constructing the PSs and the WWTPs lands are in the approval process. The Ministry of Housing, Utilities and Urban Communities, through the National Program for Sanitation in Rural Areas, has established a set of standardized standard procedures for land acquisition to mitigate and control the intensity of these impacts: • Level Grievance Mechanism is established and approved under the SRSSP. One of the key formal grievance channels is the Hotline and the one which is meant, by design, to be the single official channel. The HCWW is working	• Application of the Project Level Grievance Mechanism established under the SRSSP • Implementation of the land acquisition standard procedure	The lack of the inter-agencies' coordination role to facilitate the process of obtaining approvals may result in a delay in the process of finalizing land acquisition (steps # 5 & 6)	Assign an engineer from LWSC for following up and speed up the procedure of land acquisitions. This engineer needs to have fully authorization from the LWSC for facilitating his mission until he obtain the various approvals of all the required lands.

	against ill-prepared and poorly implemented resettlement plans	to strengthen the Hotline system—including the call centers within the WSCs—and is aiming, through this strengthening, to enable this channel to be the single official uptake modality • From site visits and official documents, it is clear that IRSUE-Luxor will not result in resettlement activities since the land acquisition for constructing the PSs and the WWTPs lands in the zone of intervention are already now in the step # 5 (Obtain various approvals) in the 6 steps that are normally taken for voluntary land donation.			
OS 3 **Biodiversity and ecosystem services**	• To preserve and restore biological diversity by avoiding, or if not possible, reducing and minimizing impacts on biodiversity; • To protect natural, modified and critical habitats; and to sustain the availability and productivity of priority ecosystem services to maintain benefits to the affected communities and to sustain project performance.	All selected areas for PSs and WWTP are in places that will not affect the biological diversity. PSs are in the areas selected to avoid any detrimental impact on the nearby householders. Also, WWTPs have been selected in the desert area far from the residential areas by more than 500 m and they are selected in areas that have no animal settlement and plants cultivation. In case the treatment plant is away from the nearest residential area less than 500 meters, a health impact assessment report is required in accordance with the decision of the Minister of Health		No gaps are identified	

OS 4 **Pollution prevention and control, hazardous materials and resource efficiency**	• To manage and reduce pollutants likely to be caused by IRSUE-Luxor so that they shall not pose harmful risks to human health and the environment, including hazardous, non hazardous waste and GHG emissions. • To set a framework for efficiently utilizing all IRSUE-Luxor raw materials and natural resources especially focusing on energy and water.	-Hazardous and Non-Hazardous waste generation is fully controlled by implementing the mitigation and monitoring measures in the approved EIA study. . -The storage and disposal of hazardous wastes have carefully performed as to abide by the existing legal framework and the periodical monitoring from the ministry of Environment.	- Treated wastewater disposal in a drain and sludge used for land applications and irrigation should be carried out in manner consistent with the Egyptian law 48 for year 1982 and the Egyptian code of practice of 501 for year 2015 and the World Health Organization (WHO) Guidelines for the Safe Use of Wastewater, Excreta and Grey water and applicable national requirements. - Law 4/1994 on Environmental Protection provides detailed information on the law limit on Hazardous and non-hazardous waste	- Potential Incompliance of treated wastewater from the two WWTPs with law 48 for year 1982 for the disposal into agricultural drains due to potential high algae concentration in the effluent of the waste stabilization ponds. - Currently practice of reusing the sludge without sludge biological treatment in agricultural lands may has its influences on the environment and health aspects. - Bad management and control on the disposal of septage at the un sewered villages is also may have its impact on the health aspects.	• Develop a mitigation plan to reduce the algae concentration in the effluent linked to the use the technology of waste stabilization • Carrying out a study for sustainable sludge management and reuse / disposal plan for IRSUE-Luxor including: 1. Identify the end-use market for sludge reuse : - Sludge composting to produce organic fertilizers suitable for reuse in agriculture - Production of electricity or gas for cooking from the biogas produced from the anaerobic digestion units. - Use of dry sludge in the

					operation of cement kilns. *2.* Carry out study for Septage management in Luxor governorate
OS 5 **labour conditions, health and safety**	• To protect the workers' rights • To promote compliance with national legal requirements and provide due diligence in case national laws are silent or inconsistent with the OS; • To provide broad consistency with the relevant International Labor Organization (ILO) Conventions, ILO Core Labor Standards and the UNICEF Convention on the Rights of the Child in cases where national laws do not provide equivalent protection; • To protect the workforce from inequality, social exclusion, child Labor and forced Labor; and • To establish requirements to provide safe and healthy working conditions	Standard Bidding Documents (SBDs) (volume 2) have been issued under NRSP with new aspects to assure the application of Egyptian Labour law and to cover the Labours and community as follows: 1- Sub-contractor Labors insurance 2- OHSE mitigation measures 3- Community HSE 4- ESMP 5- Daily financial penalty in case of the absence of the HSE procedures	Application of the workers' rights, protection against workforce inequality, other social exclusion, and child Labour and forced Labour protection.	labours health and safety and their insurance are assured in SBDs. However, workers' rights; protection against workforce inequality; other social exclusion; and child labour and forced labour need to be secured in the documents. This can be done by applying Egyptian Labour Law No. 12 for 2003 for the protection, occupational health and safety for the workers, which is amending Law 137 for Year 1981 and its executive decrees and the international construction standards requirements needs.	Develop a set of standards for Labour protection conditions clauses based on Egyptian and internationally recognized standards specific for the construction activities

Table (8-1): Operational Safeguard Matrix and proposed actions

Chapter 9: Institutional Arrangements and Capacity

9.1 Institutional Arrangements and Capacity on Social and Environmental Aspects

The institutional arrangements in applying the proposed project action plan (PAP) regarding environmental aspects will be as follows:

- The main implementation responsibility of the PAP will be on the PIU who should assign environmental specialist and another health and safety specialist (with minimum 5 years experience for each) on a full-time basis. The two environmental specialists at the PIUs will be supported by an environmental specialist at the PMU level, who is expected to be assigned with sufficient environmental assessment and management experience (more than 10 years of experience). He/she with the support from PMCF will also provide help in reviewing the ESIAs and giving insight into the bottlenecks usually confronted in other projects and how they can be overcome.
- The ISC would support the environmental specialists of the PIU on implementation and supervision of site-specific Environmental and Social Management Plans (ESMPs) with support from the PMCF. The LWSC would take advantage of the ISC's role in construction supervision to overlook the environmental management of construction contractors.
- The PIU with the support of the PMU and PMCF should train the WWTPs operators all over Luxor Governorate in preparing / updating the environmental register report
- The Quality Sectors should add the sludge quality to the mandate of the Effluent Quality follow up. The LWSC should procure sufficient laboratory equipment in the labs to analyze sludge. In case the sludge complies with the standards, it could be sold to contractors on a condition that the contractor would be responsible for making farmers aware of the application rate of sludge otherwise disposing into an adequate disposal site.
- The Occupational Health and Safety Department at LWSC with the support of the PIU and PMU should add the following responsibilities to its mandate: reviewing designs of new WWTPs and PS; ensuring that sufficient H&S measures are taken; and following up on the adherence of the WWTP and PSs staff to the H&S site-specific measures.
- The Operation Sector with the support of the PMU and PMCF should prepare a documented O&M manual specific for each WWTP, including the environmental measures included as recommended by the environmental specialists, and should include standard procedures to be followed under normal conditions as well as during emergency conditions. The manuals should include measures for reporting bypass incidents, adequate handling of solid waste, and ensuring effluent quality.
- Environmental and social (E&S) capacity building: Training and capacity building will be key prerequisites to enable the assigned E&S teams in the WSCs to carry out their responsibilities as planned. Training on safeguards and environmental health and safety protection has been therefore included in the RBF action plan for the safeguard teams in the implementing agencies. With the collaboration of the existing safeguard team at the PMU level and with the assistant of PMCF, environmental specialist and social specialist along with health and safety specialist will be recruited in the PIU and trained to strengthen the technical capacity of the implementing agency (PIU) in Luxor to i) ensure the maintain of the IRSUP boundaries to the listed identified clusters and the exclusion of any category 1 project that could be linked to the achievement of the IRSUP

DLIs; ii) monitor and follow-up on the construction activities and iii) to strengthen Community engagement management. In addition, engineers from LWSC will be assigned to follow up and speed up the procedure of land acquisitions established under the SRSSP-WW at the PMU level.

- The PMU/PIU/ LWSC related departments (awareness- community participation ……ect) shall:
    - Monitoring and follow up construction phase
    - Strengthen Community engagement management
    - Assign social specialist at the PIU level to ensure the application of and to be linked with the community during the implementation

The PIUs should assess the achievement of the DLIs based on the WWTPs within the borders of the program. Other clusters from the national program—especially clusters that include relatively large WWTPs—which might be considered as Category A should be excluded from the assessment.

The following measures are proposed for minimizing environmental and social risks and mitigating environmental impacts:

- The ISCs, with support from the PIU and the PMU, should study the ESIA process for EL Dabibia cluster. A robust system should be in place for following up on the implementation of site-specific ESMP measures.
- The proposed numbers in the code of rural sanitation (2017) should be followed regarding the rural sewage strength and peak flows when designing the WWTPs.
- The ISCs should provide sufficient site supervision of contractors during excavation works to report on any chance finds of culturally valuable objects. The ISCs should also ensure that H&S issues are adequately managed during construction and that dewatering operations are well controlled.
- The Occupational Health and Safety sector should conduct quarterly inspection of each WWTP and PS to ensure compliance with H&S standards.

With regard to the completion measurement responsibility, the The GoE will hire an internationally reputed firm with a strong local presence to be the Independent Verification agency (IVA) under the IRSUE-Luxor. The firm selected will demonstrate a wide array of competencies, and will have an international reputation to live up to. The IVA will work with EWRA, the Egyptian Water Regulatory Agency as feasible, since EWRA will be able to provide substantial information and analysis as required.

Action Description	Date Due	Responsible Party	Completion Measurement
Technical			
1. LWSC trained on network cleaning technics	2022 - 2023	PMCF, HCWW, PMU	IVA Report
2. LWSC trained on O&M of the newly built WWTPs	2023-2024	PMCF, Luxor WSC	IVA Report
3. Awareness campaigns implemented for a better use of the HH connections by the people served	2020 - 2025	PMCF, Luxor WSC	IVA Report
Climate, Environmental and Social			
3.1 WWTPs: Operational Health and Safety	Before construction phase	PMCF and PMU	Measuring the return of the training course by evaluating sheets
3.2 Construction Sites: Operational Health and Safety	Before construction phase	PMCF and PMU	
3.3 Community: Occupational health and safety	Before construction phase	PMCF and PMU	
3.4 ESIA for sanitation Project	Before construction phase	PMCF and PMU	
3.5 Environmental aspects in Wastewater treatment and Effluent quality regulations	Before construction phase	PMCF and PMU	
3.6 Decentralized wastewater treatment options / on site sanitation	In the first year of construction phase	PMCF and PMU	
3.7 Environmental registers in WWTPs	In the first year of construction phase	PMCF and PMU	
3.8 Sludge management and reuse	After the approval of the strategic master plan for sustainable sludge management and reuse / disposal plan	PMCF and PMU	

Table (9-1): Technical and CES capacity building program

9.2 Institutional Arrangements and Capacity on Land Acquisition

The existing institutional arrangement and capacity for handling land acquisition issues have some shortage and gaps that need to be strengthening to allow for an enhanced and transparent system in dealing with land acquisition. The following are the main identified gaps:

- Absence of the inter-agencies coordination role to facilitate the process of obtaining approvals.

- Shortage in human resources to handle land acquisition issues in a more diligent and transparent manner.
- Inadequate of institutional responsibilities and mandates for local-level grievance to handle land-related complaints and concerns.

9.3 Institutional Arrangements and Capacity on GRM

As described before, the official grievance-handling mechanisms are mainly the Hotline for the various types of complaints. However, most of the complains are related more to water issues and the customer service centers for the issues related to billing and subscriptions. From our discussion with the householders in the project area, most of them did not know how to complain and did not know what the number of the hotline is. Also, most of them did not heard about the new GRM system.

Based on the current situation, the following are the main arrangement that need to be addressed:

- Awareness campaign should be arranged to make householders in the project area familiar with CMS and the steps that should be followed when they have complains.
- The system needs to be fully automated and the monitoring system shall be with sufficient size for data base recording.
- Time interval for resolving the complaints shall be shortened and committed.

9.4 Institutional Arrangements and Capacity on Community Engagement

The conducted institutional assessment for handling community engagement showed that existing resources and mechanisms for managing community engagement has a number of strengths that could be summarized as follows:

- Availability of staff to handle the issues related to community awareness and communication at the governorate level.
- The activities of the Public Relations and Awareness Department at the WSC level is conducted based on an agreed work plan.
- There is an M&E system to track the performance of the WSCs. The HCWW evaluates performance against the work plan on an annual basis and ranks the WSCs.
- Availability of awareness and communication guidelines and good quality materials that are used by the staff.

In the meantime, a number of institutional gaps were identified. These gaps are concerning the mandates, accountability, the amount and capacities of existing manpower, and the resources available to them. The following actions need to be taken:

- Set annual mandates and planning for the community participation activities and awareness campaigns.
- Increase the full-time/part-time human resources with right assignment consistency in working with the community.
- Improve the monitoring system to measure the impacts and the efficiency of the implemented community-based activities, including the awareness.
- Set reasonable annual budget for publications and brochures.
- Facilitate the transportations to the concerned villages.

- Providing training to the teams of the LWSC and relevant stakeholders on community-engagement-related aspects. The Proposed Training Topics for the Teams Working in Community Engagement are:
    - Social assessments
    - Social risk assessment
    - Participatory planning approaches
    - Monitoring consultants and contractors
    - Consultation and engagement with affected persons
    - Information sharing and disclosure
    - GRMs
    - M&E
    - Report writing

Based on the conducted institutional assessment for handling community engagement and the above- proposed actions, IRSUE-Luxor will need to include the following additional measures to strengthen the PMU, reinforce the capacity of LWSC and enhance sustainability:

- Creation of Corporate Social Responsibility (CSR) platform for water and sanitation in Luxor governorate in order to coordinate and streamline their actions and align their approaches.
- Design gender and social outreach program for LWSC
- Provide logistic support to public relation and customers care departments
- Training of different governorates in Upper Egypt on Procurement Construction Management, Citizen Engagement, M&E,

The costs of these measures are included in the following table:

	Proposed Action	Cost in Euro	Explanation
STRENGTHENING THE NATIONAL PMU AND LWSC			
	Creation of CSR platform for water and sanitation in Luxor governorate	10,000	This includes financial and non-financial support (in kind contribution / training) to poor households. The private sector needs a platform (Corporate Social Responsibility) to be developed in order to coordinate and streamline their approach and contribution
CAPACITY DEVELOPMENT FOR ENHANCING SUSTAINABILITY			

	Package consulting contract to design gender and social outreach program for LWSC.	150,000	The value addition of the project would be to promote social and gender inclusion and increasing economic opportunity. (i) There is a need to increase the participation of community especially women. To enhance community participation especially women LWSC need to be equipped (policy and technically) to undertake effective outreach program. (ii) Unemployment is very high among the youth. Skills training of youth will create employment opportunities during the consultation and operation of the project is proposed. (iii) Due to cultural issues, women need to be equipped with the basic plumbing and quick fix solutions. A training and equipment for basic services will be provided to women. (iv) Gender informed education and communication material and programme for hygiene and health will address the current hygiene problems. Moreover, Training of LWSC staff in communication, environmental and social safeguards, gender and social inclusion, public participation, and monitoring and reporting. This will be designed in a way to involve LWSC staff and achieve "learning by doing".
	Logistics Support	50,000	The public relation and customers care departments need to be strengthened in terms of equipment and mobility. Small equipment such as printers and computers for LWSC network in governorate. There is a need as well for multi-purpose vehicle.
IMPROVING THE GOVERNANCE AND GRIEVANCES SYSTEM			
	Training of different governorates on upper Egypt on Procurement Construction Management, Citizen Engagement, M&E and Land SOP	30,000	

Table (9-2): Agreed Actions linked to citizen engagement under RWSSI Trust Fund

Chapter 10: Recommended action to address identified Risks and impacts

10.1 Risks and Impacts Identifications and recommendations

The proposed program is a high priority of the GoE in its efforts to urgently protect the environment and water resources from pollution and to reduce health risks due to discharge of partially treated or un-treated wastewater into the drains and canals. The development of rural sanitation will enhance wastewater re-use to reduce water scarcity and increase food security and improve the quality of life of people in line with the Bank's high 5s. The project targeting Upper Egypt as one of the less developed regions in Egypt and will enhance the sustainable socio-economic and environmental conditions.

The planned activities under Result Area 1 – Improved Sanitation Access will involve civil works and temporary or permanent land acquisition to set up the water sanitation plants, pumping stations and networks. The anticipated adverse environmental effects are linked to the construction works and movement of engines (air pollution, noise and vibration, etc.), in addition, to the solid wastes and sludge generated by the wastewater treatment plants.

An Environmental Impact Assessment (EIA) study was conducted for the infrastructure component of the project in Keman El Matana (El Dabayba cluster EIA study is still missing). The report was produced following the Egyptian Environmental Affair Agency (EEAA) standards. The latter coincide to a far extent with AfDB and other international standards such as, (WHO, EU, etc.) with regard to environmental issues (permissible pollution level, safe noise standards, etc.), however, the instrument considered for the environmental assessment does not include a full assessment of the socio-economic impacts of the project as required by the Bank's Integrated Safeguards System (ISS).

The project is not expected to generate significant adverse impacts on the environment and/or affected communities. The category 2 was therefore proposed and validated reflecting a medium risk. As per the Bank's policy on Result Based Financing instrument, the program will not include any potential category 1 sub-project/component. With regards to the climate risks, the preliminary data on the Bank's program indicate that the planned infrastructure (water sanitation plants, stations, etc.) are not located in areas vulnerable to climate change and do not indicate that the planned infrastructure (water sanitation plants, stations, etc.) traverse terrain and topography that may be vulnerable to climate change.

To ensure compliance with the Bank's Safeguards Integrated system (ISS) and the Bank's policy on Result Based Financing instrument, the present study which is the strategic Environmental and Social Assessment Study (SESA) was conducted for the project. In addition, the SESA focused on the country system and environmental and social procedure (especially related to the land acquisition) to determine whether the existing laws, regulations and procedures are sufficient and adequate to manage and mitigate the impacts of the project and/or identify areas for improvement.

One of the important finding in this report is the sludge handling issue. Solving the problem of sludge management and disposal must be on a national or governorate scale. The following recommendations shall be applied to solve sludge disposal issue:

- Urgent need for a sustainable sludge management and reuse / disposal plan.
- Identify the end-use market for sludge reuse :

1. Sludge composting to produce organic fertilizers suitable for reuse in agriculture

2. Production of electricity or gas for cooking from the biogas produced from the anaerobic digestion units.
3. Use of dry sludge in the operation of cement kilns.
4. Use of water hyacinth in sludge drying and to obtain sludge that can be used safely in agriculture.

- A new code of practice should be prepared for methods of sludge dewatering, stabilizing, disposal / reuse and the establishment of laws governing it.

- A Faecal Sludge Management (FSM) plan should be developed for decentralized sanitation in unsewered villages.

The followings organizational and procedural considerations Assessment shall be applied:

➢ The institutional support for managing the environmental aspects of the PAP will be as follows:

- PIU should assign two environmental/social specialists and onehealth and safety specialist on a full-time basis. These three specialists will be supported by an environmental specialist at the PMU level, who is expected to be assigned with sufficient environmental assessment and management experience.
- The ISC would support the environmental specialists of the PIU on implementation and supervision of site-specific Environmental and Social Management Plans.
- The PIU with the support of the PMU and PMCF should train the WWTPs operators in preparing / updating the environmental register report.
- The Quality Sectors should add the sludge quality to the mandate of the Effluent Quality follow up.
- The Occupational Health and Safety Department should add the following responsibilities to its mandate: reviewing designs of new WWTPs and PS; ensuring that sufficient H&S measures are taken; and following up on the adherence of the WWTP and PSs staff to the H&S site-specific measures.
- The Operation Sector in the LWSC with the support of the PMU should prepare a documented O&M manual specific for each WWTP.
- The PMU and PIU should ensure that no DLIs under the IRSUE-LUXOR are linked with any potential category 1 project planned under the overall NRSP.
- Also, the PMU/PIU shall:
    - Monitoring and follow up construction phase
    - Strengthen Community engagement management
    - Assign social specialist to ensure the application of social impact in the design and to be linked with the community during the implementation

The following measures are proposed for minimizing environmental risks and mitigating environmental impacts:

- The ISCs, with support from the PIU and the PMU, should study the ESIA process for EL Dabeyba cluster.
- The figures in the code of rural sanitation (2017) should be followed regarding the rural shock loads and peak flows when designing the WWTPs.

- The ISCs should provide sufficient site supervision of contractors during excavation works to report on any chance finds of culturally valuable objects.
- The ISCs should ensure that H&S issues are adequately managed during construction.
- The Occupational Health and Safety sector should conduct quarterly inspection of each WWTP and PS to ensure compliance with H&S standards.

➢ Determining Actions to Strengthen CES Management Capacity

Similar to the other RBF project which is SRSSP, strengthen the CES Management Capacity will be through:

- Strengthen the enabling environment to allow for more efficient and accountable rural sanitation service delivery. This includes continuing improvements to the tariff structure to allow for cost recovery, completion of a strategy for water and sanitation, development of a unified M&E system and strengthening of EWRA's regulatory functions.
- Improve operational systems and practices of LWSC in terms of operating, financing and citizen awareness and engagement, through the combination of fiscal-based incentives, based on Annual Performance Assessment and scoring systems, combined with technical support.
- Improve financial sustainability of LWSC, through support to the national policy framework for water and sanitation tariffs to achieve cost recovery as well as through measures to improve revenue collection.
- Strengthen LWSC' efficiency to deliver services responsive to customers' needs. The decentralization of implementation responsibilities at WSC level, as well as the RBF mechanism through Disbursement-Linked Indicators (DLIs) incentivizing performance, seek to strengthen LWSC in core functional areas.
- In order for the LWSC to be able to deliver on the annual performance targets established in the Annual Performance Assessments, LWSC will be supported in key areas of managerial and operational gaps, identified in their PIAPs:
    - Operational performance, is assessed against the LWSC' ability to maintain functional wastewater treatment plants and sewerage networks;
    - Institutional performance, focuses on the L WSC's ability to carry out procurement and fulfill project management functions. The revision of the Project Procurement Manual (PPM), as well as the development of standard bidding documents and the training of stakeholders is supportive of these new functions at sub-national levels;
    - Financial performance, is assessed against the LWSC's ability to achieve cost recovery and collect tariffs;
    - Citizen engagement, focuses on the LWSC' capacity to handle customers' complaints. The development of effective Grievance Redress Mechanisms (GRM) and Citizen Reports Card (CRC) are supportive of this shift towards greater local accountability.
- Strengthen the national sector framework. The WB through SRSSP has already provided support to MHUUC to develop policies and instruments, and achieved the following objectives:
    - Approval of a national tariff structure for sustainable cost recovery.

- Establishment of the Program Management Unit and approval of national rural sanitation program .
- Approval of standard operating procedures for land acquisition (Land SOP). Adopted to Upper Egypt (Luxor).

These achievements help in the effectiveness of a decentralized service provision and strengthen of the central institutions that able to articulate a clear vision for the sector. This approach will help the AfDB in implementing efficiently the proposed project.

- Applying/ Developing Standardized Approach for Land Acquisition

Although all the required lands for PSs and WWTPs in the project area, that are privately owned, are acquainted through signing land acquisition form, a further procedure to final allocation of these lands are still needed. Also, after topographic surveying work more lands for more than one pump station in each village might be technically needed. Therefore, applying the following approach could be required:

- Develop the ToRs for the SOP.
- SOP needs to be adapted for the Upper Egypt (Luxor)
- Develop a memorandum of understanding (MoU) and associated mechanisms.

➢ Enhancing the System for Engaging with Communities and Addressing Social Risks

- Designation employees with appropriate experience in the community participation department.
- Increase the resource for the logistics for the Community Engagement such as the publications and brochures and improving the transportation issue.
- Develop the ToRs for the Procedural Guidelines for Community Engagement.
- Develop the Procedural Guidelines for Community Engagement.

➢ Addressing Poverty and Affordability Issues

- Set and apply a strategy for assistance scenarios (including targeting techniques) to be provided to the poor households.
- Applying grievance mechanism to accommodate various issues.
- Develop a strategy for ongoing consultation with stakeholders across various stages.
- Establish transparent system for sharing and disclosing information.

➢ Strengthen the enabling Institutional Issues through:

1. Assign the appropriate human resources for handling land acquisition.

- Develop ToRs for the senior land acquisition officer at the LWSC level and obtain Bank approval.
- Assign land acquisition teams.

2. Assign the appropriate human resources for community engagement and handling social risk.

- Develop ToRs for the community engagement officer at the LWSC level, and the focal points at the markaz or branch level.
- Assign community engagement teams.

3. Enhance the performance evaluation system.

- Establish a performance-based monitoring system to evaluate the teams that will be assigned.
- Establish a strong reporting mechanism that allows for bottom-up flow of information and allow decisions to be made accordingly.

➢ Implementation Support

Training and capacity building will be key prerequisites to enable the assigned E&S teams in the LWSC to carry out their responsibilities as planned. Training on safeguards and environmental health and safety protection has been therefore included in the RBF action plan for the safeguard teams in the implementing agencies. The environmental and social specialists along with health and safety specialist will be assigned and trained to strengthen the technical capacity of the implementing agency (PIU) in Luxor to i) ensure the maintain of the IRSUP boundaries to the listed identified clusters and the exclusion of any category 1 project that could be linked to the achievement of the IRSUP DLIs; ii) monitor and follow-up on the construction activities and iii) to strengthen Community engagement management. In addition, engineers from LWSC will be assigned to follow up and speed up the procedure of land acquisitions established under the SRSSP-WW at the PMU level.

➢ Performance Improvement Action Plan Linked to Citizen Engagement

The Annual Performance Assessment (APA), which was established between the local and the national level to assess the performance of the WSC included among the 12 Key Performance Indicators (KPIs) specific KPIs linked to citizen engagement. The LWSC, with the assistance of the PMU, will design and approve a Performance Improvement Action Plan, which will be evaluated through the APA.

	Name	Unit	Definition
PERFORMANCE AREA 4- CITIZEN ENGAGEMENT			
	Resolution of complaints within 24 hours	%	Percentage of registered complaints that were resolved within 24 hours during a year; calculated by dividing the number of complaints resolved within 24 hours by the total number of complaints registered over that year in the complaint management system (CMS)..
	Community services and participation entities captured by the Complaints Management System that are established and sustained	Nr	Number of complaints handling entities connected to the Complaints Management System and fully operational with trained staff and equipment. A sustained entity is one available continuously during government working hours and comprising a building or room, an operational computer connected to the CMS, and a trained operator.
	Quarterly community engagement reports verified by spot checks on resolved complaints.	Nr	The number of qualifying Quarterly reports in one calendar year period documenting application of the community engagement process as defined in the Procedural Guidelines. A qualifying quarterly period is one where 85% of spot checks on a sample of monthly resolved complaints during that quarter are correctly recorded. The spot checks shall be evenly distributed across all sanitation related categories which are as follows (1) Flooding, (2) Settlement, (3) Broken pipe, (4) Stolen of manhole cover, (5) Other. A minimum of 30 spot checks shall be made per quarter spread evenly over

			the three months covered. The spot checks shall be made only in villages covered by the Program. Percentages shall be rounded up to the next whole number.

Table (9-1): LWSC KPIs linked to citizen engagement

10.2 Summary of Climate, Environmental and Social Systems Assessment and Action Plan

The SESA study identifies four main actions to strengthen the Environmental and Social management System and mitigate the Program negative impacts : i) to develop a national or governorate plan for sustainable sludge and septage management and reuse / disposal to better manage the cumulative impact of sludge generation by the WWTP; ii) to strengthen the existing community engagement plan by the reinforcement of the public and environmental health awareness programs, iii) to develop a set of standards Environmental, health and safety, and Labor conditions clauses based on national and internationally recognized standards specific for the construction activities and iv) to develop a mitigation plan to reduce the algae concentration in the effluent linked to the use the technology of waste stabilisation ponds in the project. These actions are described in the following table.

PROGRAM ACTION PLAN			
Action Description	**Date Due**	**Responsible party**	**Completion Measurement**
Assign environmental and social specialists and health and safety specialist	*Within one month after project commerce*	LWSC	Hiring specialists in the company
Ensure that no DLIs under the IRSP are linked with any potential category 1 project planned under the overall NRSP	*At design period and before construction phase*	PMU and PIU	*No potential category 1 project planned under the overall NRSP*
E&S monitoring and follow up during construction phase	*During construction phase*	PMU and PIU	No environmental problems during the construction
Designate an environment supervisor to ensure implementation of EMP during construction	*During construction phase*	PMU and PIU	Hiring *environment supervisor*
Strengthen Community engagement management	*At startup of the construction*	PMU and PIU	Well-designed mandate is set
Assign engineers for following up and speed up the procedure of land acquisitions	*At design period and before construction phase*	LWSC	Land acquisition procedures are finished
Develop a study for sustainable sludge management and reuse / disposal plan for IRSUE-LUXOR in Luxor	*During design and construction period*	HCWW	*study for sustainable sludge management is developed*
Develop a Septage Management System	*During design and construction period*	HCWW	*Septage Management System is developed*
Developing a mitigation plan to reduce the algae concentration in the effluent	Before the end of construction phase	PMCF and PMU	Effluent requirements are maintained

Develop a set of standards Environmental, health and safety, and Labor conditions clauses based on national and internationally recognized standards specific for the construction activities	*During design and tendering period*	**ISC, PMCF and PMU**	*Environmental, health and safety, and Labor conditions are met*

Table (9-2) Program Action Plan

Chapter 11: Capacity development program for improvement and monitoring arrangements

➢ With Regarding to Program Results Monitoring and Evaluation

The national program has developed a Monitoring and Evaluation (M&E) system during its first phase of implementation, in 2015. The project will use and strengthen the system in place, integrating to the equation the LWSC and reinforcing its capacities.

The project M&E system is based on the Results Framework with monitoring at all levels, including activities, outputs and outcomes. DLIs, as part of the indicators, will be monitored following the M&E system established. The M&E will be done at five levels of detail and frequency:

- Normal day-to-day program management monitoring carried out by Implementation Support Consultant (ISC) on the infrastructure implementation, and the normal day-to-day monitoring systems used by the LWSCs for their service;
- A Quarterly Financial Reports prepared by the PMU and ISCs with collaboration with the LWSC and following the Bank's rules.
- A bi-annual Program Reports, prepared by the PMU and ISCs on behalf of the LWSC and following the Bank's rules. Bi-annual reports will be done in close collaboration with ISC and LWSC, which will provide data. Reports will also detail the activities and results during the 6 months, including implementation progress, fiduciary status, stakeholder participation, safeguards risks and mitigation measures as well as highlighting issues and decisions needed;
- Annual validation assessment by the IVA to audit the DLI achievements. Evidence of the DLI achievements will be send from LWSC and present by the PMU to the IVA, which is tasked with verifying the results. In order to validate the disbursement request submitted by the PMU, the IVA will verify all DLI target indicators through a desk review and physical inspection. IVA report must be validated by the Bank prior to disbursement.
- A mid-term review by the Bank after two years.

The CES monitoring plan included in the project's overall monitoring plan is presented in the below table:

Action Description	DLI (Yes/No)	Date Due	Responsible party	Completion Measurement
Climate, Environmental and Social				
Recruit environmental, social and health and safety specialists	No	Within one month after IRSUE-Luxor launching	LWSC	Hiring specialists in the company
Ensure that no DLIs under the IRSUE-Luxor are linked with any potential category 1 project planned under the overall NRSP	No	At design period and before construction phase	PMU and PIU	No potential category 1 project planned under the overall NRSP
E&S monitoring and follow up construction phase	No	During construction phase	PMU and PIU	No environmental or social problems / accidents during the construction

Designate an environment supervisor to ensure implementation of ESMP during construction	No	During construction phase	PMU and PIU	Hiring environment supervisor
Strengthen Community engagement management	No	During all phases	PMCF, PMU and PIU	Well designed mandate is set
Assign engineers for following up and speed up the procedure of land acquisitions in cooperation with the legal and property departments	No	At design period and before construction phase	LWSC	Land acquisition procedures are finished
Develop a master plan for sustainable sludge management and reuse / disposal plan in the Luxor governorate	No	During design and construction period	PMCF, PMU and LWSC	master plan for sustainable sludge management is developed
Develop a Septage Management System in the Luxor governorate	No	During design and construction period	PMCF, PMU and LWSC	Septage Management System is developed
Developing a mitigation plan to reduce the algae concentration in the effluent	No	Before the end of construction phase	PMCF, PMU and LWSC	Effluent requirements are maintained
Develop a set of standards Environmental, health and safety, and labour conditions clauses based on internationally recognized standards specific for the construction activities	No	During design and tendering period	PMCF and PMU	Environmental, health and safety, and labour conditions are met
Adoption and implementation of the Citizen Engagement Framework	NO	During the life span of the project	LWSC	Hiring of consultancy firm to package the capacity building and on-job training.
Gender and social inclusion awareness raising	No	During the project cycle	LWSC	Hiring of consultancy firm to package the capacity building and on-job training.
Gender and Social Inclusion Policy for Inclusive infrastructure (pro-poor policy for households connections)	No		PMU	Technical Expert for Pro-Poor
5% poor households connections of which 14%	No	After Pro-Poor policy approved	PMU and PIU	Identification of the poor households

of female headed households		and households connection started		
Training of women on plumbing and small repairs of breakdowns	No	before and after construction phase	LWSC	capacity building and on-job training by the Awareness department, public relations, and community participation departments
Gender Sensitive Health and Hygiene Promotion	No	At start-up of the construction and during implementation	LWSC	Hiring of consultancy firm to package the capacity building and on-job training.

Table (11-1): Climate Environmental, Social monitoring plan There are some existing M&E processes

already being used within the sector operational level, as the Monitoring, Analysis and Reporting System (MARS), used by the WSCs to report their performance to HCWW and which covers 16 WSC KPIs; or the Annual Information reports (AIR), prepared by EWRA, covering the numerous KPIs of WSC performance measured by EWRA. The National Sanitation Rural Program establishes an additional M&E process, levering the existing KPIs within the sector, the Annual Performance Assessment (APA), used by the program to assess WSC performance and to provide grants based on the results. The APA covers a 12 Key Performance Indicators, grouped in 4 performance areas: operation, financial, institutional (procurement) and citizen engagement (the selected KPIs for LWSC are described in the technical annex). The LWSC's APA is one of the project DLIs, so will be audited by the IVA on a yearly basis.

M&E system will be considerably reinforced under the project, including the setting of additional staff at PMU level with a prime function of M&E, the procurement of the ISC under the loan to support LWSC, including carrying out most of the M&E activities and the provision of an IVA.

The Bank office in Egypt and the regional office in Tunis will closely monitor day-to-day implementation of the project. The Bank will carry out at least two supervision missions annually including financial management and procurement assessment reviews. In addition, the Bank will also carry out a mid-term review of the program and a program completion report will be prepared at the end of the project. The implementation progress reports from these missions, which will render an account on the achievement level on indicators, will be used with the IVA reports to monitor the progress of the program.

- With Regarding to Environmental Impacts Mitigation and Monitoring

The assessment of the environmental impacts of the different components of the project in Luxor governorate was discussed in chapter 6 during the construction, operation and decommissioning phases.

The key impacts which the bank has considered include:

1) Air and noise;

2) Soil (soil quality, erosion, landscape);

3) Water (water quality and resource consumption);

4) Biological environment (Flora and Fauna); and

5) Human environment (Occupational health & safety, Community safety, Visual impacts, Cultural heritage and Archaeology impacts, and the Socio-economic and Health impacts).

These impacts shall be mitigated to ensure a safe work environment by implementing mitigation and monitoring plans and procedures, which considers national and international requirements. In the following tables, the improvement and monitoring arrangements of the potential impacts are described.

Phase	Impact	Mitigation measures	Monitoring measures	Follow up responsibility
During construction	Noise impact	On site Construction noise shall be mitigated to ensure a safe work environment. The plan shall include the following measures: • Ear muffs/protective hearing equipment shall be made available to all workers. • Training on how and when to use protective hearing equipment. • Place visually clear instructions in areas. • Optimize the use of noisy construction equipment. • Regular maintenance of all equipment and vehicles. • Stop all construction activities during the night. • Communicate the construction schedule with neighboring communities and sensitive receptors. • Implement a complaints handling system.	• Measuring the ambient noise level in noise critical areas and in the same place during work breaks. • Investigate noise complaints from workers and neighboring communities in the affected locations.	**PIU and ISC**
	Air Quality impacts	Implement a construction site management plan including the following measures: • Store construction materials in pre-identified storage areas. • Cover friable materials during storage. • Wet the network of unpaved roads on site. • Regulation of speed to a suitable speed (20 kmh) for all vehicles. • Implement preventive maintenance program for vehicles and equipment.	• Investigate dust complaints from workers and residents of affected villages. • Measure NO, HC, CO and opacity for construction machinery. • Visual inspection of vehicles and equipment operating. • Record the number of vehicles and the type of materials. • Record the number and capacity of vehicles disposing of waste and aggregates.	**PIU and ISC**
	Soil and groundwater impacts	• Design and construct an impermeable protective base layer. • Implement a site construction management plan. • Use appropriate procedures for handling chemicals and petroleum products. • Apply contour plowing, conservation tillage and other soil erosion prevention techniques.	• Document the amount of soil disposed of, and the amount of soil brought to the site. • Keep records of waste accumulation.	**PIU and ISC**

During construction		• Ensure waste management plans are developed for the site.		
	Occupational health and safety	the main mitigations measures to prevent common construction hazards are: • Workers must follow safety standards and use protective equipment. • Workers should be trained to identify and evaluate fall hazards. • Workers must comply with OSHA's general rule for the safe use of ladders and stairways. • The scaffolding hazard shall be addressed as stated by OSHA standards. • To prevent Heavy Construction Equipment risk, workers should follow all construction safety guidelines. • The best way to prevent the Electrical hazard is for the workers to be at a safe working distance away from the power lines. • Identification of hazard sources to workers • Eliminating the sources of hazards. • Workers must be trained to recognize potential hazards. • Inspection and testing of all equipment and machines. • Appointing an Accident Prevention Officer at the site. • Designation of restricted areas, such as construction sites. • Preparation of an emergency response plan. • Provision of necessary rescue equipment. • Elaboration and management of a safety guarantee plan. • Provision of appropriate and sufficient first aid equipment. • To prevent Excavation and Trenching accidents and injuries, both the contractors and workers must follow safety standards and use protective equipment. • It is recommended that engineering procedures be applied to support weak and old buildings. • Using fences and warning signs during the construction phase. • Using protective barriers and safe walkways.	• Regular reporting of any accidents, as well as records and reports on health. • Continuous monitoring of all hazardous events. • Regular inspection of workers against pathogenic agents.	**PIU and ISC**

During construction		• Appointing of an officer on site, to take protective measures to prevent accidents and/or to respond to accidents. • Provision of appropriate and sufficient of first aid equipment on site		
	Traffic impacts	• All mitigation measures for safeguarding long delays of vehicles and trains traffic will be undertaken. • During the excavation of roads in villages, there should be a wood or metal bridge for pedestrians' access over each opened trench. • Alternate access routes should be identified and communicated with the residents before starting construction.	• The monitoring of traffic flow on roads and railways shall be undertaken by the Traffic Department and the Railway Authority.	**PIU and ISC**
	Archaeology and cultural heritage impacts	• Prior to construction works the project's construction plan should be presented to the Supreme Council for Antiquities. • Chance find procedures will be employed, in case an antiquity is found during excavation. The process includes immediate cessation of excavation works.	• Chance find objects will be documented by the Consultant to supervise implementation. The documentation should include date, time and exact location of the found object.	**PIU and ISC**
	non-hazardous (NH) waste generation impacts	• Implement a segregation system based on compatibility of different waste streams. • Specify an area/containers for non-hazardous wastes. • Dispose of non-recycled wastes in the nearest landfill. • Evacuation of closed/demolished household cesspits and construction site sewage to the nearest existing WWTP. • Prior estimation of dewatered liquid volume during the digging works. • Collect and analyze samples of the dewatered liquid • Identify the recycling contractor preferably from neighboring villages.	• Regular inspection of the waste storage area (for PS's and WWTP's sites). • Regular inspection of the site(s) in general to identify random disposal of waste materials, specifically during the installation of gravity sewers and FMs. • Regular inspection of the waste disposal manifests.	**PIU and ISC**
		• All types of hazardous waste can only be transported by licensed hazardous waste service providers and disposed of in licensed landfill.	• Regular inspection of the hazardous waste storage area. • The spent oil containers are inspected monthly for leaks or any other form of	**PIU and ISC**

During construction **During construction**	hazardous (H) waste generation impacts	• The different types of hazardous wastes should not be mixed. • Spent mineral oils shall be collected, stored in sealed containers and recycled using a licensed company which also has to be identified by the contractor. • Obtain and read the material safety data sheet (MSDS) for this material. • Identify the common name of the compound. • Determine whether or not the substance is listed in hazardous waste lists. • If not mentioned, check whether they have any hazardous properties. • Laboratory analysis should be used if the material safety data sheet is not available. • No mixing of different hazardous waste streams. • The storage area must have a water supply. • Must be accessible from at least two parts of an emergency • Hazardous waste and sludge should be stored in drums. • No Smoking. • Mark the call numbers in case of emergency • The site must remain closed at all times and secure from unauthorized access.	damage and are kept in good condition. • Regular inspection of the site to identify randomly dumped hazardous waste materials. • Recording the amount of hazardous waste sent for disposal and archiving disposal receipts. This must be done in the form of hazardous waste registers required by Egyptian law.	
During the operation	Noise Impacts	Off site: • Cultivate and maintain a tree belt around the site. • Implement a complaints system to investigate any noise complaints from neighboring communities. On site: • Ear muffs/protective hearing equipment shall be made available to all workers. • Training on how and when to use protective hearing equipment. • Place visually clear instructions in areas. • Regular maintenance of all equipment and vehicles.	• Measuring the ambient noise level in noise critical areas, using a portable noise meter • The generator should be tested for noise standards • Investigate noise complaints from workers and neighboring communities in the affected locations.	**LWSC**
		• Maintain efficient performance of biological treatment efficiency	• Record odor complaints received from neighboring areas. The record should include name of the person	**LWSC**

	Air emissions and odor impacts	• Establish close communication with the neighboring areas. • Supplied standby generators to PSs and WWTPs should be checked with suppliers for their emission standards. • Regular checks and maintenance of the drainage system to ensure no significant ponding of leachate. • Handle and store waste in a manner which ensures that it is held securely without loss or leakage. • Remove waste in a timely manner. • Maintain and clean waste storage areas regularly. • Sludge containers should be flushed with water regularly. • Sludge should be transferred to and in closed containers.	who has made the complaint, time of complaint, GPS location of the affected area, time and duration of unacceptable odor. • Measure, annually or when needed, CO, SO_2, total hydrocarbons (HC) and NOx annually using onsite gas analyzer. • Monitor, annually or when needed, the air quality on site downwind of the WWTP (SE direction) at the closest location possible. • Monitor, annually or when needed, air quality downwind at the closest sensitive receptor	
	Soil and groundwater impacts	• A leak detection plan shall be developed and implemented for the oxidation ponds. When the leakage rate exceeds a threshold limit, the WWTP operator shall cease discharge to the identified leaking pond. • The flow connection between the different oxidation ponds should be regularly maintained and cleaned from precipitated sludge. • Ensure that a layer of water with a depth around 20cm is maintained in any non-operating oxidation pond. • Maintain and operate oxidation ponds to meet permitted discharge requirements. • A method for recording the wastewater levels in each oxidation pond shall be provided.	• Monitor the WWTP for physical stability features, such as tension cracks, surface erosion, piping failures and other features. • Regular inspection of all components of PSs and WWTP for any potential leaks.	**LWSC**
	Flora and Fauna impacts	• Enclose secure fencing sites to ensure that disturbance of off-site areas is reduced. • Restrict activities and waste storage to the project site boundary.	• Recording and documenting complaints from neighboring communities related to health and impact on Flora and Fauna.	**LWSC**

During the operation **During the operation**	Occupational health and safety	The project's operator shall implement an occupational health and safety plan with the following measures; 1-Immunization Ensure routine vaccinations for workers for influenza, tetanus, and Hepatitis "A" 2- Safe Practices and Personal Protective Equipment (PPE) It is recommended to avoid liquid contact with exposed skin, by using a full-body impervious suit in addition with using rubber boots, gloves, hard hats and eye protection. When working in confined spaces, the team (inside and outside) must have extra flashlights and two-way radios readied for communication. A first-aid kit must be readily available; an eyewash and flushing station, neutralizing solutions, cleaning equipment, and emergency medical services. 3-Training Workers must be trained to recognize potential hazards, use proper work practices and procedures, recognize adverse health effects, 4-Control Measures prior to entering and/or maintenance • Assess and review sewage systems, components and piping. • Perform jobsite safety and health analyses and be aware of all associated risks and hazards. • Post warning signs and labels. • Secure all toilets, urinals, drains, pumps, and sewage treatment systems. • Isolate, close, secure, divert, de-energize, lockout and apply tags-plus applications to all valves, piping and associated equipment. • When confined space entries are performed, have a trained rescue team with the proper rescue equipment available at the job site. • Follow confined space entry testing and permitting procedures. If feasible, use sample ports to test for atmospheric contaminants inside the tank or / and pipeline manholes.		**LWSC**

During the operation		• Cautiously and deliberately remove bolts and nuts off manholes and piping. • Use appropriate tools and operating procedures. • Install and use adequate exhaust ventilation devices, ducting, lighting, and tank-cleaning equipment. • Cover and isolate all work areas with disposable plastic sheeting to prevent possible contamination. • Pumping and drain all residual products flush tanks and piping systems. • Check for residual pressure or vacuum effects in tanks and piping. • While remaining outside the tank, continue to test the atmosphere inside the tank remotely for safe conditions. • Before beginning tank cleaning operations, while wearing the appropriate PPE, clothing and respiratory protection, cautiously enter the tank for an internal inspection. • Chlorinate or sanitize the tanks and piping systems when necessary. 5-Post-Work Cleanup • Remove contaminated clothing and bag for proper disposal or decontamination. • Shower or wash face, arms, hands and legs with soap, using a substantial amount of water. • Disinfect equipment and wash contaminated spaces, decks and bulkheads with detergent, sanitizer, or bleach. • Dispose of or re-wash rubber boots, gloves, eye goggles, face shields and respirators with a disinfectant solution. • Wash contaminated clothing separately. • Using fences and warning signs during maintenance periods and/or close the roads. • Regular inspection for all the components of the sewage system especially the manholes cover. • Take instantaneous measurements for correction.		

		• Preventive maintenance program. • Adjust the maintenance schedules away from the rush hour.		
	Impacts on the Open water streams (i.e. Drains)	• Implement preventive maintenance program to all structures and electromechanical equipment in PSs and WWTPs. • Reduce the possibility of using the By-pass Pipeline for a wastewater treatment plant. • The pump station should be designed on the basis of the largest storm expected during the designed operating period. • Each wastewater treatment plant must have at least two parallel lines. During maintenance / repair of a line, liquid waste must be diverted to the other line. • Advance preventive maintenance program should be planned annually.	• Continuous monitoring of PS and WWTPs incoming and outgoing discharges. Daily averages should be calculated and documented • Monitoring of influent and effluent water quality at WWTPs should be undertaken. Monitoring should include analysis of COD, TSS, TKN and total P. • Monthly monitoring of full Law 48/1982 parameters • An annual audit of the WWTP to review performance efficiency shall be undertaken by an environmental consultant.	**LWSC**

During the operation	Environmental impacts due to Sludge management	• The stabilization and hygienisation of sludge using quicklime could be implemented on site. • The sludge and lime should be thoroughly mixed. A pH not less than 12 and a temperature not less 55°C should be maintained for at least 2 hours after mixing. • A manual for sludge treatment shall be developed and should be annually revised based on the actual sludge quality, actual quantity, news laws and regulations. • A de-sludging plan shall be developed. • Maintenance of service roads around the ponds. • A plan for solids removal from the oxidation ponds shall be developed which will be protective of the liner system • A plan for measuring the depth of solids (sludge) accumulated in the oxidation ponds shall be developed using suitable equipment • Ensure that collected sludge is transferred to a sludge dewatering facility (or a sludge drying area) and then to an adjacent sludge storage area with minimal spills. • Ensure that discharge of water effluent from the sludge dewatering facility is collected back to the evaporation pond • The sludge shall be stored and transported in closed drums to minimize environmental impacts. • Workers handling sludge, or working near sludge tanks in the WWTP should wear suitable gloves and boots.	• The project operator should undertake continuous monitoring of pH of immature sludge. Logs of pH values should be used for controlling the lime dosing. • Taking representative sludge samples (every 6 months or whenever sludge is being sold) and analyze it. • Periodical medical examination for the workers and lab analysis.	**LWSC**
	Handling and disposal of non-hazardous wastes	• A waste management plan shall be developed. • Implement a segregation system based on compatibility of different waste streams. • Specify an area/ containers for non-hazardous wastes which accommodate for the generated segregated streams. • Dispose of non-recycled wastes in the nearest landfill. • Register the amounts of disposed of wastes and keep waste disposal and transportation receipts/manifests.	• Regular inspection of the waste storage area (for PS's and WWTP's sites) • Regular inspection of the waste disposal manifests.	

During the operation **During the operation**	Handling and disposal of hazardous wastes	PIU/PMU should adopt the measures listed below and ensure that all waste relevant information (types, amounts, disposal methods, etc...) are included in the environmental register of the plant. In addition to that, a separate hazardous waste register (according to the Egyptian Laws) has to be prepared, containing all information relevant to the generation, handling and disposal of hazardous wastes. • A waste management plan shall be developed. a) General measures • All types of hazardous waste can only be transported by licensed hazardous waste service providers and disposed of in licensed landfill. • The different types of hazardous wastes should not be mixed. • Spent mineral oils shall be collected, stored in sealed containers and recycled using a licensed company. • Use appropriate procedures for handling chemicals and petroleum products during facility operation. b) Adopting an Identification system for hazardous wastes generated on site The operator shall be able to identify the different potential hazardous wastes. c) Storage and Management of the waste accumulation area The waste storage area for hazardous wastes could be integrated with the general waste storage area but shall be fenced, secured with limited admission and shaded from rain and sun heat/light.: • It is recommended that the maximum period for storing hazardous waste is 270 days from the start date of accumulation of waste. • The storage area must have a water supply • A hazardous waste label that has a “Hazardous Waste” mark on it must be placed on the container while still at the generation point.	• Diesel leaks will be detected through visual observation. Any leakage should be documented in monthly reports. • Records of empty containers returned to vendors, or contaminated soil transported to hazardous. • Waste facilities should be kept in the WWTP, along with signatures of hazardous waste facility operator. • Registering the amount of hazardous waste sent for disposal and archiving the collection and disposal receipts. • Regular inspection of the waste storage area. • Regular inspection of the site to identify random disposal of waste materials. • The containers should be inspected monthly for leaks or any other form of damage and are kept in good condition. • Regular inspection of the site to identify randomly dumped hazardous waste materials.	**PIU/PMU**

		• No Smoking • The site must remain closed at all times and secure from unauthorized access.		

Table (11-2): Environmental Impacts Mitigation and Monitoring

Annexes

ANNEX (1) Land Acquisition of El-Dbabya Cluster
ANNEX (2) Land Acquisition of Keman El-matana Cluster
ANNEX (3) Population of EL - Dbabya Cluster
ANNEX (4) List of Attendance of the Consultation Meetings
ANNEX (5) Minutes of Meetings of the Consultations by WSC
ANNEX (6) Presentations of the Consultation Meetings
ANNEX (7) Field Visits Context
ANNEX (8) Conceptual Design of the Proposed Sanitation System
ANNEX (9) Natural, Climate, and Social Environment Status of Project Areas

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