



**1.5 Million Natural Gas Connections  
Project in 11 Governorates**

**Site-Specific Environmental and  
Social Impact Assessment**



**EGAS**  
Egyptian Natural Gas Holding Company

**Qantara Gharb PRS /Ismailia  
Governorate**  
**Final Report**

**April 2019**

Developed by



**EcoConServ Environmental Solutions**



**Petrosafe**  
**Petroleum Safety & Environmental Services  
Company**



### List of acronyms and abbreviations

QG	Qantara Gharb
AFD	Agence Française de Développement (French Agency for Development)
ALARP	Stands for "As Low As Reasonably Practicable", and is a term often used in the milieu of safety-critical and safety-involved systems. The ALARP principle is that the residual risk shall be as low as reasonably practicable.
BUTAGASCO	The Egyptian Company for LPG distribution
CAPMAS	Central Agency for Public Mobilization and Statistics
CDA	Community Development Association
CO	Carbon monoxide
CRN	Customer Reference Number
CULTNAT	Center for Documentation Of Cultural and Natural Heritage
EEAA	Egyptian Environmental Affairs Agency
EGAS	Egyptian Natural Gas Holding Company
EGP	Egyptian Pound
EHDR	Egyptian Human Development Report 2010
EIA	Environmental Impact Assessment
ER	Executive Regulation
E&S	Environmental and Social
ESIA	Environmental and Social Impact Assessment
ESIAP	Environmental and Social Impact Assessment Framework
ESM	Environmental and Social Management
ESMF	Environmental and Social Management framework
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
GAC	governance and anticorruption
GDP	Gross Domestic Product
GIS	Global Information Systems
GoE	Government of Egypt
GPS	Global Positioning System
GRM	Grievance redress mechanisms
HDD	Horizontal Directional Drilling
HDPE	High-Density Polyethylene pipes
HH	Households
HHH	Head of the Household
hr	Hour
HSE	Health Safety and Environment
IBA	Important Bird Areas
IDSC	Information and Decision Support Center
IFC	International Finance Corporation
IGE/SR	Institute of Gas Engineers/Safety Recommendations
LDCs	Local Distribution Companies
LGU	Local Governmental Unit
LPG	Liquefied Petroleum Gas
mBar	milliBar
MDG	Millennium Development Goal
MOP	Maximum operating pressure
MP	Management Plan
MTO	Material take-off



NG	Natural Gas
NGO	Non-Governmental Organizations
NO <sub>2</sub>	Nitrogen dioxide
OSH	Occupational Safety and Health
P&A	Property and Appliance Survey
PAP	Project Affected Persons
PE	Poly Ethylene
PM <sub>10</sub>	Particulate matter
PPM	Parts Per Million
PRS	Pressure Reduction Station
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SDO	Social Development Officer
SIA	Social Impact Assessment
SO <sub>2</sub>	Sulphur dioxide
SSIAF	Supplementary Social Impact Assessment Framework
SYB	Statistical Year Book
T.S.P	Total Suspended Particulates
Town Gas	The Egyptian Company for Natural Gas Distribution for Cities
WB	The World Bank
WHO	World Health Organization
\$	United States Dollars
€	Euros

Exchange Rate: US\$ = 17.96 EGP as of November, 2018

Exchange Rate: € = 20.5 EGP as of November 2018



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## Executive Summary

### Introduction

Aiming at connecting the natural gas (NG) to about 3,500 clients in Qantara Gharb (QG), Sinai Gas, the local distribution company (LDC), will construct a new 10,000 m<sup>3</sup>/h pressure reduction station (PRS). The off take location will be 30 meters from the outlet point (on the line of GASCO Company on the right of way of Port Said/ Ismailia).

The objective of the proposed project is to construct a new pressure reduction station (PRS) in order to connect the NG to wider range of clients. This will enable achieving reduction of leakage, reduction of subsidy allocated for the butane gas, and reducing dependence of imported fuel.

The ESIA has been prepared by Petrosafe (Petroleum Safety & Environmental Services Company) and EcoConServ Environmental Solutions (Cairo, Egypt) with collaboration and facilitation from EGAS, Egypt Gas, Sinai Gas HSE and Engineering Departments. The names of the Petrosafe and EcoConServ experts who have participated in the preparation of the ESIA study are listed in Annex (1) of this report.

### Project Description

The PRS consists of the following components: an inlet unit (isolated cathodic system), a liquid separation unit, a filtration unit, and a pressure and temperature gauge. Other components include auxiliary devices such as a safety valve (Slam Shut), relief valves, an odorizing unit, ventilation equipment, as well as diesel and jockey pumps.

Utilities in the PRS include a control room, a firefighting system (firefighting water tank, firefighting valve), a staff bathroom, a storage area, and an entrance room located adjacent to the entrance gate.

The PRS for QG will be designed to reduce an inlet pressure of 25-70 bar to an outlet pressure of 2:4 bar at a flow rate of 10,000m<sup>3</sup>/h.

### Legislative and Regulatory Framework

The project will adhere to the Egyptian legislations, WB operational policies and IFC performance standards.

#### Applicable Environmental and Social Legislation in the Egypt legislations:

- Law 217/1980 for Natural Gas
- Law 4/1994 for the environmental protection, amended by Laws 9/2009 and 105/2015. Executive Regulation(ER) No 338/1995 and the amended ER No. 1741/2005, amended with ministerial Decrees No. 1095/2011, 710/2012, 964/2015, and 26/2016
- Law 38/1967 for General Cleanliness
- Law 93/1962 for Wastewater
- Law 117/1983 for Protection of Antiquities
- Traffic Law 66/1973, amended by Law 121/2008 traffic planning
- Law 12/2003 on Labor and Workforce Safety

#### World Bank Safeguard Policies

Three policies are triggered for the project as a whole: Environmental Assessment (OP/BP 4.01), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12).





However, OP/BP4.11 will not be applicable in Qantara Gharb as no archeological sites or sites that bear significant historical or cultural value were identified in the project area of Qantara Gharb. In case of any unanticipated archeological discoveries; Annex 7, titled 'Chance Find Procedures,' outlines the set of measures and procedures to be followed.

OP/BP 4.12 will not be applicable to the land obtained in Qantara Gharb as the process of obtaining the land for the pressure reduction station was based on a willing buyer willing seller approach. No pipelines will cross agriculture lands in Qantara Gharb and accordingly no compensation will be applied.

**World Bank Group General Environmental, Health, and Safety Guidelines<sup>1</sup> & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems- IFC Guideline<sup>2</sup>.**

The General Environmental, Health, and Safety Guidelines (EHS) are designed to be used together with the relevant Industry Sector EHS guidelines, which provide guidance to users on EHS issues in specific industry sectors. Gas distribution system – Health and Safety Guideline are applicable to the project.

Gaps between requirements outlined by WBG guidelines and actions detailed by the ESIA have been analyzed. There are no significant differences between the requirements outlined by the WBG EHS guidelines on Gas distribution systems and the management and monitoring actions outlined by the ESIA.

In addition to the above mentioned safeguards policies, the Directive and Procedure on Access to Information<sup>3</sup> will be followed by the Project.

## *Environmental and Social Baseline*

### **A. Environmental baseline**

Qantara Gharb District is located north east of Ismailia city on the western side of the Suez Canal, 160 kilometers northeast of Cairo and 50 kilometers south of Port Said. .

- **Climate**

- Temperature

Qantara Gharb's climate is a desert one. The Köppen-Geiger climate classification is BWh. In QG, the average annual temperature is 21.6 °C. The rainfall averages 50 mm. The variation in the annual temperature is around 14.4 °C.

- Rainfall

Between the driest and wettest months, the difference in precipitation is 10 mm.

- Site-Specific Ambient Air Quality

8-hour average measurements were conducted for pollutants of primary concerns, namely, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), Total Suspended Particulates (T.S.P) and particulate matter (PM<sub>10</sub>).

The concentrations of measured air pollutants are below national and WB guidelines. All the measurements for the gaseous pollutants were complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and the executive regulation issued in 1995 and its amendments no. 710 in 2012 and 964 in April 2015”. Additionally, the gaseous air pollutants were below the WB permissible limits as in section 4.1.3 of this report.

- Site specific Noise Measurements

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<sup>1</sup> <https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

<sup>2</sup> <https://www.ifc.org/wps/wcm/connect/9c6e3d0048855ade8754d76a6515bb18/Final%2B-%2BGas%2BDistribution%2BSystems.pdf?MOD=AJPERES&id=1323162128496>

<sup>3</sup> <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694>



Noise level measurements were conducted in the same location (proposed site of the new Pressure reduction station) of the ambient air quality measurements. The duration of the measurements is 8 hours with one hour averaging intervals. Baseline ambient noise levels are below the national and World Bank permissible limits.

- **Geology**

Soil composition in Ismailia varies from clayey soil and sandy soil. The topography in the study area is nearly flat with ripple marks. It is covered by extensive sedimentary clastic and non clastic accumulation and alluvial deposits ranging from Oligocene to Quaternary age.

- **Water resources**

- Surface water

Ismailia governorate depends on the Ismailia fresh water canal as a main source of irrigation water. The canal is also used as a source of drinking water..

- Groundwater

There are 354 Wells used for irrigation of agriculture lands according to the information of General Department of Irrigation in Ismailia.

No site specific data is available on groundwater in Qantara Gharb .

- **Terrestrial environment**

Qantara Gharb is located in an arid coastal zone of the Sinai Desert. Present, scarce water resources are rainfall (below 100 mm/year) and groundwater. Groundwater is available in limited quantities in shallow and deep aquifers and is often saline (2000-8000 ppm). The flow of the shallow aquifer is towards the north in the direction of Lake Bardawil and the coast.

- **Solid waste management**

Solid waste management in Qantara Gharb is planned, operated, and monitored by the local municipality. Primary waste collection is handled using old trucks and tools. There is a remarkable gap in waste collection efficiency as the allocated resources are limited.

- **Physical cultural resources**

No archeological sites or sites that bear any significant historical or cultural value were identified in the project area of Qantara Gharb. However, in case of any unanticipated archeological discoveries (section Annex 7) titled 'Chance Find Procedures' outlines the set of measures and procedures to be followed.

- **Physical structures**

The PRS project area is located on the side of the Port Said- new Ismailia road outside the city of Qantara Gharb and the offtake is located 30 meters away from the GASCO Company line on the right of way of Port Said/ Ismailia.

- **Traffic profile**

The PRS project area is located on the side of the Port Said- new Ismailia road outside the city of Qantara Gharb and the offtake is located 30 meters away on the GASCO Company line on the right of way of Port Said/ Ismailia.

B. **Socio-economic Baseline**

The PRS is located close to the entrance of Qantara Gharb city that lies within the jurisdiction of Qantara District in Ismailia Governorate. Qantara Gharb City is located on the west bank of the Suez Canal, near the northern borders of Ismailia Governorate. It is linked to East Qantara by Al-Salam Bridge.

- **Administrative affiliation**

Qantara Gharb city is administratively affiliated to Qantara Gharb district. The total occupied area of Qantara Gharb city is 88.335 km<sup>2</sup> according to Ismailia Governorate's official website.

- **Demographic characteristics**



According to CAPMAS figures from 2013, the total population of Qantara Gharb city is estimated at 34,484 persons distributed among 7,806 households.

- **Living conditions**

The average family size in Ismailia Governorate is about 4.17 persons while in Qantara Gharb City is 4.41 persons.

- **Access to basic services**

The number of subscribers in Ismailia Governorate is 381.83. The total consumption of electricity stood at 1091.10 k.w/h annually which includes lighting usage (954.10 k.w/h) and industrial usage (137.00 k.w./h).

According to CAPMAS poverty mapping (2013), nearly 100% of individuals living in Qantara Gharb city use electricity for lighting.

Accessibility to the water network is high in Qantara Gharb city. The percentage of individuals having access to the public water network is 99.98 %, and 98.15 % of individuals have tap water inside their houses.

The coverage of the public wastewater network is also very high in Qantara Gharb city as 94.85% of individuals have access to the public wastewater network according to CAPMAS poverty mapping 2013.

- **Human development profile**

According to CAPMAS poverty mapping data 2013, the percentage of manpower joined labor force at the age of 15 - 65 year is 45.43 %. The percentage of agriculture workers from total employed persons is 8.71 %. The unemployment rate in Qantara Gharb city stands at 11%. The formal statistics obtained from the poverty mapping data 2013 regarding manpower reflected that the age of starting work is 15 years old.<sup>4</sup> Both the child law and the labor law state that children shall not be employed before they complete 14 calendar years old, nor shall they be provided with training before they reach 12 calendar years old; however children between 12 and 14 years old are permitted to work as trainees.

- **Health facilities**

Qantara Gharb city has one general hospital, one urban medical unit, 8 rural medical units, and 3 ambulance centers.

Many participants of the focus group discussions and a number of government officials reported that the level of medical services provided in Qantara Gharb city is very poor.

- **Human activities in the project areas**

According to focus group discussions, the main economic activities in Qantara Gharb city are trade and commercial activities. The majority of respondents stated that most people work in commercial activities and the remainder work as employees. Agriculture activities are very low in Qantara Gharb city as it absorbs a small percentage of the manpower (8.7%) according to CAPMAS poverty mapping data 2013.

## *Environmental and Social Impacts*

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The environmental and social impact assessment (ESIA) is a process used to identify and evaluate the significance of potential impacts on various environmental and social receptors as a result of planned activities during (construction and operation) phases of the Project. Furthermore, the analysis of

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<sup>4</sup> Based on Labor law number 12 of year 2003 and The Child Law (No. 12, 1996). There are certain critical obligations to recruit children below 15 years old. Article 98-103 of Labor law put limitations related to age, type of occupation, hazards work...etc



environmental and social impacts is important to detail an effective management and monitoring plan which will minimize negative impacts and maximize positives.

## A. Potential positive impacts

- **Positive impacts during construction**

- Impacts related to employment

*Provide direct job opportunities to skilled and semi-skilled laborers*

The construction of the Qantara Gharb PRS is expected to result in the creation of direct and indirect job opportunities. Based on similar projects implemented recently by EGAS and the local distribution company, the daily average number of workers during the peak time will be about 30 workers (26 laborers + 2 supervisors + 2 engineers). The workers also include drivers, digging staff, technicians, and welders.

*Create indirect opportunities*

As part of the construction stage, a lot of indirect benefits are expected to be sensed in the targeted areas due to the need for more supporting services to the workers and contractors who will be working in the various locations. These benefits could include, but are not limited to accommodation, food supply, transport, trade, security, manufacturing, etc...

- **Positive impacts during operation**

The operation of Qantara Gharb is expected to result in the creation of job opportunities. The average number of workers during operation of the PRS will be about 17 workers from the permanent workers of the LDC; 6 technicians, 2 foremen, 2 maintenance (one engineer and one engineer's assistance), and 3 security. With regards to health and safety, one person will be assigned from the staff of Sinai Gas.

## B. Potential negative impacts

Various impacts were assessed in accordance with the impact assessment methodology. Of no significance impacts are ecological, land acquisition, and visual intrusion during construction phase. Risks pertaining to child labor, air emissions, soil, ecological, and traffic are assessed as of no significance in the operation phase. (Please see section 5.3 of this report that highlights impact assessment).

**Assessment of significance of impacts for the accidental (non-routine) events throughout the project phases and safety issue is included in a separate quantitative risk assessment (QRA) study that showed the following:**

**Impact during accidental (non - routine) events (Operation Phase)**

Quantitative Risk Assessment Study (QRA), demonstrated the following hazards

- Gas Release
- Fires (Heat Radiation)
- Explosion (Overpressure Waves)
- Suffocation (Odorant Leak)

Risk calculations concluded that, the individual risk level to the exposed workers / public based on the risk tolerability criterion have been identified in Acceptable region (Lower Tolerability Limit<sup>5</sup>) for workers and ALARP region (Below the Upper Tolerability Limit<sup>6</sup>) for public. Some recommendations

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### 5 ***Lower Tolerability Limit***

*Which the risks are broadly tolerable to society and comparable to everyday risks faced by the public. If the overall risk is below the Lower Tolerability Limit, the ALARP Assessment is likely to be straightforward and limited to ensuring compliance with Good Practice. Below the Lower Tolerability Limit, the principal risk management concern is the maintenance of existing risk reduction measures to avoid degradation.*

### 6 ***Below the Upper Tolerability Limit***



need to be considered to keep the risk tolerability, as described in section 7.7 and the QRA Study in Annex-11

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*The risk is only tolerable if it is ALARP. This means that all practicable risk reduction measures must be identified and those that are reasonably practicable implemented. The term reasonably practicable indicates a narrower range than all physically possible risk reduction measures. If the cost of a risk reduction measure, whether in terms of money, time or trouble, can be demonstrated to be grossly disproportionate to the risk reduction gained from the measure, taking account of the likelihood and degree of harm presented by the hazard, then implementation of the measure may not be required.*



### Summary of potential negative impacts

Potential Impact Significance										
Activity	Air emissions	Noise	Reduction of Traffic Flow	Surface Water	Solid, Hazardous Wastes and Liquid Waste	Community health and safety	Labor conditions and occupational health and safety	Child labor	Labor influx	Soil pollution
Potential negative impacts during construction phase										
<b>Mobilization</b>	Temporary, medium	Temporary, low	Temporary, low	N/A	Temporary, low	N/A	Temporary, medium	Temporary, medium	Temporary, low	N/A
<b>Excavation</b>	Temporary, medium	Temporary, low	Temporary, medium	Temporary, medium	Temporary, medium	Temporary, low	Temporary, medium	Temporary, medium	Temporary, low	Temporary, low
<b>PE Pipe laying</b>	Temporary, medium	Temporary, low	Temporary, medium	N/A	Temporary, low	N/A	Temporary, medium	Temporary, low	Temporary, low	N/A
<b>Leakage testing</b>	Temporary, medium	Temporary, low	Temporary, low	N/A	Temporary, low	N/A	Temporary, medium	Temporary, low	Temporary, low	N/A
<b>Impact Assessment</b>	Medium	Minor-Medium	Medium	Minor	Medium	Minor	Medium	Low - Medium	Low	Minor
Potential negative impacts during operation phase										
<b>PRS operation</b>	N/A	Permanent low	N/A	N/A	Permanent medium	Permanent low	Permanent medium	N/A	N/A	N/A
<b>Repairs</b>	N/A	Permanent low	N/A	N/A	Permanent medium	Permanent low	Permanent medium	N/A	N/A	N/A
<b>Impact Assessment</b>	Of no significance	Minor	Of no significance	Of no significance	Medium	Minor	Medium	Of no significance	Of no significance	Of no significance

Detailed description of the impacts is presented in section 5.3 of this report





## *Analysis of Alternatives*

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- **Technology Alternatives**

- **Outlet pressure**

The PRS reduces the pressure in HP pipelines from 30-70 bar to 4 or 7 bar, making it suitable for distribution or use in domestic or industrial applications. The PRS of Qantara Gharb will produce 2:4 bar outlet pressure for the local distribution network (intermediate pressure). The local distribution company (LDC) choose to produce 2:4 bar instead of 4:7 bar due to low consumption rates excepted at QG.

- **Odorant handling**

Environmental and safety control considerations and measures are integrated into the selected technology design. For example, in order to reduce emissions from the odorant unit, the odor will be automatically added or by using a plunger pump. Automatic and sophisticated unit management systems ensure safe and easy operation and can encompass complete remote operation of the units.

- **PRS location Alternatives**

- **PRS location**

As per national and WB guidelines, PRS siting avoids habitat alteration and seeks to minimize environmental, occupational health and safety, and community health and safety impacts.

The process of land acquisition has focused on assessing three potential alternative lands. The three plots of lands were owned by community people (private lands). EGAS and the LDC paid visits to the three lands and negotiated with the owners about the price. Finally, an agreement was reached with one of the land owners. The three alternative lands were technically accepted. Therefore, the price was the main determinant in obtaining this land

EGAS and LDCs follow a set of agreed upon procedures for the process of permanent Land take for the construction of PRSs Annex (2). The procedure covers cases of land acquisition of State-Owned Lands or privately-owned Lands on willing Buyer Willing Seller basis. It is the priority of EGAS as an asset holder, to acquire State Owned Lands that are free of any uses (both formal and informal EGAS never resorts to the land expropriation decrees in PRSs selection, particularly because of the flexibility of the PRSs locations.

In cases of unavailability or in case the available land is technically unacceptable, private land is usually used as a second a resort. Land alternatives are examined, and the optimum technical and socio-economic scenario of land is selected. Consultation activities are conducted through the project cycle including with the individuals who offer to sell their land, dissemination of project information at the early stages of the project during the frameworks' preparation followed by consultation activities with the Project affected persons (e.g. cases of farmers whose land are temporary affected from the high-pressure pipelines passing their land) and during land acquisition with



land owners. Annex (3) summarizes the land acquisition process of Qantara Gharb PRS Land

### *Environmental and Social Management & Monitoring Plan*

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The objective of the Environmental and Social Management and Monitoring Plan (ESMMP) is to outline actions for minimizing or eliminating potential negative impacts and monitor the application and performance of mitigation measures. The ESMMP identifies roles and responsibilities for different stakeholders for implementation and monitoring of mitigations as well as estimate costs for these mitigations. This section also presents an assessment of the institutional capacity and institutional responsibilities for implementing the ESMMP.

Full ESMMP is presented in section 8 of this report.

### *Stakeholder Engagement and Public Consultation*

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The consultation activities were conducted in full compliance with the following legislations:

- WB policies and directives related to disclosure and public consultation, namely,
  - o Directive and Procedure on Access to Information
  - o World Bank Operational Policy (OP 4.01)
  
- Egyptian regulations related to the public consultation
  - o The environmental law No 4/1994 modified by Law 9/2009 modified with ministerial decrees no. 1095/2011 and no. 710/2012

Qualitative information and data were collected through identifying stakeholders and recognize their views and concerns about the project. Key groups of relevance include: ordinary citizens, community leaderships, officials and government representatives, potential Project Affected Peoples (PAPs), local Non-Governmental Organizations (NGOs), and Community Development Associations (CDAs). In this regard, various tools were used (i.e. in-depth interviews, focus group discussions, Panel meetings, and public consultation session). Stakeholder engagement and public consultation activities encompassed a gender aspect that women's views and concerns were taken into account and were well documented.

- **Consultation Methodology and Activities**

In order to establish a more profound understanding of the local communities' perceptions and perspectives of the project, stakeholders' engagement and public consultation activities included a broad base of community members and governmental entities.

The first step was to collect the responses and feedbacks of the local communities through conducting Focus Group Discussions (FGDs), structured questionnaires, panel meeting, and public consultation sessions. The second step was to analyze these qualitative data in order to reach a conclusion regarding the general stance and attitudes of the local communities towards the project. Various NGOs participated actively in the preparation of the FGDs and provided data collectors to assist the team in data collection.

- **Summary of Discussions**

Throughout the discussions interviewees were asked about five main points:

- Type of fuels currently in use and its associated problems



- Upsides and downsides of NG compared to other types of fuels
- Effects of the project during constructions and operations
- Cost of NG installation to households
- Future positive\negative impact of NG connections project
- Safety of the PRS

It was notable that the reactions and attitudes of the local communities towards the project are in favor of the project. The field research team noted a strong public support and eagerness towards the project. Beside some legitimate concerns expressed by the public, the field research team has recorded the general view that NG is a far better substitute for the type of fuel currently in use.

- **Summary of consultation outcomes**

Site-specific consultation activities in Qantara Gharb City have included wide range of concerned stakeholders. This included, but not limited to, individuals/households affected by the project activities, civil society organizations representing the interest of the community and governmental bodies that will play a role in facilitating or regulating the implementation of site-specific project activities.

The general perspective towards the project is very supportive even after the disclosure of the negative impacts during construction. Community people realize that these negative impacts are temporary and the upsides will outweigh the downsides during operations.

The main concerns raised about the project were the extended time plan that put limitation to benefit from the project.

- **ESIA disclosure**

As soon as the site-specific ESIA for Qantara Gharb is approved by the World Bank and EAAA, a final report will be translated into Arabic and published on the WB, EGAS, and Sinai Gas websites. An executive summary in Arabic will be published on EGAS and Sinai Gas websites.

A copy of the ESIA report in English and a Summary in Arabic will be made available in the customer service office. Additionally, an Arabic summary will be made available in the contracting offices. An A3 poster will be installed in the contracting office informing about the results of the ESIA and the website link for the full ESIA study.



# 1 INTRODUCTION

## 1.1 Preamble

Aiming at installing the NG to about 3,500 clients in Qantara Gharb, the Local Distribution Company Sinai Gas will construct a new PRS 10,000 m<sup>3</sup>/h PRS. The off take location will be 30 meters from the outlet point (on the line of GASCO High pressure pipeline on the right of way of Port Said/ Ismailia road).

The objective of the proposed project is to construct a new PRS in order to install the NG to wider segment of clients. This will enable achieving reduction of leakage; reduction of subsidy allocated for the butane gas and reducing dependence of imported fuel.

## 1.2 Environmental and Social Impact Assessment (ESIA)

The ESIA is undertaken to assess and propose mitigation measures for environmental and social impacts of off-takes from the national network to the project areas and pressure reduction stations. Impacts of NG exploration, extraction, refining, and transmission are outside the scope of the ESIA.

### Objectives of the ESIA include:

- Describing project components and activities of relevance to the environmental and social impacts assessments
- Identifying and addressing relevant national and international legal requirements and guidelines
- Describing baseline environmental and social conditions
- Assessing project alternatives and the no project alternatives
- Assessing potential site-specific environmental and social impacts of the project
- Developing environmental & social management and monitoring plans in compliance with the relevant environmental laws
- Documenting and addressing environmental and social concerns raised by stakeholders and the Public in consultation events and activities

The project in Qantara Gharb (QG) encompasses construction of a HP pipeline (30m) connecting the National Grid to the PRS, and a new 10,000 m<sup>3</sup>/h PRS.

**The local distribution company responsible for project implementation in QG is Sinai Gas or شركة (سيناء للغاز).**

## 1.3 Contributors

The ESIA has been prepared by Petrosafe (Petroleum Safety & Environmental Services Company) and EcoConServ Environmental Solutions (Cairo, Egypt) with collaboration and facilitation from EGAS and Sinai Gas HSE and Engineering Departments. The names of the Petrosafe and EcoConServ experts who have participated in the preparation of the ESIA study are listed in Annex (1) of this report.

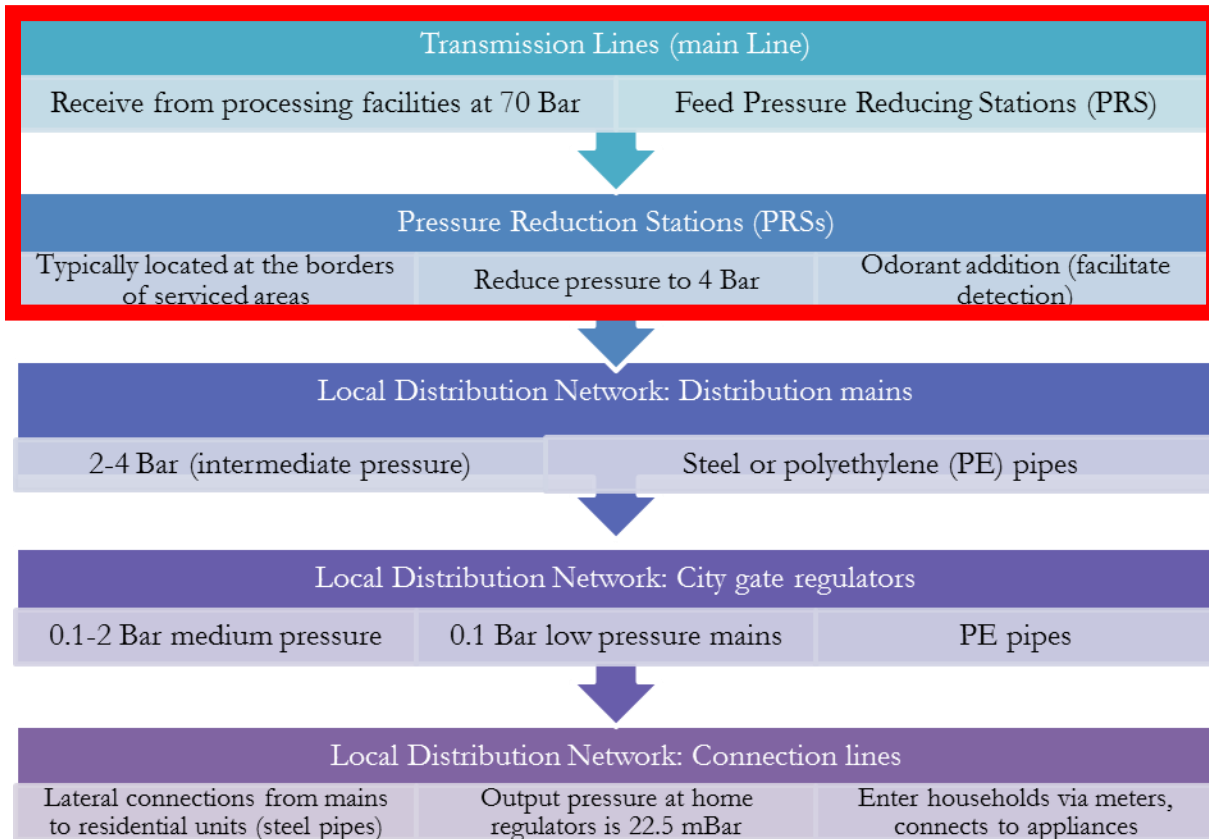


## 2 PROJECT DESCRIPTION

### 2.1 Background

Natural Gas (NG) is processed and injected into the high pressure lines of the national Grid (70 Bar) for transmission. Upon branching from the main lines to regional distribution networks, the pressure of the NG is lowered to 4 Bar at the PRS. An odorant is added to the NG at PRSs feeding distribution networks to residential areas<sup>7</sup> in order to facilitate detection in the event of leaks. Regulators are then used to further lower the pressure to 100 mbar in the local networks, before finally lowering the pressure to 20 mbar for domestic use within households. In addition to excavation and pipe laying, key activities of the construction phase also include installation of pipes in buildings, internal connections in households, and conversion of appliance nozzles to accommodate the switch from LPG to NG.

The diagram below presents the components of a city’s distribution network. The components covered in this ESIA are lined in red. Other components are addressed in a separate ESMP:



**Figure 2-1: General components of QG’s distribution network**

<sup>7</sup> Because natural gas is odorless, odorants facilitate leak detection for inhabitants of residential areas.



## 2.2 Project Work Packages

### 2.2.1 Off-take

The off take is the point on the HP national grid pipeline where a branch of the pipeline is constructed to connect a new PRS to the national grid. The off take location will be 30 meters from the outlet point (on the line of GASCO Company on the right of way of Port Said/ Ismailia) within the borders of the PRS

### 2.2.2 Inlet connection/Pipeline “70 bar system”

A 30m carbon steel pipeline connection having a 6 inch diameter will be installed between the off-take from the national high-pressure grid (70:25 bar) and the PRS in QG.

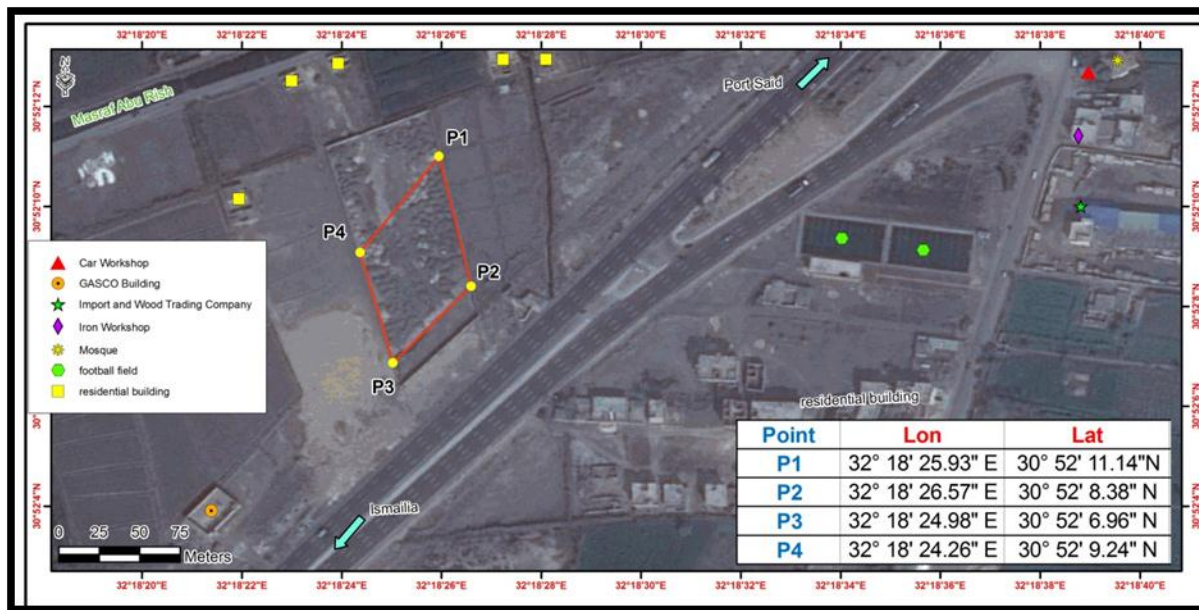


Figure 2-2: Project Site

### 2.2.3 Pressure Reduction Station (PRS)

The PRS consists of the following components: an inlet unit (isolated cathodic system), a liquid separation unit, a filtration unit, and a pressure and temperature gauge. Other components include auxiliary devices such as a safety valve (Slam Shut), relief valves, an odorizing unit, ventilation equipment, as well as diesel and jockey pumps.

Utilities in the PRS include a control room, a firefighting system (firefighting water tank, firefighting valve), a staff bathroom, storage area and entrance room located adjacent to the entrance gate.

The PRS for QG will be designed to reduce an inlet pressure of 25-70 bar to an outlet pressure of 2:4 bar at a flow rate of 10,000m<sup>3</sup>/h.

## 2.3 Project Location

The PRS is located on the side of the Port Said- new Ismailia road outside the city of Qantara Gharb and the off-take is located 30 meters away on the GASCO Company line on the right of way of Port Said/





Ismailia. The nearest residential building is about 150 meters away from the PRS. Figure 2-4 shows the PRS and its surroundings



Figure 2-3 PRS Qantara Gharb Location



Figure 2-4 PRS Qantara Gharb and the surrounding area



## 2.4 Project Execution Methodology

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### 2.4.1 General survey

- Identifying availability of utilities in the area and their conditions (electricity, water, telephone lines, and sanitary pipelines) through data and maps from the relevant authorities.
- Identifying the location of the nearest national grid pipelines, gas networks and off-take.
- Identifying the location of the new PRS.

### 2.4.2 Design and material take-off (MTO) including procurement

Once the final location of project components is finalized, a final design of the PRS is utilized to estimate the materials and equipment needed to implement the project. Procurement of the materials includes local and international components. The main international purchases may include regulators, and metering stations.

### 2.4.3 Construction works of Off-take & Inlet connection/High Pressure Pipeline “70 bar system”

QG will be connected to the national Natural Gas Grid (High-Pressure Steel lines). A 30m off-take will connect the 70-bar HP line to a new 10,000 m<sup>3</sup>/h Pressure Reduction Station (PRS). Diameters of the steel-HP pipelines are 6 inch, and are 2m deep inside the ground.

General features of the construction activities are also applicable to excavation and installation of the 70-bar high-pressure piping. However, HP piping in the case of QG is quite limited (30m). HP piping will take place within the borders of the PRS on the line of GASCO

The following activities will take place during the construction of the HP Pipeline:

- Clearing and grading activities and Pipe transportation and storage
- Site preparation “within the borders of the PRS at a distance of 30metres”
- Excavation (Open Trench with a width of 1m is used for the HP pipeline)
- Pipe laying
- Welding
- Backfill and road repair
- Leakage testing



Figure 2-5 Open Trench Example

## 2.4.4 Construction works of PRS

### 2.4.4.1 Pressure Reduction Station area

PRS siting was performed according to international best-practice and guided by minimizing the possible negative impacts on the project's surroundings: the safety of neighboring areas from possible gas release accidents and noise associated with reducers operations. The PRS will be surrounded by a wall for safety and security purposes (including reducing noise impacts of the PRS reducers on the surrounding receptors). There is one building located approximately 150 m north west of the PRS's proposed location and the closest residential area is approximately 100 m south east of the PRS.

In the event that buildings are constructed in the area surrounding the PRS, the Institute of Gas Engineers Safety Recommendations requires the following buffer zones:

- Minimum distance between high pressure line (70 bar) and buildings outside the PRS will be 90 meters from the center line.
- PRS should have free areas from each side to allow for emergency vehicle access.
- At least 20 meters between reducers and any building which may arise in the future to minimize noise impacts.

QG PRS is to be located in a low-population-density area on plot of land measuring 50m x 50 m. The PRS is to be accessible by an existing road (Ismailia – Port Said Road) to ensure quick response in the event of repairs or emergencies. The site was obtained through a willing buyer (EGAS committee) and a willing seller process (Annex 4 provides the sale contract of the land).

### 2.4.4.2 Pressure Reduction Station Civil Works

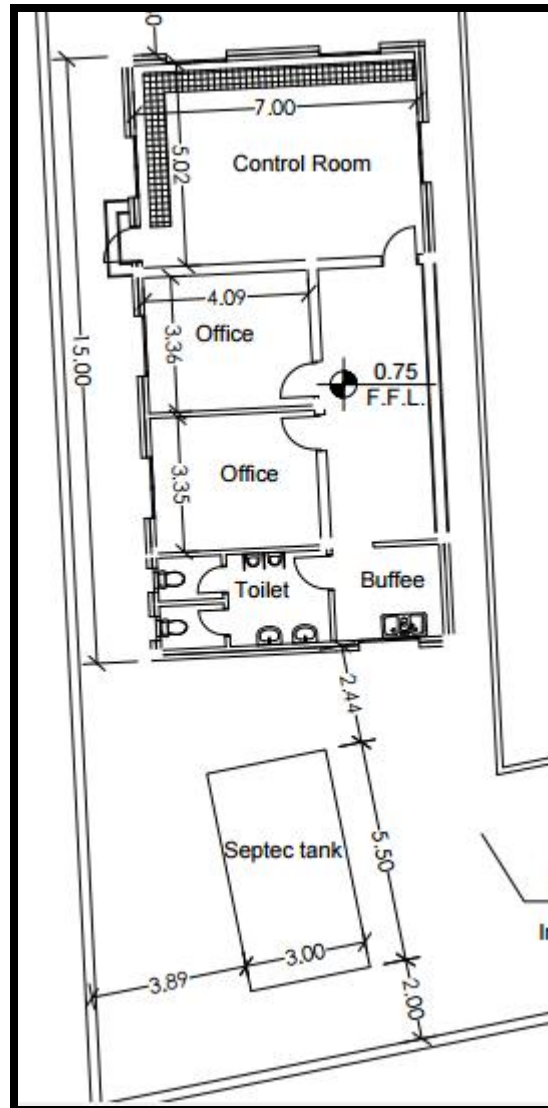
The main construction activities will include:

- Site preparation, acceptance and placement of major fabricated equipment items, construction of buildings, testing and commissioning.





- Initial construction activities involve clearing and grading of the site, sediment fences and silt traps will be installed, as necessary, to control erosion and sediment transport during site preparation activities.
- Following site preparation, individual excavations will be made for fire-fighting tanks, domestic wastewater trenches, pipe racks, and a high wall (of cement) around the PRS.
- Concrete foundations for buildings and footings for mechanical equipment will be laid down;
- Facility piping (inlet, outlet and firefighting line) both above and below ground, are installed.
- Construction of a 105m<sup>2</sup> control room with a bathroom, an electrical units room, and a security room adjacent to the PRS



**Figure 2-6 Proposed Plan for the Control room, bathrooms and offices in QG's PRS**

#### 2.4.4.3 Pressure Reduction Station Mechanical Works

The QG PRS comprises of two pressure streams, the upstream (inlet) high pressure ranging from 30 to 70 Bar and the downstream (outlet) low pressure 2-4 Bar. The PRS design is in accordance with the Institute of



Gas Engineers/Safety Recommendations IGE/SR/9, 10, 16, 18, 22, 23, 24, 25; Institute of Gas Engineers/Transmission Distribution IGE/TD/13; and National Fire Protection Association NFPA 15.



Figure 2-7 PRS Example

Following the construction of the foundation and fences, construction will continue with the installation of mechanical components. Mechanical components include the following:

- Inlet ball valve
- Solid filtration
- Liquid filtration
- Water bath heater
- Reduction regulator
- Active regulator
- Monitor regulator
- Slam shut /Safety valve
- Relief valve
- Measuring unit
- Odorizing unit
- Outlet unit

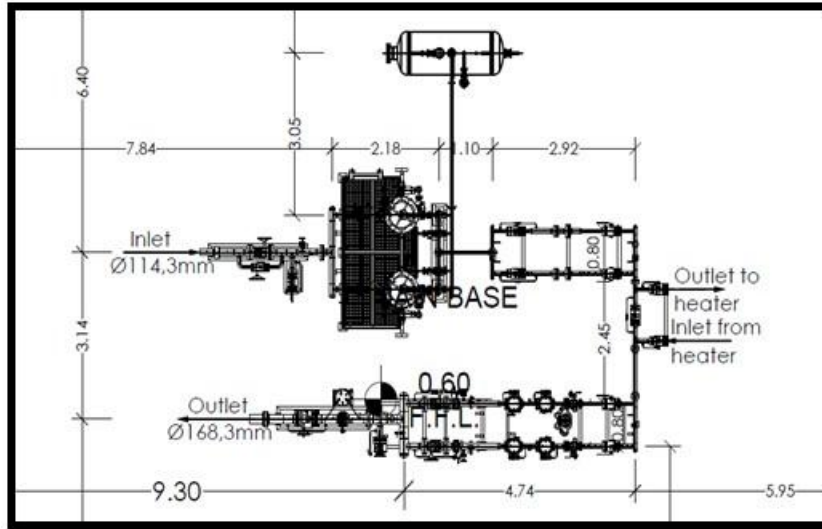


Figure 2-8 QG PRS Internal Components

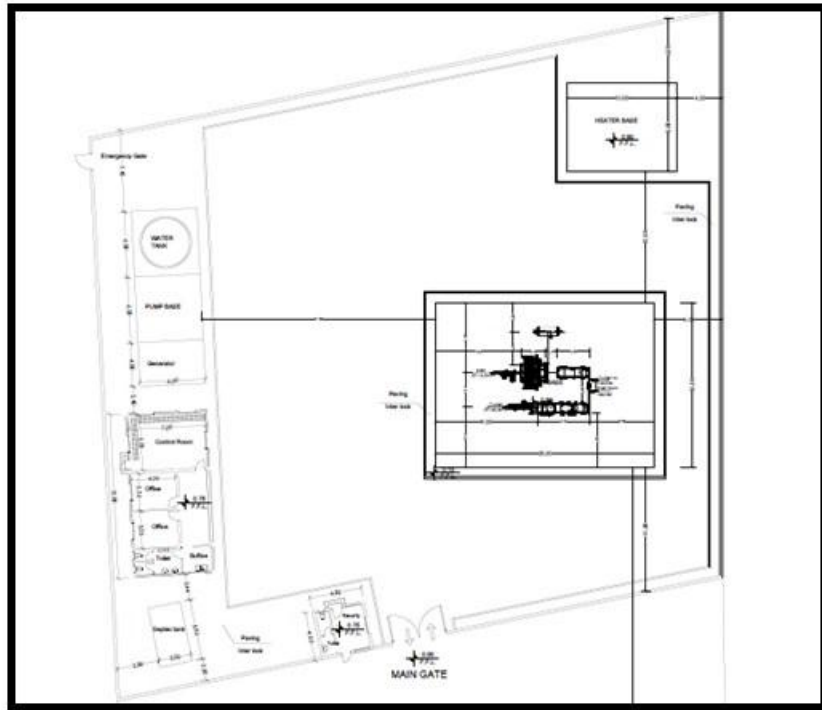


Figure 2-9 QG PRS Layout

#### 2.4.4.4 Testing

Following mechanical completion, testing of the facility components will be performed in accordance with applicable standards.





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## 2.5 Operation Phase

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### 2.5.1 Operation of the off-take

The main activities during the operation phase are the monitoring of the main off take valve and the routine checking for the occurrence of gas leaks.

- *SCADA (Supervisory Control and Data Acquisition System)*

GASCO is working with SCADA, a highly sophisticated integrated system used to control the national natural gas pipeline network. The SCADA system performs remote controlling of the valve rooms to adjust the operating pressure, and if necessary change the flow of natural gas by bypassing the main route. The SCADA system can also detect natural gas leakage if a pressure drop was observed in a certain pipeline. The SCADA system is connected to a fiber optics system installed in the pipelines

### 2.5.2 Operation of the PRS

Operation of the PRS involves operation of the various components outlined in the construction phase. Risks associated with those activities are further addressed separately in a Quantitative Risk Assessment (QRA) (Refer to Annex-11 Quantitative Risk Assessment)

#### 2.5.2.1 Inlet ball valves

The inlet valve includes an insulation joint to completely isolate the PRS inlet from the cathodic system applied to the feeding steel. Insulation joints isolate the PRS as a measure of protection during strikes and current.

#### 2.5.2.2 Filtration unit

The filtration unit consists of two main stages, a liquid filtration stage and a solid filtration stage. The aim of the filtration unit is to remove dust, rust, solid contaminants and liquid traces before entering into the reduction stage. Two filters and two separators are installed in parallel; each filter-separator operates with the full capacity of the PRS to separate condensates and liquid traces. The solid filtration unit is designed to separate particulate matter larger than 5 microns. Filter-separator lines are equipped with safety devices such as differential pressure gauges, relief valves, liquid indicators, etc.

#### 2.5.2.3 Heating unit/Water Bath Heater

This unit ensures that inlet gas to the reduction unit enters with a suitable temperature (the temperature of gas flow entering the station should be 15°C; and to avoid the formation of natural gas water hydrates in the line downstream of the choke or regulator (due to Joule Thompson effect). Temperature increases by heat exchange between gas pipeline pass through the heating unit filled with hot water. The unit was designed to be heated to 60°C; while the heating temperatures for the outlet flow gas ranges between 35°C and 45°C.

The heating unit comprises of the following components:

- Heater body/shell
- Process gas inlet/outlet
- Water Expansion tank
- Burner , Gas Train & BMS Panel
- Removable Fire tube
- Exhaust stack



- Heating medium( Water Bath)

#### 2.5.2.4 Reduction

The PRS includes two reduction lines in parallel (one of them being on standby in case of emergencies). The lines are equipped with safety gauges, indicators and transmitters to maintain safe operating conditions. According to the IGEM standards, the reduction unit should be installed in a well-ventilated closed area or, alternatively, in an open protected area.

#### 2.5.2.5 Active and monitor regulator

The active regulator controls the outlet pressure while the monitor regulator assumes control in the event of failure of the active device.

#### 2.5.2.6 Slam shut valve

The purpose of Slam shut valve is to automatically and rapidly cut off gas flow when the outlet pressure exceeds or drops below the setting pressure. The valve has to be installed to protect the system. The safety valve has to be sized for the maximum gas flow with the highest pressure that could be provided to the pressure reducing valve.

#### 2.5.2.7 Measuring unit

After adjusting the outlet pressure, gas flow and cumulative consumption are then measured to monitor NG consumption from the PRS and to adjust the dosage of the odorant indicated in the subsection below.

#### 2.5.2.8 Odorizing unit

Natural gas is generally odorless. The objective of odorizing is to enable the detection of gas leaks at low concentration, before gas concentrations become hazardous. The odorant is composed of Tertiobutylmercaptan (80%), Isopropylmercaptan (16%), and n-Propylmercaptan (4%). The normal dosing rate of the odorant is 16 mg/cm<sup>3</sup>. The odorant system consists of a stainless steel storage tank, which receives the odorant from 200-liter drums, injection pumps, and associated safety devices.

#### 2.5.2.9 Outlet unit

The outlet unit includes an outlet valve gauge, temperature indicators, pressure and temperature transmitters and non-return valves. The outlet pipes are also, like inlet pipes, isolated from the cathodic protection by an isolating joint.

### 2.5.3 Hotline

A 24-7 Hotline (**129**) is available for customers and the public to request repairs or assistance. This line is also used in case of emergencies to report leaks, damage, emergencies, and/or incidents related to gas connections, components, infrastructure, and activities (inside or outside households)

## 2.6 Resources Consumption

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## 2.6.1 During construction phase

### 2.6.1.1 Water

Water is mainly used during the construction phase in concrete preparation, for the pipeline, and domestic uses by the workers and engineers. Bottled water will be used for drinking purposes.

### 2.6.1.2 Fuel

Diesel fuel will be mainly used for:

- Diesel generators to supply electricity to the various construction activities including welding.
- Trucks and excavators.

The fuel will be supplied from the nearest petrol station to the PRS.

## 2.6.2 During Operation phase

### 2.6.2.1 Water

Water is mainly used during the operation phase in the firefighting storage tank as well as for domestic use by workers in the PRS and drinking water.

The water will be connected to the public water network.

### 2.6.2.2 Electricity

Electricity consumption during the operation phase is expected to be minimal which will be mainly consumed at the control room. The PRS will be connected to the national grid network existing in the area.

## 2.7 Waste Generation

All solid waste generated during the construction phase will be managed and disposed in accordance with applicable regulations and established best management practices. All generated wastes will be reused and/or recycled to the maximum extent possible.

### 2.7.1 During construction phase

#### 2.7.1.1 Solid waste

Construction waste will consist mainly of left over piping materials such as polyethylene pipes and carbon steel. The amount of waste is approximately 2% of the total amount of materials, which is collected by the Contractor and resold as scrap.

The waste is expected to include the following waste streams:

**Table 2-1: Solid waste generation and treatment**

Waste type	Hazardous/Non-hazardous	Treatment and Disposition
Domestic Waste (food waste, packing)	Non Hazardous	Disposed to an approved solid waste facility
Wood – Scrap	Non-hazardous	Sold to specialized companies in a public auction
Tires		
Cardboards		
Containers		



Waste type	Hazardous/Non-hazardous	Treatment and Disposition
Paints containers	Hazardous	Transported by Town Gas for final disposal is Nasreya
Batteries	Hazardous	Resold to the supplier
Used oil waste (vehicles and machines)	Hazardous	Transported by Town Gas for final disposal to UNICO

#### 2.7.1.2 Wastewater

During the construction phase, liquid waste will comprise mainly of domestic wastewater and vehicle/equipment wash down water. Domestic water is the only continuous source during construction. There will be a trench (to be used for wastewater) lined with an impervious layer for use by workers during the construction phase and the wastewater will be collected in a septic tank and disposed of at an authorized wastewater treatment facility.

### 2.7.2 During operation phase

#### 2.7.2.1 Solid waste

The operation of the high pressure networks and the PRS is expected to generate minimal solid waste, which will be limited to domestic waste and will be collected regularly by trucks.

Hazardous waste- mainly empty odor containers- will be treated on-site, transported (using certified hazardous waste vehicles and personnel) to the Sinai Gas storage facility that will be transferred to a licensed landfill ,El Nasserya, site in Alexandria

#### 2.7.2.2 Wastewater

During operation, the only wastewater source is domestic wastewater. The wastewater is not connected to the public sewage system. Wastewater will be collected in a septic tank. The septic tank will be emptied by trucks and disposed of at an authorized wastewater treatment facility. There is a possibility that the site be connected to the municipal sanitary network in the future.



## 3 LEGISLATIVE AND REGULATORY FRAMEWORK

### 3.1 Applicable Environmental and Social Legislations and guidelines in Egypt

- Law 217/1980 for Natural Gas
- Law 4 for Year 1994 for the environmental protection , amended by Law 9/2009 and law 105 for the year 2015
  - Executive Regulation(ER) No 338 for Year 1995 and the amended regulation No 1741 for Year 2005, amended with ministerial decree No 1095/2011, ministerial decree No 710/2012, ministerial decree No 964/2015, and ministerial decree No 26/2016
    - EEAA guidelines on ESIA's preparation
    - EGAS HSE guidelines. LDCs comply with EGAS– HSE Guidelines on PRS construction and operation
- Law 38/1967 for General Cleanliness
- Law 93/1962 for Wastewater
- Law 117/1983 for Protection of Antiquities
- Traffic planning and diversions
  - Traffic Law 66/1973, amended by Law 121/2008 traffic planning during
  - Law 140/1956 on the utilization and blockage of public roads
  - Law 84/1968 concerning public roads
- Work environment and operational health and safety
  - Articles 43 – 45 of Law 4/1994, air quality, noise, heat stress, and worker protection
  - Law 12/2003 on Labor and Workforce Safety
- 

### 3.2 World Bank Safeguard Policies

Three policies are triggered for the project as a whole: Environmental Assessment (OP/BP 4.01), Physical Cultural Resources (OP/BP 4.11), and Involuntary Resettlement (OP/BP 4.12).

However, OP/BP4.11 will not be applicable in Qantara Gharb as no archeological sites or sites that bear significant historical or cultural value were identified in the project area of Qantara Gharb. However, in case of any unanticipated archeological discoveries; Annex 7, titled 'Chance Find Procedures,' outlines the set of measures and procedures to be followed.

OP/BP 4.12 will not be applicable to the land obtained in Qantara Gharb as the process of obtaining the land for the pressure reduction station was based on mutual consent between the seller and buyer (willing buyer willing seller approach). With regard to the High Pressure pipeline, it will pass in the main road right of way owned by state. Consequently, no land acquisition will be in place for the PRS or the HP pipeline.





### **3.3 World Bank Group General Environmental, Health, and Safety Guidelines & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems**

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The Environmental, Health, and Safety (EHS) Guidelines<sup>8</sup> are technical reference documents with general and industry specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are involved in a project, these EHS Guidelines are applied as required by their respective policies and standards. These industry sector EHS guidelines are designed to be used together with the General EHS Guidelines document, which provides guidance to users on common EHS issues potentially applicable to all industry sectors. For complex projects, use of multiple industry-sector guidelines may be necessary.

Gaps between requirements outlined by WBG guidelines and actions detailed by the ESIA have been analyzed. There are no significant differences between the requirements outlined by the WBG EHS GUIDELINE on GAS DISTRIBUTION SYSTEMS<sup>9</sup> and the management and monitoring actions outlined by the ESIA.

### **3.4 International Finance Corporation (IFC) EHS Guidelines**

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The IFC Environmental Health and Safety (EHS) Guidelines describes pollution prevention and abatement measures and emission levels that are normally acceptable to the Bank. However, it is taking into account borrower country legislation and local conditions.

In 2007, IFC Environmental, Health, and Safety (EHS) Guidelines were released which replace World Bank Guidelines previously published in Part III of the Pollution Prevention and Abatement Handbook.

The IFC EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). When one or more members of the World Bank Group are

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<sup>8</sup> <https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

<sup>9</sup> <https://www.ifc.org/wps/wcm/connect/9c6e3d0048855ade8754d76a6515bb18/Final%2B-%2BGas%2BDistribution%2BSystems.pdf?MOD=AJPERES&id=1323162128496>



involved in a project, these EHS Guidelines are applied as required by their respective policies and standards.

The General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, which provide guidance to users on EHS issues in specific industry sectors.

### **3.5 Permits Required**

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- Army force permits to construct the PRS (Annex 5)
- Constructions permit to be obtained from the Local Governmental Unit in Qantara Gharb City.
- Environmental permit: according to Egyptian Law for the Environment, Law 4/1994 amended by Law 9/2009. EEAA approval on ESIA is considered the environmental permit.
- Utility installation permission to the PRS
- Permission from the High Council of Antiquities in accordance to Law No 117 of year 1983 and its amendment No 12 of year 1991
- PRS land selling contracts.(Annex 4)
- Storage site lease contract



## 4 ENVIRONMENTAL AND SOCIAL BASELINE

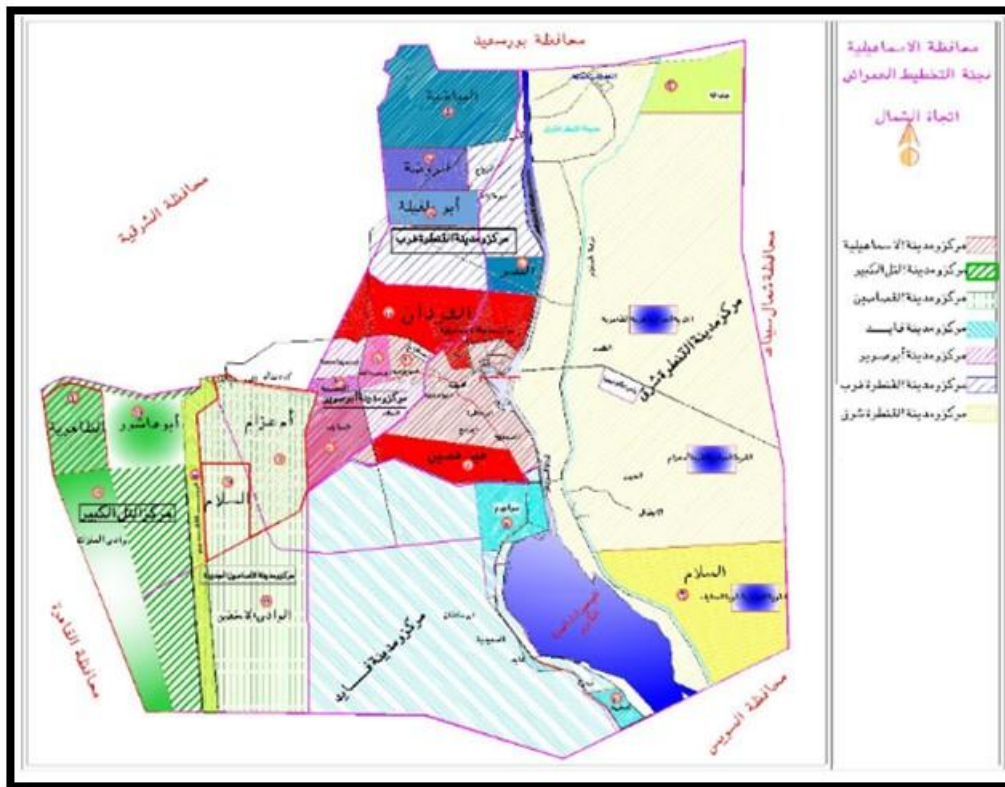
### 4.1 Environmental Baseline

#### 4.1.1 Introduction

Ismailia Governorate is one of the 27 Egyptian governorates, situated in the north-eastern part of Egypt. The capital city of this governorate is Ismailia; Fayed, Tel-el-Kabeer and El-Qantara Shark are the other major cities of this Egyptian governorate. This governorate covers an area of 1,442 Km<sup>2</sup>, with a population of over 1 million.

#### 4.1.2 Location

Qantara Gharb District is located northeast of Ismailia city on the western side of the Suez Canal, 160 kilometers northeast of Cairo and 50 kilometers south of Port Said. .



**Figure 4-1: Map of Ismailia Governorate**  
 Source: Ismailia Governorate website

The project site is located about 150 meter from the nearest residential building. However, the city of Qantara Gharb is about one kilometer away from the site.



Figure 4-2 Location of Qantara Gharb relative to Suez Canal



Figure 4-3 Location of Qantara Gharb PRS site relative to the nearest building



### 4.1.3 Climatology and air quality

#### 4.1.3.1 Climate

Qantara Gharb's climate is a desert one. The Köppen-Geiger climate classification is BWh. In Qantara Gharb, the average annual temperature is 21.6 °C. The rainfall averages 50 mm.

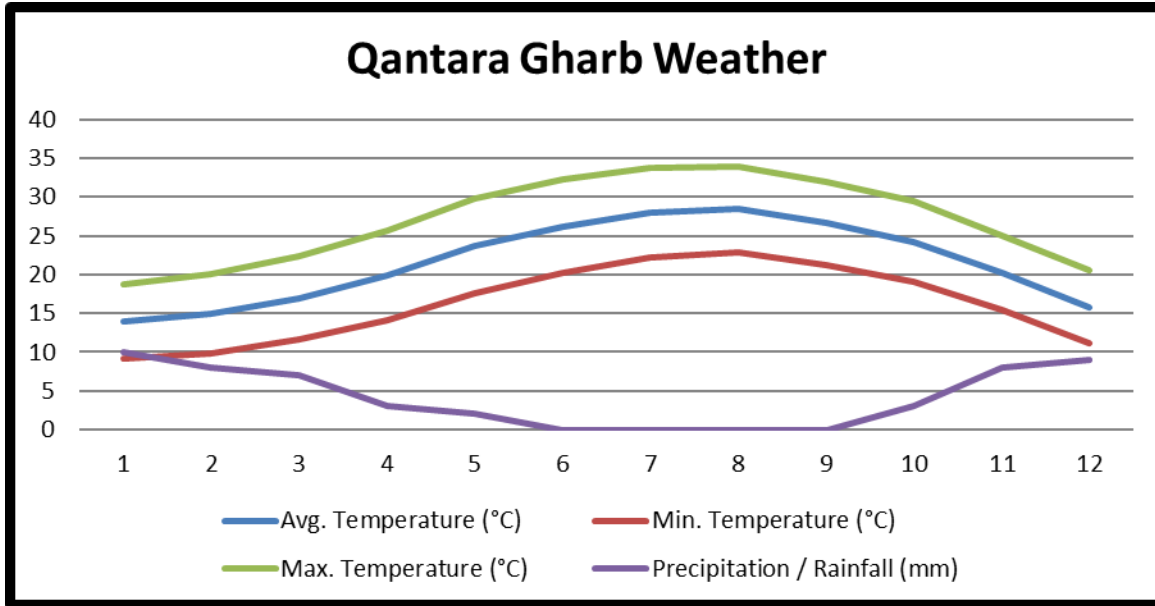
Between the driest and wettest months, the difference in precipitation is 10 mm. The variation in the annual temperature is around 14.4 °C.

**Table 4-1: Qantara Gharb Historical Weather Data**

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
<b>Avg. Temperature (°C)</b>	14	14.9	17	19.9	23.7	26.2	27.9	28.4	26.6	24.2	20.2	15.8
<b>Min. Temperature (°C)</b>	9.2	9.9	11.7	14.2	17.6	20.2	22.2	22.8	21.2	19.1	15.4	11.1
<b>Max. Temperature (°C)</b>	18.8	20	22.4	25.7	29.8	32.3	33.7	34	32	29.4	25	20.5
<b>Precipitation / Rainfall (mm)</b>	10	8	7	3	2	0	0	0	0	3	8	9

Source: <https://en.climate-data.org/location/51099/>





**Figure 4-4 Temperature and Rainfall in Qantara Gharb**

Source: <https://en.climate-data.org/location/51099/>

### 4.1.3.2 Air and noise quality measurement

#### 4.1.3.2.1 Site specific ambient air quality

The selection of the active air measurement location is based on the nature of the surrounding activities, the location of the nearest sensitive receptors<sup>10</sup> (such hospitals, schools, protectorates, ... ect.) with respect to the project plots, prevailing wind direction, site topography and the future layout of the proposed project components. Moreover, the selection is based on the guidelines stated in the American Society for Testing Materials (ASTM) reference method.

Accordingly, environmental measurements have been taken at the PRS location as a benchmark to be able to assess the impacts of the PRS construction and operation activities on air quality and noise intensity.

8-hour average measurements were conducted for pollutants of primary concerns, namely, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), Total Suspended Particulates (T.S.P) and particulate matter (PM<sub>10</sub>).

**Table 4-2: Location of Air and Noise measurements**

Location	Latitude	Longitude
PRS site	30°52'6.04"N	32°18'25.14"E

Methodology, instrumentation, and results of air quality measurements are detailed in Annex 6.

<sup>10</sup> Non were observed during the site visit.



The concentrations of measured air pollutants are below national and WB guidelines. All the measurements for the gaseous pollutants were complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments by law No.9/2009 and the executive regulation issued in 1995 and its amendments no. 710 in 2012 and 964 in April 2015”, as well as, the WB limits reported below:

**Table 4-3: Average ambient air pollutants’ concentrations (µg/)**

Measurements	NO	NO <sub>2</sub>	NO <sub>x</sub>	SO <sub>2</sub>	CO(mg/m <sup>3</sup> )	PM <sub>10</sub>	T.S.P
<b>Average</b>	35.325	45.7	78.95	12.325	2.4	107.2	121.3
<b>National</b>	150	200	150	350 (1 h) 150 (24hrs)	30 (mg/m <sup>3</sup> )	70 (24hrs)	230 (24hrs)
<b>WB limits</b>	NA	200	150 <sup>a</sup> mg/Nm <sup>3</sup> 50 <sup>b</sup> mg/Nm <sup>3</sup>	75 mg/Nm <sup>3</sup>	100 mg/Nm <sup>3</sup>	10 mg/Nm <sup>3</sup>	60-90 long term 150-230 (24 hrs)

- a. The 150 mg/NM3 NOX value is applicable to facilities with a total heat input capacity of up to 300 MWth.
- b. The 50 mg/NM3 NOX value is applicable to facilities with a total heat input capacity greater than 300 MWth.

Construction engines are certified, i.e., exhaust is below permissible levels. Ambient concentrations of gaseous pollutants, NO<sub>x</sub>, SO<sub>x</sub> and CO are unlikely to surpass permissible levels due to operation of construction equipment. Management and mitigation plans for ambient air pollution are further addressed in chapters 5 and 7.

Excavation and rehabilitation are done on the same work day. Therefore, the duration of permissible levels being surpassed will be intermittent for the duration of the work day i.e., 8-10 hours. Management and mitigation plans for dust concentration beyond permissible levels are further addressed in chapters 5 and 7.

#### 4.1.3.2.2 Site specific noise measurements

Noise level measurements were conducted in the same location (proposed site of the new Pressure reduction station) of the ambient air quality measurements. The duration of the measurements is 8 hours with one hour averaging intervals.

Methodology, instrumentation, and results of Noise measurements are detailed in Annex 6.

### Results of Noise measurements

The noise measurements in the studied areas are below national and WB guidelines. The excavation and construction activities may or may not cause noise levels to temporarily surpass permissible levels at the site. The duration of permissible levels being surpassed will be intermittent for the duration of the workday i.e., 8-10 hours Management and mitigation plans for noise levels beyond permissible levels are further addressed in chapter 7.



**Table 4-4: Ambient noise level measurements**

Sound Level Equivalent & Percentile Recordings in dBA for 8 Hours					Permissible Limits	
LAeq	LA10	LA50	LA90	LA95	LAeq (dBA)	
					National	International
64.16	60.7225	58.595	54.3025	52.0125	70	70

#### 4.1.4 Geology and soil

Soil composition in Ismailia varies from clayey soil and sandy soil. The topography in the study area is nearly flat with ripple marks. It is covered by extensive sedimentary clastic and non clastic accumulation, alluvial deposits ranging from Oligocene to Quaternary age.

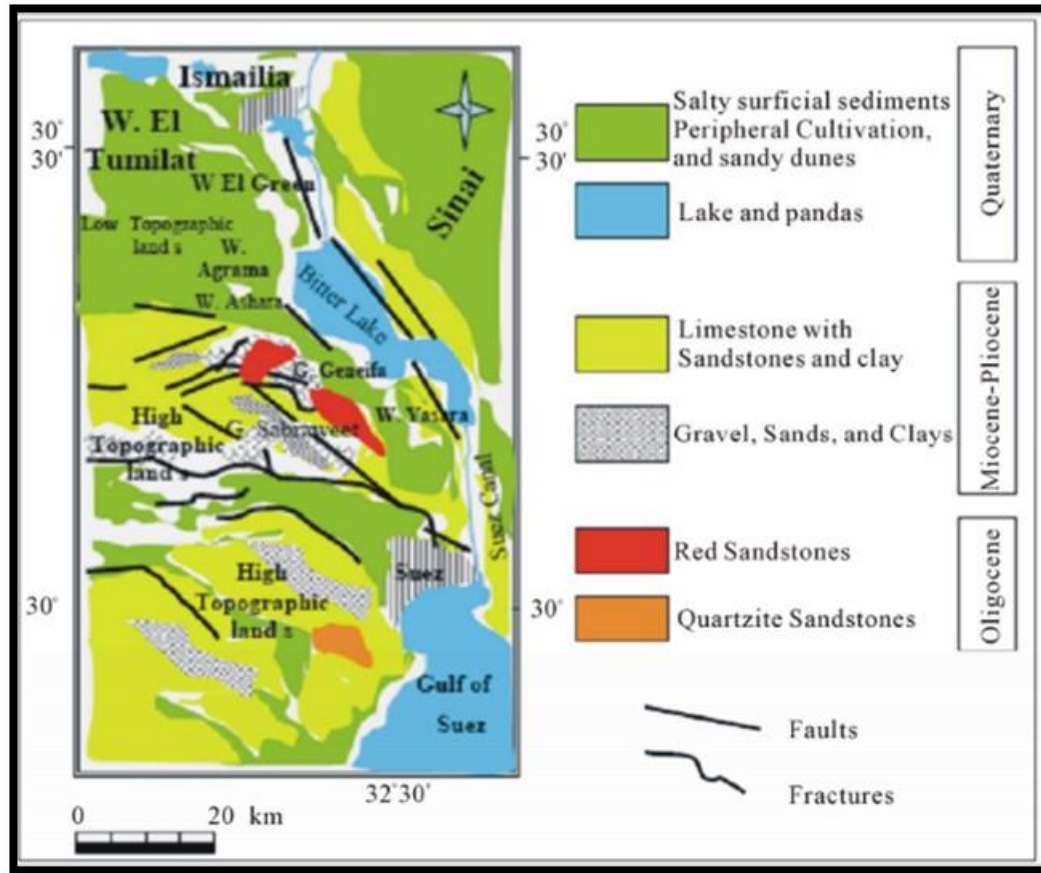


Figure 4-5 Type of Soil in Ismailia

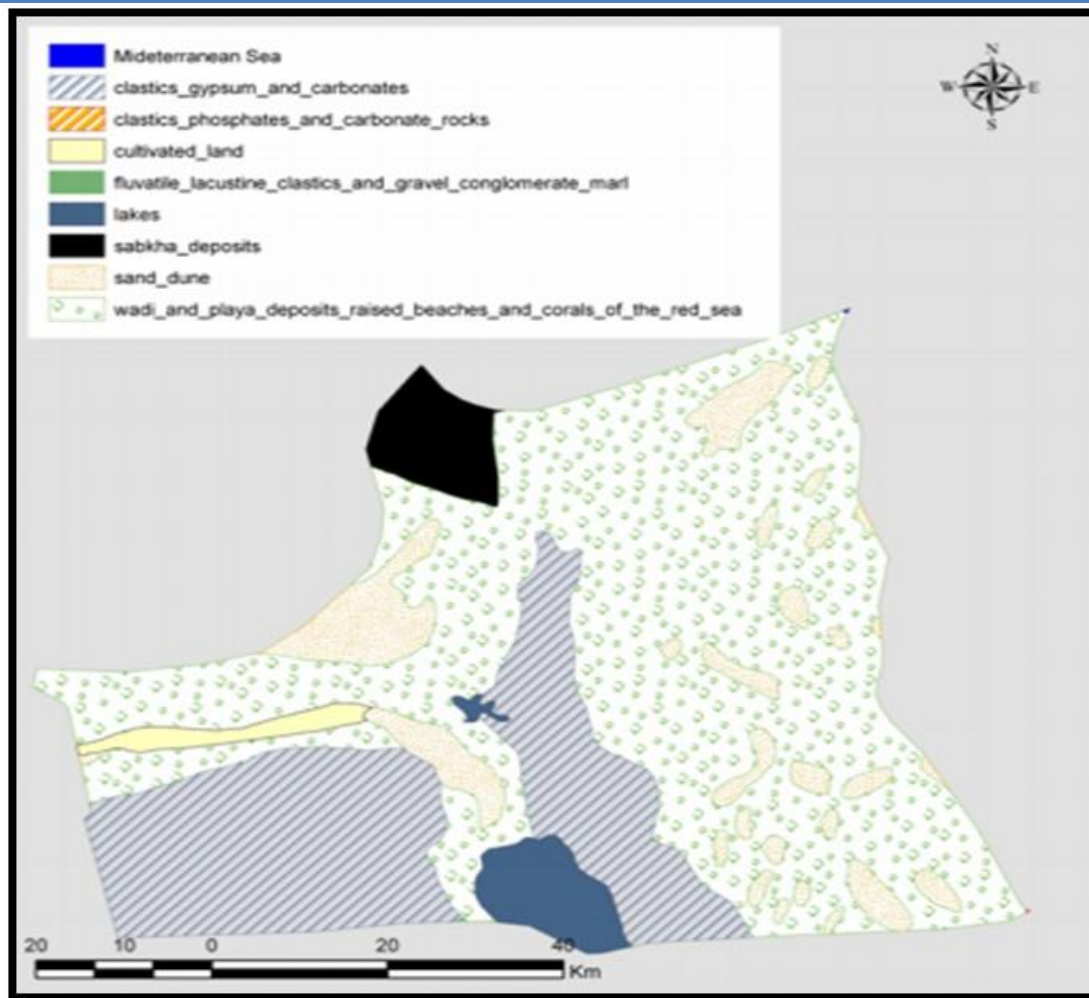


Figure 4-6 Geological Map of the area  
Source: EEAA Environmental profile 2007

#### 4.1.5 Water resources

##### 4.1.5.1 Surface water

Ismailia governorate depends on the Ismailia fresh water canal as a main source of irrigation water. The canal is also used as a source of drinking water



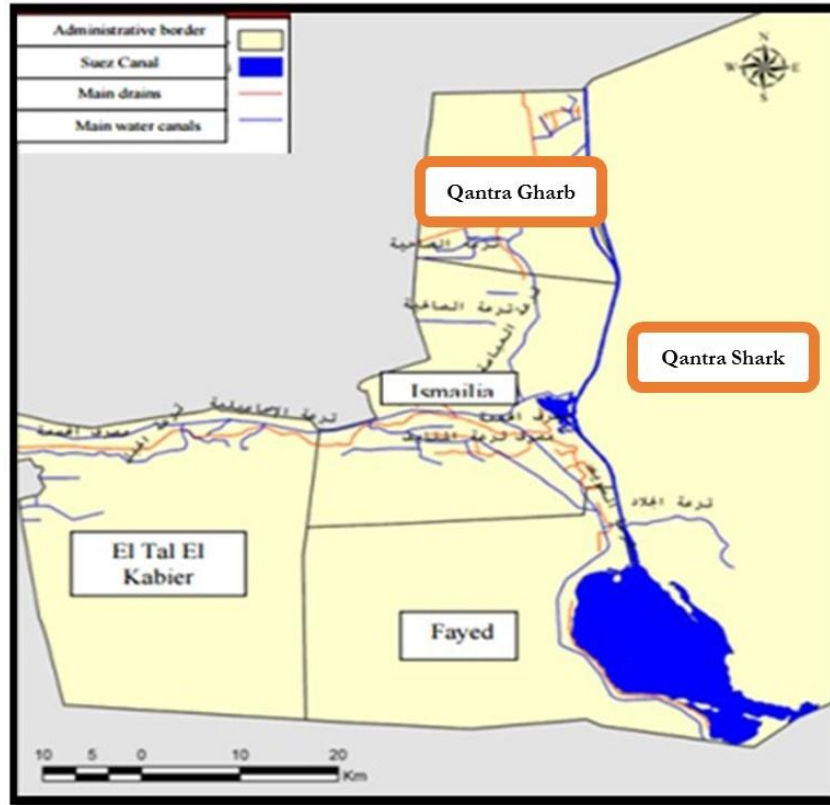


Figure 4-7 Main canals and drains in Ismailia  
Source: EEAA Environmental profile 2007

An agricultural drainage canal is located 40 meters away from the PRS parallel to Ismailia – Port Said road



Figure 4-8 Drainage next to Port Said –Ismailia road and PRS Qantara Gharb



Figure 4-9 Drainage next to Qantara Gharb PRS

#### 4.1.5.2 Groundwater

There are 354 Wells used for irrigation of agriculture lands according to the information of General Department of Irrigation in Ismailia.

**No site specific data is available on groundwater in Qantara Gharb**

#### 4.1.6 Terrestrial environment

Qantara Gharb is located in an arid coastal zone of the Sinai Desert. Present, scarce water resources are rainfall (below 100 mm/year) and groundwater. Groundwater is available in limited quantities in shallow and deep aquifers and is often saline (2000-8000 ppm). The flow of the shallow aquifer is towards the north in the direction of Lake Bardawil and the coast.

##### 4.1.6.1 Flora

With respect to flora of significance, none were encountered in project areas, where the PRS will be installed. Typical residential areas are free of significant vegetation as shown in the figure below. Planned off-take from national grid to the PRS does not come into contact with palm trees alongside the road.



Figure 4-10 *Arundo donax Sp.* Closed to the PRS Site

#### 4.1.6.2 Fauna

Very confined species had been recorded in the project site area in Qantara Gharb. *Bubulcus ibis* (white egret bird) were recorded in moderate numbers in the project site area.

Large numbers of Palearctic migratory birds, rest and feed there in Spring and Autumn before they continue their long journey. A total of 91 migratory waterbird species which are considered to have vulnerable populations in the Mediterranean basin frequent Lake Bardawil. Important species are Slender-billed Cull and Greater Flamingo. For broad-winged birds like birds of prey and storks the Sinai is important flyway on their yearly migration to the South.

Cats (*Felis domestica*) were noted in the project area, living among garbage dumps in the area. Also, some number of dogs (*Canis sp*) cats (*Felis domestica*), Raven Black Desert: (*Corvus sp.*) and Hoopoes (*Upupa epops*) in very little numbers have been recorded.

No endangered or vulnerable species were observed in the project area.

#### 4.1.6.3 Nearest natural protected areas

The nearest Important Bird Area (IBA) and protected area to the Qantara Gharb is Ashtum El-Gamil protected area 39 km north-west of Qantara Gharb . Zaranik, a nationally declared protected area is located approximately 93 km to the north-east of Qanatar Gharb. Zaranik is a part of Lake Bardawil, an IBA.



Figure 4-11 Nearest Protected Areas to Ismailia

#### 4.1.6.4 *Ashtoom El-Gamil and Tennis Island Protected Area in Port Said Governorate*

The protected area includes the bays of El Gamil and Ashtoom El Gamil and Al Manzala lagoon. Tennis island is located in El Manzala lagoon, the largest among the Delta lagoons with various environmental systems. El Manzala lagoon area was a rich agricultural land that fell down due to an earthquake that occurred in the late sixth century, the sea water overflowed the sand dunes which used to separate the sea from the agricultural land. The water gradually covered the land year after year except the renowned Tennis. It was a large city with great buildings and markets. It had palm trees, grapes and farms. It had high water channels pouring water in the sea currently known as Ashtoom. It was called Tennis after Tennis the son of Ham, the son of Noah.

#### 4.1.6.5 *Zaraniq Protected Area and El Bardawael Marsh in the North Sinai Governorate*

Zaraniq protected Area and El Bardawael Marsh are key points for bird migration in the world since it is the first pit stop for birds after the long migration trip from Europe and Asia during the fall. Other birds call this area home permanently. Over 270 species of birds have been recorded in the area. They represent 14 classes. The most important birds recorded are: Pelicans, herons storks, crestet lark, quail, white stork, lark, avocet, Hem Harrier Rail and falcon.

### 4.1.7 Physical structures and cultural resources

#### 4.1.7.1 *Physical cultural resources*

No archeological sites or sites that bear any significant historical or cultural value were identified in the project area of Qantara Gharb. However, in case of any unanticipated archeological discoveries; section Annex 7, titled 'Chance Find Procedures,' outlines the set of measures and procedures to be followed in such a case.



#### 4.1.7.2 Physical structures

There are no physical structures near the PRS project site in Qantara Gharb

#### 4.1.8 Road distribution network.

The PRS project area is located on the side of the Port Said- new Ismailia road outside the city of Qantara Gharb and the off-take is located 30 meters away on the GASCO Company line on the right of way of Port Said/ Ismailia.



**Figure 4-12 Port Said – Ismailia Road**

With regard to the conditions of the streets, the average width ranges between 1 to 3 lanes wide. Despite the modest conditions and maintenance of the streets, they are mostly paved out and convenient for NG installations. According to Ismailia governorate's website; since 2014, the governorate has embarked on an infrastructure upgrade, which included roads and streets, sanitary and sewage systems, and restoring main squares.

#### 4.1.9 Waste management

Solid waste management in Qantara Gharb is planned, operated and monitored by the local municipality. Primary waste collection is handled using old trucks and tools. There is a remarkable gap in waste collection efficiency as the allocated resources are limited.

The main sources of solid waste generated are: houses, - streets, clubs, commercial and industrial waste ,tourist activities,, - buildings nonhazardous waste.

The volume of daily generated solid waste in Qantara Gharb is estimated at 25,863 tones. The majority of solid waste is organic waste.





Qantara Gharb city managed to partially solve the problem of waste accumulation. The study team did not find any wastes inside or in the entrance of the city. No waste dumping was observed in the project area.



**Figure 4-13** Wastes in the streets of Qantara Gharb

## 4.2 Socioeconomic Baseline

The PRS is located close to the entrance of Qantara Gharb city that lies within the jurisdiction of Qantara District in Ismailia Governorate. Qantara Gharb City is located on the west bank of the Suez Canal, near the northern borders of Ismailia Governorate. It is linked to East Qantara by Al-Salam Bridge.

### 4.2.1 Administrative affiliation

Qantara Gharb City is administratively affiliated to Qantara Gharb Markaz. The total occupied area of Qantara Gharb City is 88.335 km<sup>2</sup>, according to Ismailia Governorate's official website.

### 4.2.2 Urbanization trends

Qantara Gharb Markaz is of a mixed nature. It encompasses Qantara Gharb City which is the capital and the urban center, and six villages (Abou Khalifa, al-Reyah, al-Nasr, al-Bayadah, al-Roudah, and Abou Toufelah). According to figures from 2014, Qantara Gharb city encompasses 14.3% of the governorate's total population<sup>11</sup>.

### 4.2.3 Demographic characteristics

#### 4.2.3.1 Total population

According to CAPMAS figures from 2013, the total population of Qantara Gharb City is estimated at 34,484 citizens; distributed among 7,806 households.

<sup>11</sup> <[http://www.ismailia.gov.eg/w\\_qantara/Pages/display\\_wqantrata\\_cityinfo.aspx?ID=6](http://www.ismailia.gov.eg/w_qantara/Pages/display_wqantrata_cityinfo.aspx?ID=6)>





#### 4.2.3.2 Rate of natural increase

The birth rate in Ismailia is 32 births per 1000 persons, while mortality rate stands at 6 per 1000 persons. That gives a natural growth rate which of 26 per thousand persons in Ismailia.

The IDSC 2012 (Description of the Egyptian Governorates) reported figures from 2010 that the neonatal mortality rate 8.70 per 1000, while infant mortality is 16.2 per thousand live births. Infant mortality rate below five years old stood at 21.90 per 1000.

### 4.2.4 Living conditions

#### 4.2.4.1 Household size and density

A household is defined as “Family (and non-family) members who share residence and livelihood, and operate as one social and economic unit”. The average family size in Ismailia Governorate is about 4.17 persons; while in Qantara Gharb City is 4.41 persons.

#### 4.2.4.2 Access to Basic Services

##### Access to Electricity

The number of subscribers in Ismailia Governorate is 381.83. The total consumption of electricity stood at 1091.10 k.w/h annually, which includes lighting usage (954.10 k.w/h) and industrial usage (137.00 k.w./h).

According to CAPMAS Poverty Mapping 2013, almost 100% of individuals living in Qantara Gharb City use electricity for lighting.

##### Access to potable water and sanitary system

Accessibility to the water network is high in Qantara Gharb City. The percentage of individuals having access to the public water network is 99.98 %, and 98.15 % of individuals have tap water inside their houses.

The coverage of the public sanitation network is also very high in Qantara Gharb city, as 94.85 % of individuals have access to the public sanitation network, according to CAPMAS poverty mapping 2013.

### 4.2.5 Human development profile

#### Education

According to CAPMAS Poverty Mapping data 2013, 10.77 % of individuals have had basic education, while only 11.59% have university degrees. Currently, there are 95.10 % of individuals, between 6 to 18 years old, are enrolled at schools; while the percentage of drop-outs stands at 2.08 %.

In the same respect, the percentage of females with basic education stands at 17.15 %, while the percentage of females having university degrees is significantly low at 0.1 %. The percentage of females, between the age of 6 to 18 years old, enrolled at schools is 95.4 %. And the percentage of female drop-outs stands at 0.8%.

The illiteracy rate in Qantara Gharb city stands at 29.52 %, while the illiteracy rate among females stands higher at 35.98 %.

#### Unemployment and Work Status



According to CAPMAS Poverty Mapping 2013, the percentage of manpower which joined labor force at the age of 15 years to 65 year is 45.43 %. The percentage of agriculture workers from total employed persons is 8.71 %. The unemployment rate in Qantara Gharb city stands at 11%.

In the same respect, female employment figures show female unemployment rate at 28%. The percentage of female workers, who joined the labor force at the age of 15 years old and above, is 11.66%. There are significant numbers of shops in El Tahrir Street that trade in readymade garment and electric appliances. Such human activities absorb a remarkable number of workers. Significant numbers of administrative laborers work inside the local governmental unit.

The formal Statistics obtained from the Poverty Mapping Data 2013 regarding manpower reflected that the age of starting work is 15 years old.<sup>12</sup> Both the Child Law and the Labor Law state that children shall not be employed before they complete 14 calendar years old, nor shall they be provided with training before they reach 12 calendar years old; however children between 12 and 14 years old are permitted to work as trainees.



Figure 4-14: Ready Made Garment Shops



Figure 4-15: Local Governmental Unit

#### 4.2.6 Health facilities

Qantara Gharb city has one general hospital; in addition to one urban medical unit, 8 rural medical units, and 3 ambulance centers.

Many participants of the focus group discussions and a number of government officials reported that the level of medical services, provided in Qantara Gharb City, is very poor.

<sup>12</sup> Based on Labor law number 12 of year 2003 and The Child Law (No. 12, 1996). There are certain critical obligations to recruit children below 15 years old. Article 98-103 of Labor law put limitations related to age, type of occupation, hazards work...etc



Figure 4-16: Qantara Gharb Hospital

#### 4.2.7 Poverty index

According to poverty mapping developed by CAPMAS in 2013, the number of poor people in Qantara Gharb city is 4579 representing 13.28%. The Gini Coefficient, which indicates income inequality, stands at a critical 0.21. The percentage of female-headed households is 10.7%.

Electricity bills, according to respondents of the focus group discussions, are financially burdensome, compared to their level of income. Household expenditure, according to focus group discussions, range between 1500 LE and 4000 LE. On the other hand, CAPMAS poverty mapping data shows that per capita consumption stands at 6413.62 pounds.

#### 4.2.8 Human activities in the project areas

According to focus group discussions, the main economic activities in Qantara Gharb city are trade and commercial activities. The majority of respondents stated that most people work in commercial activities, and the remainder work as employees. Agriculture activities are very low in Qantara Gharb City as it absorbs a small percentage of the labor force (8.7%), according to CAPMAS Poverty Mapping 2013.



## 5 ENVIRONMENTAL AND SOCIAL IMPACTS

The environmental impact assessment (EIA) is a process used to identify and evaluate the significance of potential impacts on various environmental and social receptors as a result of planned activities during (construction and operation) phases of the Project. Furthermore, the analysis of environmental and social impacts is important to detail an effective management and monitoring plan which will minimize negative impacts and maximize positives. The evaluation of the potential impacts on various receptors is based on a significance ranking process described in the following subsection. Details are presented in Annex 8 of this report.

### 5.1 Impact Assessment Methodology

The impact assessment methodology adopted for this ESIA is a semi-quantitative “cause-effect” matrix modified from Leopold and Buroz’s Relevant Integrated Criteria. The Leopold matrix is two-dimensional, where the stages of the project (activities) are assessed in relation to the existing environmental characteristics and conditions that may be affected during the execution of those actions. The impact of each activity on each receptor was assessed according to magnitude on a scale of -10 to 10, where negative values indicate a negative influence on the receptor, and importance on a scale of 0 to 10, which encompasses the probability of occurrence, frequency of the impact etc. The numbering system is used as a relative measure, where more negative numbers correspond to impacts having a higher negative magnitude. Susceptible receptors and corresponding activity are deduced if magnitude and importance are of minor severity.

For both methods, the severity of the impact is defined as either of no significance , minor, medium, or major. Results from both methods are summarized and presented according to the following scheme:

Impact rating	Color
<b>None</b> or of no significance (no impact);	
<b>Minor</b> severity (minimal impact; restricted to the work site and immediate surroundings)	
<b>Medium</b> severity (larger scale impacts: local or regional; appropriate mitigation measures readily available);	
<b>Major</b> severity (Severe/long-term local/regional/global impacts; for negative impacts mitigation significant).	

Detailed impact assessment results are presented in two tables in Annex 8.



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## 5.2 Potential Positive Impacts

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### 5.2.1 Positive impacts during construction phase

#### 5.2.1.1 *Impacts related to employment*

The project will result in positive impacts through the provision of job opportunities.

#### ***Provide direct job opportunities to skilled and semi-skilled laborers***

The construction of the Qantara Gharb PRS is expected to result in the creation of job opportunities, both directly and indirectly. Based on similar projects implemented recently by EGAS and the local distribution company, the daily average number of workers during the peak time will be about 30 workers, being 26 laborers, 2 supervisors and 2 engineers. The workers also include drivers, digging staff, technicians and welders.

#### ***Create indirect opportunities***

As part of the construction stage, a lot of indirect benefits are expected to be sensed in the targeted areas due to the need for more supporting services to the workers and contractors who will be working in the various locations. These benefits could include, but are not limited to accommodation, food supply, transport, trade, security, manufacturing, etc.

### 5.2.2 Positive impacts during operation phase

#### 5.2.2.1 *Impacts related to employment*

The project will result in positive impacts through the provision of job opportunities.

#### ***Provide direct job opportunities to skilled and semi-skilled laborers***

The operation of Qantara Gharb is expected to result in the creation of job opportunities, both directly and indirectly. The average number of workers during operation of the PRS will be about 17 workers from the permanent workers of the LDC; 6 technicians, 2 foremen, 2 maintenance (one engineer and one engineer's assistance) and 3 security. With regards to health and safety, one person will be assigned from the staff of Sinai Gas.

#### ***Create indirect opportunities***

As part of the operation stage, a lot of indirect benefits are expected to be sensed in the targeted areas due to the need for more supporting services to the workers and contractors who will be working in the various locations. This could include, but will not be limited to provision of waste disposal services and septic tanks evacuation.

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## 5.3 Potential Negative Impacts

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Various impacts were assessed in accordance to the impact assessment methodology. The impact related to soil, ecology, and community health and safety during construction were ranked as of no significance . During operation, soil, traffic, community health and safety, and ecology were also of no significance .

### **5.3.1 Potential negative impacts during construction phase**

#### *5.3.1.1 Impact on soil*

Construction activities will be carried out on cleared land (PRS) and on an existing road (installation of the high pressure pipeline.)

The excavation activities will result in disturbance of the soil and geological characteristics. This will be more pronounced in the trenched areas (around 2 meter deep) for the HP pipeline where excavation, pipeline laying, and soil compaction as a result of heavy equipment take place. In addition, potential soil contamination may take place as a result of spillage or leaks

**Soil Pollution Impacts are expected to be of minor severity.**

#### *5.3.1.2 Air Emission*

WB requirements and Law 4/1994 (modified by laws 9/2009 & 105/2015) stipulate strict air quality standards. Air emissions (gases and particulates) during construction shall arise from:

- Particulate matter and suspended solids from excavation/backfilling operations
- Possible dispersion from stockpiles of waste or sand
- Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO<sub>x</sub>, NO<sub>x</sub>, CO, VOCs, etc.
- Traffic congestions resulting from road closure or slowing down of traffic due to excavation works.

#### **Dust**

The PRS and the High pressure pipeline construction activities include installation of the new equipment might result in dust during civil work and digging the site. Additionally, activities such as transportation of material and equipment, burial of cables and pipes, etc. take place in this phase. These activities in consequence are expected to emit air pollutants to the ambient air. The duration of this impact is expected to be short. The following air pollutants are foreseeable for most of the construction activities:

- Fugitive dust emissions ( PM10, PM2.5)
- Exhaust of vehicles or equipment such as temporary generators, trucks, trolley, etc

Emissions of CO<sub>2</sub>, CO and PM will result from the operation of construction machinery and road vehicles during construction of the PRS. Air pollutants emitted from machine are generally temporary (during the working activities). The intensity of work activities and the number of vehicles traveling onsite would be relatively low for all tasks. The emissions will be mostly limited to the construction phase and therefore are temporary.

**Air emissions impacts are expected to be temporary, local, and of medium severity.**





### 5.3.1.3 Noise emissions

Construction of the PRS and the installation of the high pressure pipeline will require using various construction equipment, vehicle, etc. in addition to the other activities that generate noise. These tools signify potential major sources of different types of noise that will have an impact on the receptors who are susceptible to the generated noise.

The potential groups who are susceptible to the construction noise during the construction of the QG PRS are the following:

- Onsite Workers
- nearby villages

The noise of construction activities to the baseline may increase the noise level, however the activities will be temporary and for short time.

Regarding the construction of the QG PRS and high pressure pipeline, it is expected that the generated noise will mainly have an impact on workers.

The impact on the construction workers will be of medium severity

The impact on the nearest receptors is of minor severity (nearest villages).

### 5.3.1.4 Impact on worker health and safety

Potential safety and health impacts to workers during construction , in general, are the same as those associated with any construction project involving use of large equipment, transportation of overweight and oversized materials, and construction and installation of facilities. In addition, health and safety issues include working in trenches.

The occupational health and safety impacts is assessed as medium

### 5.3.1.5 Risk pertaining to child labor

As mentioned in the baseline, child labor is a common practice in the project communities in Ismailia. Children below 18 work almost in all developmental projects as they receive low salaries and they are less demanding. This risk should be carefully handled in the ESMP and strict obligations and monitoring should be applied in the contractor and subcontractors obligations. Rigid penalties should also be applied to the contractor and subcontractors in case of breaching child labor restrictions.

Child labor risk is assessed as low to medium

### 5.3.1.6 Occupational health and safety

General risks associated with construction sites and anticipated include slips and falls; moving lorries and machinery; exposure to chemicals and other hazardous materials; exposure to electric shock and burns; weather related impacts (dehydration; heat stroke), exposure to high noise intensity levels. Because of the large number of unskilled workers who are reluctant to use Personal Protective Equipment (such as helmets, ear muffs, and masks), risks can be higher.

## Noise



The noise intensity level resulting from jackhammers surpasses permissible level of 90 dB (A) for work place with up to 8 hour shifts (as per Egyptian Law 1994.) Therefore, the use of construction equipment constitutes an occupational and safety health risk on workers operating and in the vicinity of the equipment.

### **Vibrations**

The use of jackhammers will result in the generation of hand-arm vibrations; the typical vibration value is of  $9 \text{ m/s}^2$ , which exceeds the ACGIH Threshold limit value of  $5 \text{ m/s}^2$  (8 hour equivalent total value), but is below the exposure limit of  $12 \text{ m/s}^2$  for a total daily duration of less than an hour. Typical drilling activities for excavation works are intermittent lasting 2 hours/day

### **Electrical**

Faulty equipment or exposed cables can cause risks of electrocution.

### **Chemical hazards**

Chemical hazards are associated with the construction and connection of the odorizing unit. Inadequate handling or compromised integrity of the connections can result in leaks/released hazardous material (tertiobutylmercaptin and methylsulphide), to which workers will get exposed resulting in a health hazard.

The impact of construction activities on OHS is of medium severity.

#### *5.3.1.7 Hazardous material and waste generation*

Construction non-hazardous solid waste includes scrap concrete, steel, bricks, packaging waste, used drums, wood, scrap metal, and building rubble. Human or domestic wastes generated by construction labor are mainly sewage and garbage collected from **the workers**. Disposal of sewage and garbage generated from construction labor, if not transported to adequate sites, will negatively affect the environment. This type of waste has to be transported outside the site.

Solid hazardous waste generated includes empty containers, spent welding materials, solvents, paints or adhesives, and other hazardous wastes resulting from operation and maintenance of the equipment and vehicles, i.e. spent oils, spent lube, waste oil filters, batteries, etc. Among the hazardous wastes also are the wasted or faulted materials.

Waste Generation impacts are of medium severity

#### *5.3.1.8 Traffic impact*

The greatest potential for traffic impacts to occur arises during the short period where construction works peak (transportation of raw materials, equipment, and foundation materials). The traffic flow that will be created during construction period will, to some extent, depend on which type and number of trips to and from the proposed site. Additional activities, such as entering and exit to the site will not have significant impacts on the road; the project will be constructed close to Port Said Ismailia road. This is the road that might be affected due to project activities.

Therefore the impact on traffic flow is of medium severity



### 5.3.1.9 *Impact on water resources*

#### Groundwater

Information on groundwater in the project site, where high pressure pipeline and PRS are planned is unavailable. Impact assessment on groundwater is not applicable.

#### Surface water

Surface waters may be susceptible to pollution resulting from uncontrolled dumping of wastes generated during construction. The aquatic environments can be impacted in case of improper disposal of sanitary wastewater, construction wastes or debris (generated from activities like ditching, and excavation). Usually the generated sanitary wastewater, as well as water resulting from the dewatering activities (if exist) during excavation, will be collected in tanks and transported via a certified contractor to the nearest wastewater treatment facility

Therefore impact on surface water pollution is of minor severity

### 5.3.1.10 *Ecological impact*

As described in the baseline section, the proposed project site is not characterized by the presence of endangered species. The project site is characterized by agricultural land, and only some non-significant exotic floral species such as grasses, and stray dogs and cats, were recorded in the project area.

Therefore the impact is considered **of no significance**

### 5.3.1.11 *Community health and safety*

Impacts on community health and safety are expected to result from emissions of gaseous pollutants and dust, increased background noise levels, uncontrolled dumping of construction waste, accidental falls in temporary excavated trenches, accidental contact with equipment, etc.

#### *Emissions of gaseous pollutants and dust*

Increased emissions of dust can result in health problems to community members and workers. Excavation work will be intermittent over a duration of 8 hours a day.

#### *Background noise levels*

Construction of the PRS and the installation of the high-pressure pipeline will require using various construction equipment, vehicle, etc. in addition to the other activities that generate noise. These tools signify potential major sources of different types of noise that will have an impact on the receptors who are susceptible to the generated noise.

The potential groups who are susceptible to the construction noise during the construction of the QG PRS are the following:

- Onsite Workers
- nearby villages

The noise of construction activities to the baseline may increase the noise level, however the activities will be temporary and for short time.



### *Waste accumulation*

Illegal dumping and potential burning of construction waste can pose health and safety threats to local community.

**Impacts due to construction activities on community health and safety are of minor severity**

#### *5.3.1.12 Land related impact*

##### *Socioeconomic impacts*

Qantara Gharb PRS required one plot of land that is estimated at 2500 m<sup>2</sup>. Following is the process of land acquisition:

- This plot of land was purchased from one owner in Qantara Gharb District.
- Sinai Gas investigated the plots of lands available and three plots were proposed.
- After negotiating with the land owners, an agreement was reached with one of the owners.
- The selected land was technically and financially accepted.

The study team conducted a meeting with the seller and visited the plot of land. The owner of land sold his land with no intimidation. He is also working as a security staff member for the project. Therefore, he managed to keep any encroachers away from the PRS site. Additionally, Sinai Gas managed to install a fence around the project land.

There was no kind of encroachment in the land allocated for the project. Additionally, obtaining the land have not resulted in any kind of economic displacement. Based on the meeting conducted in the site, no one of the consulted community stated that there were any kinds of customary or formal land use. For further elaboration Annex 3 is a summary of QG land acquisition process

**Impacts due to Land acquisition is of no significance**

#### *5.3.1.13 Visual intrusion and landscaping*

During the construction of the PRS there is a probability to result in visual intrusion due to moving construction materials and vehicles inside the lands. Given the fact that the PRS land is fenced, the probability of this impact tends to be minimal.

**Impact related to the visual intrusion during the construction phase is of no significance**

#### *5.3.1.14 Labor influx*

The LDC recruits a number of workers and technicians during the construction phase. If not managed properly, the recruited workers' interactions with the local community may result in inconvenience, inappropriate and unappreciated acts, negative impacts on privacy or may even result in serious misconducts (e.g. harassment) or inappropriate behaviors that could affect different groups including women. Although not very much expected in the project, In the meantime the increase of workers might mean in some areas influx of additional population and increased pressure on local resources, prices of commodities, accommodation and rents.

**Impact related to the labor influx during the construction phase is low**



### 5.3.2 Negative impacts during operation

#### 5.3.2.1 Occupational health and safety

Possible impacts to health and safety during operation include exposure to odorant release, gas leak, fire, noise and accidental injury to workers. In addition; health and safety issues include working around energized equipment, and possible contact with natural hazards. Quantitative Risk Assessment was prepared that studies impacts during accidental events in the operation phase that is further elaborated in section 6.3.2 and annex 11 of the ESIA.

Odorant handling is part of the operation of the PRS and is addressed in a Quantitative Risk Assessment attached as a separate study. An odorant is added to the NG in order to enable detection upon leakage. The odorant containing Tertiobutylmercaptin (80%) and Methylehysulphide (20%) is classified as a hazardous substance. The MSDS of the odorant identifies the following hazardous properties: Highly flammable, flammable and toxic products upon thermal decomposition, irritant, and toxic to aquatic flora and fauna. In case of emergency, the risk resulting from odorant release or gas leak will be managed by Qantara Gharb PRS's emergency response plan.

Occupational health and safety impacts are considered of medium severity

#### 5.3.2.2 Risk pertaining to child labor

Given the permanent nature of job opportunities during operation phase, children below 18 are not allowed to work in the PRS. Consequently, this risk is not valid in the operation phase.

Risk pertaining to child labor is **of no significance**

#### 5.3.2.3 Hazardous and non-hazardous waste management

During operation and maintenance of the PRS, besides industrial hazardous (odorant containers) and non-hazardous waste, small quantities of domestic waste (solid and liquid waste) will be generated. Industrial hazardous waste is likely to be generated during routine operations (e.g., lubricating oils, odorant containers, chemical containers). These wastes are typically stored briefly, and transported by a licensed contractor to an appropriate permitted off-site disposal facility as a standard practice, according to EEAA regulations for hazardous waste management. Poor waste management practices may also have a significant impact on environment (soil, ground water (if exists), visual, and health and safety).

Waste generation and management is considered of medium severity

#### 5.3.2.4 Noise impact

The pressure reducers normally cause noise generated from the reducers' pipes. Maximum noise level expected from the reducers is 80db. The generated noise is constant (not intermittent). Assuming ambient noise levels are above WB/IFC requirements and Law 4/1994-9/2009- 105/2015 standards for low noise residential areas and a 20-meter buffer distance kept between the reducers and the PRS fences, therefore minimum noise will propagate through the PRS borders. Additionally, the PRS is located right parallel to Ismailia-Port Said road where the noise baseline was recorded to be relatively high (121db)

Impacts of noise during operation is considered of minor severity



**5.3.2.5 Air emission**

No gaseous emissions are expected to occur during the operation phase except for the potential natural gas leak or in case of accidents (odorant handling or storage) and during maintenance activities.

Impact related to air emission during the operation phase is **of no significance**

**5.3.2.6 Soil impact**

The normal operation of the PRS will not have any impact on soil; however risk of soil contamination is only associated with the possible spillage or leakage.

Impact related to soil during the operation phase is **of no significance**

**5.3.2.7 Ecological impact**

The normal operation will not have any impact on flora and fauna.

Impact related to ecology during the operation phase is **of no significance**

**5.3.2.8 Traffic impact**

During the operation and maintenance of the PRS, there will be no expected impact. There will only be a small number of staff vehicles moving in and out of the PRS, as well as trucks transporting odorant and spare parts to the PRS. Traffic impacts are anticipated to be insignificant due to the proposed project being located at the Ismailia- Port Said road.

Traffic Impact during operation is **of no significance**

**5.3.2.9 Labor influx**

The Qantara Gharb PRS will employ approximately 17 workers, and therefore having no significant impact.

Impact related to the labor influx during the operation phase is **of no significance**

**5.3.3 Impact during accidental events (Operation Phase)**

Regarding to the Quantitative Risk Assessment Study (QRA), which demonstrate on the following hazards:

- Gas Release
- Fires (Heat Radiation)
- Explosion (Overpressure Waves)
- Suffocation (Odorant Leak)

And referring to the risk calculations determined in Qantara Gharb QRA study, the individual risk level to the exposed workers / public based on the risk tolerability criterion have been identified in Acceptable region (Lower Tolerability Limit<sup>13</sup>) for workers and ALARP region (Below the Upper Tolerability Limit<sup>14</sup>)for public. So there are some points (Study Recommendations) need to be considered to keep the risk tolerability, and this will be describe under item (7.7) (refer to the QRA Study under Annex-11)

**13 Lower Tolerability Limit**

*Which the risks are broadly tolerable to society and comparable to everyday risks faced by the public. If the overall risk is below the Lower Tolerability Limit, the ALARP Assessment is likely to be straightforward and limited to ensuring compliance with Good Practice. Below the Lower Tolerability Limit, the principal risk management concern is the maintenance of existing risk reduction measures to avoid degradation.*

**14 Below the Upper Tolerability Limit**

*The risk is only tolerable if it is ALARP. This means that all practicable risk reduction measures must be identified and those that are reasonably practicable implemented. The term reasonably practicable indicates a narrower range than all physically possible risk reduction measures. If the cost of a risk reduction measure, whether in terms of money, time or trouble, can be demonstrated to be grossly disproportionate to the risk reduction gained from the measure, taking account of the likelihood and degree of harm presented by the hazard, then implementation of the measure may not be required.*





## 5.3.4 Summary of impacts

Table 5-1: Environmental and Social impact summary

Receptor	Impact Description	Type	Impact Significance
<b>During Construction</b>			
Soil	Degradation of soil quality, Excavation and movement of heavy machinery on unpaved surface soils during site preparation and foundation-laying could cause a physical breakdown of soil particles potentially causing destabilization of the soil structure.	Negative impact	Minor
Air emission	<p>WB/IFC requirements and Law 4/1994 (modified by laws 9/2009 &amp; 105/2015) stipulates strict air quality standards. Air emissions (gases and particulates) during construction shall arise from:</p> <ul style="list-style-type: none"> <li>- Particulate matter and suspended solids from excavation/backfilling operations</li> <li>- Possible dispersion from stockpiles of waste or sand used for filling trenches.</li> <li>- Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO<sub>x</sub>, NO<sub>x</sub>, CO, VOCs, etc.</li> <li>- Traffic congestions resulting from road closure or slowing down of traffic due to excavation works.</li> </ul> <p><b>Dust</b> The impact of dust generation (particulate matter) due to excavation and other construction activities will be limited to the working hours. This will temporary affect air quality.</p> <p><b>Gaseous pollutants emissions</b> Provided machinery used during construction is certified and maintained as per guidelines, the increase in emissions stemming from the exhaust of machinery is unlikely to increase ambient levels beyond national and IFC permissible levels.</p>	Negative impact	Medium
Noise	<p><b>Noise impact on worker</b> Noise impact on construction workers, technicians and engineers in direct vicinity of the excavation works and heavy machinery is considered more significant than those on residents.</p>	Negative impact	Medium
	<p><b>Noise impact on neighbor</b> No major noise impacts are expected during construction of the PRS and the construction period is limited.</p>	Negative impact	Minor
Occupational health and safety	Inhalation of air pollutants, exposure to high noise levels, injuries and potential death as a result of operating heavy equipment, and handling hazardous materials.	Negative	Medium
Risk pertaining to child labor	As mentioned in the baseline, child labor is a common practice in the project communities in Ismailia. Children below 18 work almost in all projects as they receive low salaries and they are less demanding. This risk should be carefully handled in the ESMP and restrict obligations and monitoring should be applied in the contractor and subcontractor obligations	Negative impact	Low to medium
Solid and Hazardous waste management	<p>Inappropriate waste disposal and improper management of construction waste materials which could lead to spillage and soil contamination.</p> <p>Excavated soil and concrete/bricks waste are inert materials. Improper disposal of such wastes will only have aesthetic effects on the disposal site. The National Law 4/1994-9/2009-105/2015 for the Environment and Law 38/1967 stipulate that these wastes should be disposed of in licensed sites by the local authority, which minimizes any aesthetic effects of such waste.</p> <p>Hazardous and non-hazardous materials available onsite during construction activities are likely to include fuel, engine oil, paints, Poor handling of those materials and their inappropriate storage may result in poor containment of induced leaks.</p>	Negative impact	Medium
Traffic	The transportation of material and equipment to the construction sites will cause temporary increase in traffic along Ismailia –Port Said	Negative impact	Medium



Receptor	Impact Description	Type	Impact Significance
	road		
Groundwater contamination	Groundwater (if reached) in the area may be affected by inappropriate liquid and hazardous waste during construction	Negative impact	Minor
Impacts related to lands	The PRS in Qantara Gharb required a plot of 2625 m <sup>2</sup> . The land was obtained in accordance to willing buyer willing seller approach.	Negative impact	of no significance
Impacts related to Labor Influx	There is a probability to face a labor influx impact that might originate from the laborers come from other areas to the work site.	Negative impact	Minor
<b>During operation</b>			
Occupational health and safety	Inhalation of air pollutants (odorant or natural gas leak), exposure to noise levels, injuries and potential death as a result of operating equipment with high pressure tools and handling hazardous materials.	Negative impact	Medium
Risk pertaining to child labor	Given the permanent nature of job opportunities during operation phase, children below 18 are not allowed to work in the PRS. Consequently, this risk is not valid in the operation phase.	Negative impact	no significance
Hazardous material and waste management	<p><b>Hazardous material</b></p> <p>Odorant spill can result from improper handling of the odorant tanks. According to Qantara Gharb QRA study, modeling vapour release will extend outside the PRS boundary with no effects on public and Sinai Gas QG ERP will cover this point.</p> <p><b>Hazardous waste</b></p> <p>Discharge of remaining odorants in containers, after use, in land or sewers;</p> <p>Disposal of used containers with domestic waste, or by open disposal;</p>	Negative impact	Medium
Noise	The pressure reducers normally cause noise generated from the reducers' pipes. Maximum noise level expected from the reducers is 80db. The generated noise is constant (not intermittent). Assuming ambient noise levels are complying with WB/IFC requirements and Law 4/1994-9/2009- 105/2015 standards for low noise residential areas and a 20-meter buffer distance kept between the reducers and the PRS fences therefore minimum noise will propagate through the PRS borders.	Negative impact	Minor
Impacts during accidental events	In case of accidental gas leakage and subsequently emissions of the odorant is in the air, if it reaches the residential area it will be already dispersed and of very low concentration. In addition, it is not a harmful substance to inhale in a gaseous form especially with such low concentrations. It is only hazardous when it is in the liquid chemical form	Negative impact	Low



## 6 ANALYSIS OF ALTERNATIVES

The main target of the proposed project is to support the supply of natural gas to Qantara Gharb District and other surrounding areas in the future (households). This Natural Gas Connections to Households Project is expected to yield many economic and social benefits in terms of providing a more stable, energy source, achieve savings in LPG consumption and enhancing safety in utilizing energy.

The No-Action project alternative is not favored as it simply deprives the Egyptian Public and Government of the social, economic, and environmental advantages.

### 6.1 Technology Alternatives

#### 6.1.1 Outlet pressure

The PRS reduces the pressure in a HP pipeline from 30-70 bar to 4 or 7 bar, making it suitable for distribution or use in domestic or industrial applications. QG's PRS will produce 2:4 bar outlet pressure for the local distribution network (intermediate pressure). The LDC choose to produce 2:4 Bar instead of 4:7 bar due to low consumption rates excepted at QG.

#### 6.1.2 Odorant handling

Environmental and safety control considerations and measures are integrated into the selected technology design. For example, in order to reduce emissions from the odorant unit, the odor will be automatically added or by using a plunger pump. Automatic and sophisticated unit management systems ensure safe and easy operation and can encompass complete remote operation of the units.

### 6.2 PRS location

The main criteria for the PRS siting are:

- Proximity to high-pressure gas main lines to minimize off-take length
- Availability of space with adequate dimensions and affordability of the land for PRS construction and possible expansion
- Presence of standard buffer zones between PRS and nearest buildings or receptors

As per national and WB guidelines, PRS siting avoids habitat alteration and seeks to minimize environmental, occupational health and safety, and community health and safety impacts.

The process of land acquisition focused on assessing three potential alternative lands. The three plots of lands were owned by community people (private lands). EGAS and the LDC paid visits to the three lands and negotiated with the owners about the price. Finally an agreement was reached with one of the land owners. The three alternative lands were technically accepted. Therefore, the price was the main determinant in obtaining this land. Land Alternatives for Qantara Gharb PRS is discussed in Annex 3



## 7 ENVIRONMENTAL AND SOCIAL MANAGEMENT & MONITORING PLAN

### 7.1 Objectives of the ESMMP

The objective of the Environmental and Social Management and Monitoring Plan (ESMMP), is to outline actions for minimizing or eliminating potential negative impacts and for monitoring the application and performance of mitigation measures. The ESMMP identifies certain roles and responsibilities for different stakeholders for implementing, supervising and monitoring the environmental and social performance of the project during its life cycle as well as estimate costs for these mitigations.. Roles and responsibilities for implementing the ESMMP during the construction and operation phases have been proposed. During construction EGAS/LDC will assign supervision staff who will undertake supervision over the contractor to make sure that the mitigation measures specified in the design/tender document are implemented on field.

The Environmental and Social Management and Monitoring Plan (ESMMP) consists of a set of mitigation, management and monitoring measures to be taken during implementation of the project to avoid, reduce, mitigate, or compensate or offset any adverse social and environmental impacts analyzed at the previous chapter.

During the operation phase, the PRS shall have at least one permanent staff member for health, environment and safety.

Wherever applicable, the ESMMP is designed to accommodate alternative context-specific mitigations and monitoring measures.

**Overall, the following Environmental and Social measures are complementary to and do not substitute compliance to the detailed HSE guidelines, procedures, and actions adopted by EGAS and its subsidiary (LDC).**

In the following Management and Monitoring measures the term LDC refers to the gas company in charge of project implementation: **Sinai Gas.**

### 7.2 Management of Grievance

EGAS and the LDCs are committed to preventing, limiting and, if necessary, remedying any adverse impacts caused by its activities on local populations and their social and physical environment. Identifying, preventing and managing unanticipated impacts are facilitated by a grievance redress mechanism (GRM). As the World Bank's governance and anticorruption (GAC) agenda moves forward, grievance redress mechanisms (GRMs) are likely to play an increasingly prominent role in Bank-supported projects.

Anyone will be eligible to submit a grievance to the Project if they believe a practice is having an adverse impact on the community, the environment, or on their quality of life. They may also submit comments and suggestions to the GRM.



The GRM was designed in order to handle all grievances during the construction and operation phases. The aggrieved person has the full right to lodge his complaint anonymously. However, this might cause a challenge to inform him about any corrective procedures. Additionally, if the complaint is related to service seeking, the aggrieved person should provide full information about himself and about his residential unit.

**Objectives:** The objective of a grievance procedure is to ensure that all comments and complaints from any project stakeholder are considered and addressed in an appropriate and timely manner. This will manage to build trust and detect any weak signal. The process will reduce risk of litigation and conflicts with the community

**Disclosure of the GRM:** The Community people will be fully informed about the Grievance procedures in simple language. Information about grievance mechanism will be tailored according to the community. All information about GRM will be made available on the contracting offices during the construction phase and on customer services offices during the operation phase.

**Mode and channels of Grievance:** The Company will accept all comments and complaints associated with the project from any stakeholder. Comments can be made via email, post, fax, on the telephone or in person. The comments and complaints will be summarized and listed in a Complaints/Comments Log Book, containing the name/group of commenter/complainant, date the comment was received, brief description of issues, information on proposed corrective actions to be implemented (if appropriate) and the date of response sent to the commenter/complainant.

The proposed mechanism is built on three tiers of grievances:

- The foreman working on the ground in **PRS site in Qantara Gharb**
- The project manager in **PRS site in Qantara Gharb**,
- The regional department of **Sinai Gas in Ismailia** Governorate

The aggrieved person has the full right to immediately use tier 2 or 3 upon his convenience and there is no need to exhaust the first tier. Additionally, he can resort to any other governmental entities i.e. Ministry of Petroleum. He/ She also have the full right to bring a lawsuit without resorting to any of the grievances tiers.

#### **Grievance channels:**

##### **1. During construction phase:**

- a) Foremen act as the main channel for complaints. They are always available on the construction sites. However, complaints raised to him/her are mostly verbal. Thus, s/he should document all received grievances in writing form using a fixed serial number that the complainant should be informed about to be able to follow up on the complaint
- b) Hotline: 129 is the hotline in Sinai Gas
- c) The SDO within the LDC and EGAS
- d) Email. info@*Sinai Gas*.com.eg

##### **2. During operation phase:**

- a) Customer service office
- b) Hotline: 129 is the hotline in Sinai Gas.



- c) The SDO within the LDC and EGAS
- d) Email. info@ *Sinai Gas*.com.eg

**Response to grievances:** All comments and complaints will be responded to either verbally or in writing, in accordance to preferred method of communication specified by the complainant. Comments will be reviewed and taken into account in the project preparation; however they may not receive an individual response unless requested.

**Registration of GRM:** All grievances will be registered and acknowledged within 5 business days and responded to between to 15- 30 business days (depending on the nature of grievance). The project management will keep a grievance log and report on grievance management, as part of annual project progress reports, which will be available on the LDC and EGAS.

**Confidentiality:** Individuals who submit their comments or grievances have the right to request that their name be kept confidential, though this may mean that the LDC is unable to provide feedback on how the grievance is to be addressed.

**Management of GRM:** During construction and operation phases, grievances in relation to construction activities will be managed by the LDC and the construction contractor(s). The LDC will provide contact information to project areas

A separate grievance mechanism is available in the same manner for workers, including employees of both the LDC-employed and contractors.

**Grievance Cycle:** The grievance received via any of communication channels and tiers will follow the following cycle. The aggrieved person has the full right to submit his grievance to any of the assigned tiers. The aggrieved person also has the full right to submit his grievance to any entity he prefers i.e the Minister of Petroleum, the Governorate ...etc. It is essential to mention that the acknowledgement of grievance should not exceed two working days.



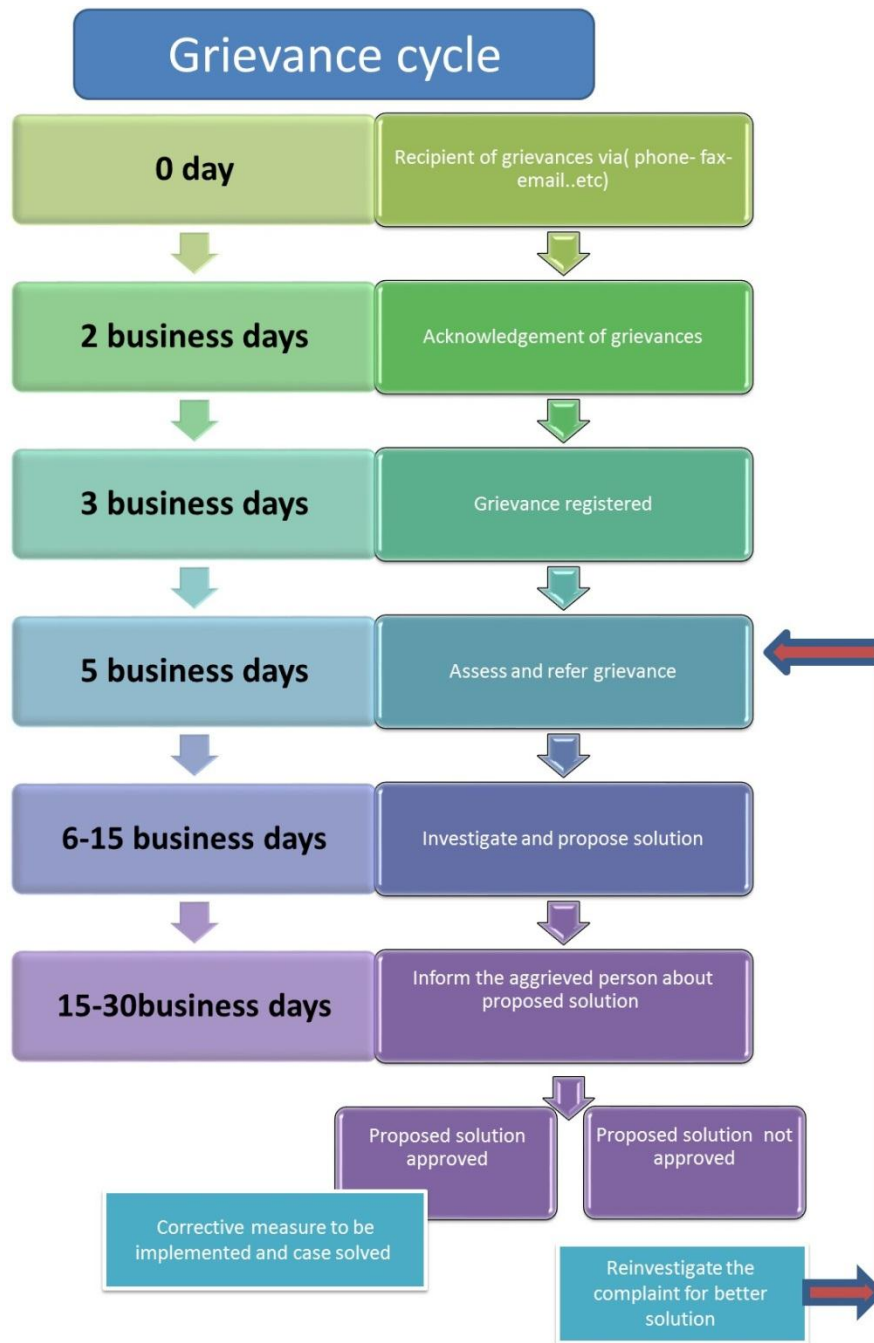


Figure7-1: Grievance cycles

**Monitoring of grievances:** All grievances activities should be monitored in order to verify the process. The monitoring process should be implemented on the level of EGAS and the LDC (both in the site and in the headquarter). For more information about GRM please see Annex 9.



### 7.3 Environmental and Social Management Matrix during CONSTRUCTION

Table 7-1: Environmental and Social Management Matrix during CONSTRUCTION

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Physical receptor	Soil	<ul style="list-style-type: none"> <li>- Decrease erosion by minimizing disturbances and scarification of the surface</li> <li>- Best practices for soil management should be followed</li> <li>- Spill prevention/control measure</li> <li>- Proper handling and management of wastes</li> </ul>	Negligible	Contractor	LDC –HSE department	Field supervision (audits) by the LDC and EGAS	<ul style="list-style-type: none"> <li>- Contractor costs</li> <li>- LDC management costs</li> </ul>
	Air emission	<ul style="list-style-type: none"> <li>- Monitoring of wind speed and direction to manage dust-generating activities during undesirable conditions.</li> <li>- Management of number of vehicles and equipment in the site.</li> <li>- Appropriate maintenance, engine tuning and servicing of construction equipment to minimize exhaust emissions</li> <li>- Minimize unnecessary journeys or equipment use</li> <li>- Adopt a policy of switching off machinery and equipment when not in use (idle mode).</li> </ul>	Negligible	Contractor	LDC –HSE department	Contractual clauses + Field supervision (audits)	<ul style="list-style-type: none"> <li>- Contractor costs</li> <li>- LDC management costs</li> </ul>
	Noise	<p><b>Worker</b> Application of the normal precautions normally taken by construction workers.</p> <p><b>Neighbor</b></p> <ul style="list-style-type: none"> <li>- Notification to the surrounding establishment prior to the construction of the PRS</li> <li>- Time management and construction schedule according to the IFC regulation provided by the</li> </ul>	Minor	-LDC -Excavation Contractor	LDC HSE department	Contractual clauses + Field supervision (audits)	<ul style="list-style-type: none"> <li>- Contractor costs</li> <li>- LDC management costs</li> </ul>
		Negligible	Field supervision Complaints receipt from local administration				



Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		contractor prior to the construction phase					
Social receptor (health and safety)	Occupational health and safety	<ul style="list-style-type: none"> <li>– The project will hire a qualified sub-contractor adopting proper health and safety standards. In addition, the ToR for the contractor and the ESIA will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during construction.</li> <li>– Standard protection by placing clear project signs.</li> <li>– Time management for vehicles movement; especially avoiding the peak hours</li> <li>– Standard protection for the workers especially when working at elevated heights or trench.</li> <li>– Regular inspection of workers compliance to the EGAS H&amp;S guidelines refer to Annex 12</li> <li>– Training and licensing industrial vehicle operators of specialized vehicles.</li> </ul> <p>As per QRA:</p> <ul style="list-style-type: none"> <li>– Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.               <ul style="list-style-type: none"> <li>○ LDC Projects Dpt.                   <ul style="list-style-type: none"> <li>▪ Daily during construction</li> <li>▪ Construction site supervision &amp; reporting</li> <li>▪ LDC management costs</li> </ul> </li> </ul> </li> <li>– Provide a suitable tool for wind direction (Windsock) to be installed in a suitable place to determine the wind direction.               <ul style="list-style-type: none"> <li>○ LDC HSE and Projects Dpt.</li> </ul> </li> </ul>	Minor	LDC Excavation Contractor	LDC–HSE department	Field supervision and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> <li>- Contractor costs</li> <li>- LDC management costs</li> </ul>



Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		<ul style="list-style-type: none"> <li>▪ Daily during construction</li> <li>▪ Construction site supervision &amp; reporting</li> <li>▪ LDC management costs</li> </ul> <ul style="list-style-type: none"> <li>- Health insurance should be applicable to the contractor workers and workers contracted by a sub-contractor</li> <li>- The contractor also will be obliged to maintain daily attendance sheets in order to verify the attendance of workers in case of accidents and provide the injured persons with proper health insurance</li> </ul>					
Social receptor	Risk pertaining to child labor	<ul style="list-style-type: none"> <li>– The project will hire a qualified contractor/ sub-contractor with the high occupational standards. Special attention will be given to add a contract term prohibiting all child labor activities</li> <li>– Rigid obligations and penalties will be added to the contractor ToR in order to warrantee no child labor is occurred in the project. In case of breaching these obligations, financial penalties will be applied</li> <li>– The ToR also will oblige the contractor/subcontractor to keep a copy of IDs of laborers in order to monitor the hired staff, especially, those below 18 years old</li> <li>– The contract between the LDC/ EGAS and the contractor should explicitly reflect the rigid commitment of Labor Law Number 12 of year 2003 regarding child labor.</li> </ul>	Negligible	LDC Excavation Contractor/subcontractor	LDC–HSE department	Field supervision and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> <li>- Contractor costs</li> <li>- LDC management costs</li> </ul>
Physical receptor	Solid and	<ul style="list-style-type: none"> <li>- Temporary storage in areas with impervious</li> </ul>	Minor	LDC	LDC–HSE	Field	Indicative cost items



Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Hazardous waste management	<p>floor</p> <ul style="list-style-type: none"> <li>- Safe handling using PPE and safety precautions</li> <li>- If hazardous waste quantities generated are too small for isolated transport to the Nassreya landfill, a temporary storage site can be created. Coordination with waste authority will be imperative to secure a location and implement adequate procedures for storage depending on quantities and type of wastes until collection and shipping to Nassreya landfill.</li> <li>- Hand-over selected oils and lubricants and their containers to Petrotrade for recycling</li> </ul>		Excavation Contractor/ /subcontractor	department	supervision and review of certified waste handling, transportation, and disposal chain of custody	<p>included in contractor bid:</p> <p>Chemical analysis of hazardous waste</p> <p>Trucks from licensed handler</p> <p>Pre-treatment (if needed)</p> <p>Disposal cost at Nasreya</p> <p>Approximate cost of the above (to be revised upon project execution): 8,000-10,000 LE per ton</p>
Social receptor (Local traffic and accessibility)	Traffic	<p>Time management for transporting the materials, equipment, debris, etc.</p> <p>Clear sign surrounding the construction site and the entrance/ exit gate.</p> <p>Coordination with traffic department (ministry of interior) for vehicles route and movement.</p> <p>Vehicle speed restrictions should be applied across the project site,</p>	Minor	Contractor	LDC + Traffic department	Contractor with a valid conditional permit + Field supervision	<ul style="list-style-type: none"> <li>- Contractor costs</li> <li>- LDC management costs</li> </ul>
Physical receptor	Ground water	<p>In general, the proposed construction activities have no impact on the quality of nearby surface water or groundwater (no information on groundwater was available at the time of submission of the report); however the following procedures should be followed:</p> <ul style="list-style-type: none"> <li>- Control all onsite wastewater streams and ensure appropriate collection, treatment and discharge. Prevent discharge of contaminants and wastewater streams to ground.</li> <li>- Provide impervious lining to the trenches for the</li> </ul>	Of no significance	Contractor	LDC –HSE department	Contractual clauses + Field supervision	<ul style="list-style-type: none"> <li>- Contractor costs</li> <li>- LDC management costs</li> </ul>





Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
		<p>worker's domestic use</p> <ul style="list-style-type: none"> <li>- Adequate management and proper handling and storage of construction materials, oils and fuel to avoid spillages.</li> <li>- The implementation of a continuous and regular site inspection system.</li> <li>- Adequate management and proper handling and storage of construction materials, oils and fuel to avoid spillages.</li> <li>- The implementation of a continuous and regular site inspection system.</li> </ul>					
Social receptor	Disturbance to Community due to Labor Influx	<p>In order to minimize impacts pertaining to labor influx the following should be thoroughly implemented:</p> <ul style="list-style-type: none"> <li>- All workers should be trained on the Code of Conduct (special attention should be paid to harassment, environmental commitment, safety and security commitments)</li> <li>- Enable grievance mechanism and disclose it to community</li> </ul>	Negligible	Contractors	LDC	Contractual Clauses & Field Supervision	Contractor costs
Social receptor	All impacts	<p>Applying a grievance and redress mechanism as follows:            The detailed grievance mechanism (GRM) is presented in <b>Annex (9)</b>. It will to be shared with the community beneficiaries.            The GRM presented various tiers of complaints, time to respond to the aggrieved person and reporting requirement for grievances. It is crucial to notify that time frame allocated for responding to a complaint will not exceed 15 business days</p>	Not applicable	Contractor	LDC –HSE department	Contractual clauses + Field supervision	- Contractor costs LDC management costs



## 7.4 Environmental and Social Monitoring Matrix during CONSTRUCTION

Table 7-2: Environmental and Social Monitoring Matrix during CONSTRUCTION

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
<b>Local traffic and accessibility</b>	Reduction of traffic flow and accessibility to local community	Comments and notifications from Traffic Department	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports Complaints log	LDC management costs
<b>Ambient air quality</b>	Increased air emissions	HC, CO% and opacity	LDC HSE	Once before construction + once every six months for each vehicle	Vehicles licensing Department	Measurements and reporting of exhaust emissions of construction activities machinery  Complaints log	LDC management costs
<b>Ambient noise levels</b>	Increased noise levels	Noise intensity, exposure durations and noise impacts	LDC HSE	Regularly during site inspections and once during the night in every residential area	Construction site	Measurements of noise levels Complaints log	LDC management costs
		Complaints from residents	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs
<b>Physical receptor (soil, groundwater, visual)</b>	Waste generation	Observation of accumulated waste piles	LDC HSE	During construction. Monthly reports	Construction site	Observation and documentation	LDC management costs
		Observation of soil accumulations resulting from excavation (if	LDC HSE	During construction. Monthly reports	Around construction site	Observation and documentation	LDC management costs



Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
		encountered)					
		Chain-of-custody and implementation of waste management plans	LDC HSE	Zonal reports	Construction site and document examination	Site inspection and document inspection	LDC management costs
		Chain-of-custody and implementation of domestic wastewater (sewage) management	LDC HSE	During construction. Monthly reports	Construction site	Site inspection and document inspection	LDC management costs
<b>Labor conditions</b>	Occupational Health and Safety	Total number of complaints raised by workers Periodic Health report - Periodic safety inspection report	LDC HSE	Biannual for PRS	Construction site	<ul style="list-style-type: none"> <li>- Safety supervisor should follow the commitment of workers to use the protective equipment</li> <li>- Inspection and recording of the performance</li> <li>-Reports about the workers and complaints</li> </ul>	LDC management costs
<b>Labor conditions</b>	Child labor	Attendees lists with workers IDs - Complaints and accidents reports	LDC HSE	Biannual for PRS	Construction site	<ul style="list-style-type: none"> <li>- Safety supervisor observe the laborers</li> <li>- Random checkup for laborers IDs</li> </ul>	LDC management costs
	Occupational Health and safety						
		Cooperation reports with the concerned parties	LDC Projects Dpt.	when needed	Construction site	Supervision & reporting	LDC management costs



Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
<b>Social Receptor</b>	Disturbance to local community due to labor influx	<ul style="list-style-type: none"><li>- Grievances received related to labor influx,</li><li>- Number of incidents violating the code of conduct,</li><li>- Disciplinary actions taken with violating workers</li></ul>	LDC in coordination with contractor	When reported	Construction sites	Supervision & reporting	Contractor Cost



## 7.5 Environmental and Social Management Matrix during OPERATION

**Table 7-3: Environmental and Social Management Matrix during OPERATION**

Receptor	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Noise	<ul style="list-style-type: none"> <li>- Locate noisy pressure reducers away from PRS borders in residential areas</li> <li>- Location of reducers should be at least 20 meters away from the PRS fences.</li> <li>- The reducers should be either in a well-ventilated closed area, or in a protected open area according to IGEM standards. If the reducers are in an open area there should be wall barriers to dissipate the noise from the PRS staff offices and the neighboring areas.                             <ul style="list-style-type: none"> <li>- Others measures as per item 7.7: Qantara Gharb quantitative risk assessment study recommendations (Annex 11)</li> </ul> </li> </ul>	Minor	LDC Design Department	LDC HSE	Review of PRS layout	LDC management costs & PRS cost
Occupational health and safety	<ul style="list-style-type: none"> <li>- Remote actuation of isolation and slam-shut valves by LDC for PRS and pipelines</li> <li>- Produce Hazardous Area Classification drawings</li> <li>- Control room exit design.</li> <li>- Preventive maintenance policy and station manual</li> <li>- Provision of self-contained breathing apparatus (2 pieces for each station) for handling odorant leaks</li> <li>- Apply jet fire rated passive fire protection system to all critical safety shutdown valves ESDVs or Solenoid valves (As applicable)</li> <li>- Place signs in Arabic and English "Do Not Dig" and "High Pressure Pipeline Underneath"</li> <li>- Install an elevated wind sock and provision of portable gas detectors</li> <li>- The design should fully comply with IGE TD/3 code requirements</li> <li>- As per QRA:                             <ul style="list-style-type: none"> <li>- Review the emergency response plan and update the plan to include all scenarios in this study and other needs including:                                     <ul style="list-style-type: none"> <li>- Firefighting brigades, mutual aids, emergency communications and fire detection / protection systems.</li> <li>- First aid including dealing with the odorant according to the MSDS for it, with respect to means of water supply for emergency showers, eye washers and cleaning.</li> <li>- Safe exits in building according to the modeling in this study.</li> <li>- Provide the site with SCBA "Self-Contained Breathing Apparatus" (at least two sets) and arrange training programs for operators.</li> </ul> </li> </ul> </li> </ul> <p>All operation is according to standard operating procedure for the PRS operations and training programs in-place for operators.</p> <p>Inspection and maintenance plans and programs are according to the manufacturers guidelines to keep all facility parts in a good condition.</p> <p>Emergency shutdown detailed procedure including emergency gas isolation points at the PRMS and valves room in place.</p> <ul style="list-style-type: none"> <li>- Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.</li> </ul>	Minor	-LDC project department  -Designer	-LDC project department -engineering dep. -HSE dept. - EGAS	<ul style="list-style-type: none"> <li>- Drawing and design Document Review</li> <li>- Policy and manual review</li> <li>- Inspection by operators</li> <li>- Signage inspection and site visits</li> </ul>	Included in PRS cost
Solid and Hazardous waste management	<ul style="list-style-type: none"> <li>- Strict use of chemical-resistant suits and PPE when handling odorant barrels, tanks, or spills</li> <li>- Evacuation of odorant from barrels into holding tank with utmost care and full PPE</li> <li>- Covering possible odorant spills immediately with sand and treatment with sodium hypochlorite as per EGAS and LDC practices</li> <li>- On-site treatment of empty containers with sodium hypochlorite and detergent as Per EGAS and LDC practice</li> <li>- Ship empty containers to a certified hazardous waste facility via company depot using certified handling and transportation contractors</li> <li>- Ensure full and empty (treated) odorant containers are accompanied by a trained HSE</li> </ul>	Minor	PRS staff	LDC HSE	Quarterly auditing for The PRS	Cost to be included in PRS running budget:

Receptor	Mitigation measures	Residual impact	Institutional Responsibility for Implementation	Means of Supervision	Estimated Cost of mitigation /
	<p>specialist during transportation to and from the depot and to/from the hazardous waste disposal facility (UNICO and/or Nasreya)</p> <ul style="list-style-type: none"> <li>- Others measures as per item 7.7: Qantara Gharb quantitative risk assessment study recommendations.</li> </ul> <p>In order to minimize risk of spillage of hazardous odorant, the following general precautions should be taken:</p> <ul style="list-style-type: none"> <li>- Pre-Plan the anticipated amounts of odorants to be used in order to minimize leftovers and residuals.</li> <li>- Handle with extreme care and always perform visual checks on the integrity of the odorant container</li> <li>- Avoid rough handling rolling or dropping of odorant containers</li> <li>- Avoid exposure to direct sunlight during storage or transportation</li> <li>- Ensure odorant containers are always sealed properly and secured from tipping/falling/damage during transportation and storage (temporary and long-term)</li> <li>- Always have sufficient amounts of sand, sodium hypochlorite and detergent on standby during usage of odorant</li> <li>- ALWAYS handle containers or spills with care and ensure PPE compliance</li> <li>- Never release or empty residual odorant from its container to any receptor or for any reason other than filling the odorant tank at the PRS</li> <li>- NEVER use empty odorant containers for any other purpose</li> </ul> <p>In case of odorant spillage:</p> <ul style="list-style-type: none"> <li>- Avoid inhalation and sources of ignition</li> <li>- Immediately cover and mix with sufficient amounts of sand and sodium hypochlorite using necessary PPE and tools</li> <li>- Collect contaminated sand in clearly marked secure containers/bags</li> </ul> <p>Add sand to inventory of hazardous waste</p>				

## 7.6 Environmental and Social Monitoring Matrix during OPERATION

Table 7-4: Environmental and Social Monitoring Matrix during OPERATION

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
Ambient air quality	Improper management of odorant during operation	<ul style="list-style-type: none"> <li>- Log of spillage incidents</li> <li>- Number of treated containers</li> <li>- Odorant delivery forms</li> </ul>	LDC HSE	Quarterly for The PRS	PRSs	<ul style="list-style-type: none"> <li>- Compare Environmental Register with odorant delivery forms, observation of site</li> </ul>	LDC management costs
Ambient noise levels	Noise of PRS operation	<ul style="list-style-type: none"> <li>- Noise intensity</li> </ul>	LDC HSE	Quarterly for The PRS	PRSs	<ul style="list-style-type: none"> <li>- Noise meter</li> </ul>	LDC management costs
Labor conditions	Occupational Health and Safety	<ul style="list-style-type: none"> <li>- Total number of complaints raised by workers</li> <li>- Periodic Health report</li> <li>- Periodic safety inspection report</li> </ul>	LDC HSE	Biannual for PRS	PRSs	<ul style="list-style-type: none"> <li>- Safety supervisor should follow the commitment of workers to use the protective equipment</li> <li>- Inspection and recording of the performance</li> <li>- Reports about the workers and complaints</li> </ul>	LDC management costs





Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
		The updated emergency response plan to include the main detailed elements for ERP according to the QRA recommendation	LDC HSE (ERP document)	Yearly (ERP doc.)	PRS location	HSE annual audit	LDC management costs
		Presence a suitable tool for wind direction (Windsock) to be installed in a suitable place to determine the wind direction.	LDC HSE and Projects Dpt.		PRS location	Supervision & reporting	LDC management costs



## 7.7 Qantara Gharb Quantitative Risk Assessment Study Recommendations

Regarding to the risk calculations the risk to public which is in ALARP, and Acceptable for workers, there are some points need to be considered to maintain the risk tolerability in its region and this will be describe in the following recommendations:

Recommendation	Timeline Phases
All facility specifications referred to the national and international codes and standards.	Design Phase
Office and security buildings designed according to the accepted standard technical specifications.	Design Phase
Considering that all electrical equipment, facilities and connections are according to the hazardous area classification for natural gas facilities.	Design Phase
Emergency shutdown detailed procedure including emergency gas isolation points at the PRS and GASCO valves room in place.	Design Phase
Surface drainage system is suitable for containment of any odorant spills.	Design Phase
Provide a suitable tool for wind direction (Windsock) to be installed in a suitable place to determine the wind direction.	Construction Phase
Review the emergency response plan for PRS Area and preparing a plan for Qantara Gharb PRS including all scenarios in this study and other needs including:	Operation Phase
<ul style="list-style-type: none"> <li>• Firefighting brigades, mutual aids, emergency communications and fire detection / protection systems.</li> </ul>	Operation Phase
<ul style="list-style-type: none"> <li>• Dealing with the external road in case of major fires.</li> </ul>	Operation Phase
<ul style="list-style-type: none"> <li>• First aid including dealing with the odorant according to the MSDS for it, with respect of means of water supply for emergency showers, eye washers and cleaning.</li> </ul>	Operation Phase
<ul style="list-style-type: none"> <li>• Safe routs and exits for the control room and security office according to the modeling in this study.</li> </ul>	Operation Phase
Provide the site with SCBA “Self-Contained Breathing Apparatus” (at least two sets) and arrange training programs for operators.	Operation Phase
All operation is according to standard operating procedure for the PRS operations and training programs in-place for operators.	Operation Phase
Inspection and maintenance plans and programs are according to the manufacturers guidelines to keep all facility parts in a good condition.	Operation Phase
Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.	The Three Phases



## 7.8 Reporting of Mitigation and Monitoring Activities

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During construction and operation, environmental performance against targets is reviewed by the management on a monthly basis and reported to the contractor and LDC. The plan is designed to record incidents and to ensure investigation, root cause analysis, corrective action and follow up. Records are kept of all incidents, investigations and actions.

Regulatory and HSE reporting systems will be brought together on a monthly basis to be used in the LDC's (Sainai Gas) reporting system to be submitted to EGAS Environment Department during the construction phase.

During operation, the reporting of any occurrence and /or the result will take the following path:

- Recording of the nature and scale of the occurrence;
- Reporting to the necessary competent/ responsible persons;
- Internal reporting and external regulatory notification.

### 7.8.1 During construction phase

Reports should include as a minimum;

- Monthly report for the implementation of the ESMMP submitted by the contractor to LDC HSE staff.
- Monthly report on incident and complaint from the surrounding establishments and residents nearby the construction site.
- Unusual traffic delays or accidents caused during construction, any complaints received, any comments or recommendations by the traffic department should be reported in the monthly report prepared by the construction contractor supervisor
- Monthly report should include any incidents of high dust emissions or smoke during the construction phase including the natural dust that might be encountered.
- There should be a form prepared by LDC's HSE department for the contractor to keep records of quantities, types of wastes received and the wastes' location.
- The monthly report of HSE supervisor from LDC should include an evaluation of the contractor's compliance to the mitigation measures and any comments noticed by the HSE site supervisor about mismanagement of construction waste during the month.
- The HSE team from LDC observer should report on monthly basis the accidents or the worker's compliance.
- Reporting on monthly basis, the total number and the type of heavy equipment used during the construction phase.
- Monthly report on health and safety performance. This report will include any incident and complaint regarding health and safety measures performed by the contractor.

### 7.8.2 During operation phase

The reports should include as a minimum;

According to law 9-2009 and its executive regulation, each facility should prepare an environmental register. Components of the environmental register are presented in annex 4 of the executive regulation. All environmental procedure included in the EMMP are to be recorded in the Environmental Register so that they can be communicated effectively and clearly. It will include (monitoring plan, solid waste management plan, emergency plan,).

The Environmental Register shall contain:



- Any complaint related to the noise generated from the PRS
- Regular noise and air measurement reports.
- Record keeping of the admitted waste and their quantity and management (bills of waste transportation).
- Summary of the HSE monthly report.

According to Article 29-32 from law 9/2009 and its executive regulation, the PRS shall prepare a hazardous material and waste register containing the handling and storage of hazardous material and waste in the facility (types, quantities, material safety data sheets, type of storage and means of transportation). Additionally, the register should contain a contract and /or bills of hazardous waste disposal at UNICO.

## **7.9 Emergency Response Plan**

Sinai Gas (سيناء للغاز) will develop an updated Emergency Response Plan (ERP) which incorporates the QRA recommendations that relates to its operations for the PRS and for its intermediate and low-pressure distribution network. The purpose of this document is to outline emergency responsibilities, organizational arrangements, responses, and procedures to be followed by personnel based in the field in the event of an emergency.

EGAS PRSs emergency plan guidelines, kindly refer to **Annex 10** attached to this report.

. For full details about the emergency plan, kindly refer to Annex 10.

**Emergency Levels are classified as Levels (Level 1, Level 2 and Level 3) as following:**

### **The first level of Emergency:**

- Potential hazards to life, safety, property and the environment are limited, and do not exceed the emergency zone or the boundaries of the public site or facility.
- The personnel of the enterprise or the site possess adequate training, capacity, personal protection equipment and necessary tools to manage and control the situation, and there is no need for external assistance.
- Alarm bells are not required to warn those outside the site or facility.
- The situation does not require evacuation of the emergency zone.
- There is no possibility of losing control or escalating the situation.
- The accident management team is not used.

### **The Second level of Emergency:**

- There is a serious risk to life, safety, property and the environment and may exceed the limits of the emergency zone, but do not exceed the limits of the public site or facility.
- There is a need to use the assistance of external parties to manage the emergency, or at least the presence of stand-by team in the presence of a potential escalation of the situation, but the situation does not extend its influence outside the facility or site.
- Members of the facility or site do not have sufficient capacity or resources to deal with the incident
- Requires evacuation and / or warnings to warn those outside the emergency zone



- Security breach or situation leading to constant threat to life and safety
- Accident management team intervenes

**The Third level of Emergency:**

- There is a serious risk to life, safety, property and the environment and may exceed the limits of the emergency zone and the possibility of exceeding the limits of the public site or facility.
- There is a need to use the help of external parties to fight fire, rescue, dealing with hazardous materials, large number of injuries and deaths.
- Measures must be taken to protect units, nearby areas and / or communities and the environment beyond the boundaries of the public site or facility
- There is a potential risk that the reputation of the company, its business or its revenues will be affected
- Any incident involving the exit of the operating system beyond the limits of safe operation with the possibility of escalation
- There is a danger to the public
- There is a possibility to start or run the communication system for emergency reporting
- The accident management team is used.

**For full details about the PRS emergency plan, kindly refer to Annex 10**

**Hotline**

A 24-7 Hotline (**129**) is available for customers and the public to report leaks, damage, emergencies, and/or incidents related to gas connections, components, infrastructure, and activities (inside or outside households) and to request repairs/emergency response/assistance.



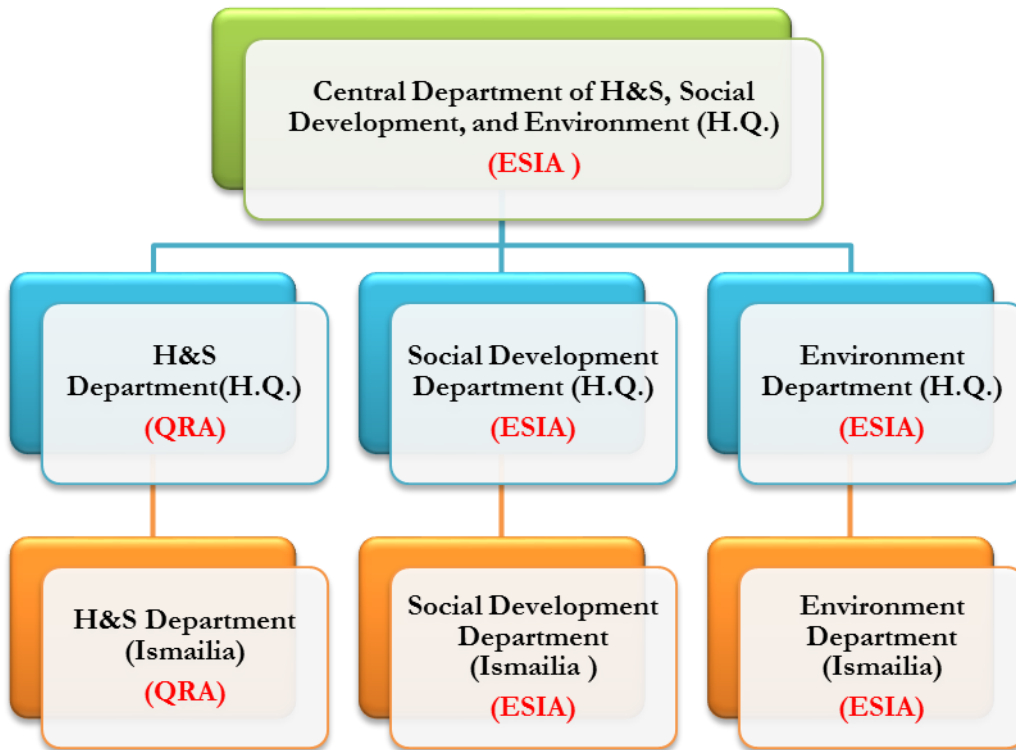
## 7.10 Institutional Framework for ESM&MP Implementation

### 7.10.1 Environmental management structures

EGAS is the supervisory body. Sinai Gas is the implementing body. Below is the management structure of Sinai Gas.

Being the implementing body of the natural gas network in project areas, Sinai Gas has a direct involvement with the environmental management and monitoring of the natural gas network. Sinai Gas has limited environmental and social background. They will be in need to upgrade their capacity regarding the environmental and social aspects. EGAS will provide Sinai Gas staff with the needed information.

One of the standard tasks of the HSE Departments of Sinai Gas, supervised by EGAS, is to ensure that the Environmental and Social Management Plan of the project is implemented in all the phases of the Project, through establishing an Environmental Register for Pressure Reduction Stations, with frequent auditing of this register.







In the structure above, designated site engineers perform daily implementation, monitoring and reporting of activities as per the ESMMP with special attention to:

1. Worker and contractor compliance to EGAS HSE manuals and procedures
2. Occurrence of HSE incidents and suggestions for incident avoidance (refer to item 7.7)
3. Management of broken asphalt (if any), unused backfill, solid waste, metal scrap
4. Management of paint cans, refueling & lubrication, soil contamination
5. Management of liquid waste such as leaked condensate hydrocarbons (if any) or chemicals used in heaters; and
6. Checking that handling of hazardous waste is done according to the requirements of the Environmental Law, where a permit for handling hazardous material and Hazardous wastes is issued from EGAS Environment Department
7. Using analyzers to measure noise, SO<sub>2</sub>, CO, CH<sub>4</sub> and NO<sub>2</sub> in ambient air, and detect possible natural gas leaks
8. Ensure and log compliant handling of odorant/odorant containers, odorant-contaminated-soils (in case of spillage)
9. Measure noise at different locations of the PRS
10. Other tasks as outlined in ESM&MP

Daily reports are to be compiled and sent to the governorate HSE officer for preparation of monthly summary reports.

Monthly reports are sent to HSE officer at Sinai Gas head office for compilation into quarterly reports to EGAS.

#### **7.10.2 Required actions**

- 1- Involvement of environmental and social officers during the design, costing, tendering, and construction phases would be advantageous.
- 2- Detailed HSE manuals covering each activity must be developed and institutionalized in EGAS. Several versions of such manuals have been developed by Egypt Gas and should be mainstreamed to other LDCs, accompanied by the appropriate capacity-building.
- 3- An updated and detailed assessment of EGAS. EHS institutional capacity and available resources for implementation of the ESMP

Specifically EGAS should take steps to develop capacity of site engineers and HSE officers with specific courses focused on implementation of the ESMP detailed in this ESIA



## 8 STAKEHOLDER ENGAGEMENT AND PUBLIC CONSULTATION

The public consultation chapter aims to highlight the key consultation and community engagement activities that took place as part of the preparation of the ESIA's and their outcomes.

Public consultation activities have been implemented during the preparation of the framework and the site-specific studies conducted for Qantra Gharb, As well as, the public consultation event conducted in Ismailia Governorate on the 10<sup>th</sup> of April 2017.

### 8.1 Legal Framework for Consultation

The consultation activities used multiple tools and mechanisms for the proposed 1.5 million household NG connections project in compliance with the following legislations:

- WB policies and directives related to disclosure and public consultation, namely,
  - o Directive and Procedure on Access to Information
  - o World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to the public consultation
  - o Environmental law No 4/1994 modified by Law 9/2009 and 105/2015 and its executive regulation until the last amendment by ministerial decrees no. 1963/2017

### 8.2 Consultation Objectives

The objective of the Stakeholder Engagement is to ensure safe and successful Project delivery by:

- Informing stakeholders, including persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively;
- listening to their comments, ideas and concerns and recording the same for follow up;
- Avoiding conflict by addressing impacts and issues raised by stakeholders promptly; particularly with the communities that will not be served by the project
- Ensuring that fears and anxieties about the nature, scale and impact of the operation have been properly considered in the development and management of the Project
- Accessing and making good use of existing local knowledge of the area;

Communicating and implementing a viable community feedback mechanism. The consultation outcomes will be used in:

- Define potential project stakeholders and suggest their possible project roles
- Identify the most effective outreach channels that support continuous dialogue with the community

Thereafter the results will provide proper documentation of stakeholder feedback and enhance the ESIA.

### 8.3 Consultation Methodology and Activities

This ESIA study team have adopted multi-dimensional consultation activities using different tools i.e. public meetings, focus group discussions (FGDs) and interviews that enable the marginalized, voiceless, youth and women to gain information about the project. As well as, gaining information about their concerns and worries regarding the project during various implementation phases.



Following are the main consultation activities:

- 1- The study team visited the project area in order to define various stakeholders.
- 2- Community engagement was conducted through the following three phases:
  - **Phase I (Scoping) for the** Preparation of the framework study in 2013 in Ismailia Governorate building which was disclosed on EGAS website as per the following link <http://www.egas.com.eg/docs/RPF%20for%20NG%20connections%20project%20for%2011%20Governorates.pdf>
  - **Phase II(Data Collection for the preparation) of** site-specific studies in February, 2017
  - **Phase III (Consultation activities and final public consultation) in** April, 2017 which was conducted in a public library meeting room in Ismailia City
- 3- All activities conducted were documented with photos and lists of participants in order to warrant appropriate level of transparency.

#### **8.4 Defining the Stakeholder**

In order to ensure an inclusive and meaningful consultation process, a stakeholder's analysis was conducted to get better understanding of the various groups and their roles, interests and influence on the project and Gender inclusion was considered in consultation activities.

For the purpose of this site specific ESIA, a focused stakeholders' identification was conducted to identify the key groups of relevance to the project in this specific location. The main identified groups are very similar to those identified on the governorate level but on a smaller scale, (elaborated details on that are included in the Governorate level ESMP). In the meantime, local communities of both men and women of projects beneficiaries, local NGOs/CDAs were among the key stakeholders on the local level. The following is the key stakeholders that were engaged during the consultation process:

- Local community representatives
- Governmental Organizations and Authorities
- NGOs / CDAs
- Educational institutions and universities
- Environmental administrations
- Formal and informal LPG distributors.
- In addition to, Sinai Gas company.

##### **Stakeholders of Phase I:**

The consultation session was conducted on December 2013

- Consultants (EcoConServ environmental and social) attended session
- Representatives of EGAS and Sinai Gas
- Representatives of EEAA accompanied the teams
- Governmental unit in QG
- Traders
- NGOs
- Community people



Figure 8-1: FGD with women in Qantara Gharb City



Figure 8-2: A panel with government officials at Qantara Gharb City LGU headquarters



Figure 8-3: Consultation meeting with El Orwa El Wothqa NGO in Qantara Gharb



Figure 8-4: Consultation meeting with the head of QG youth center



Figure 8-5: Consultation meeting with the head of Public Hospital in QG



Figure 8-6: FGD with men in QG

**Stakeholders of Phase II:**

-Local Governmental Units and Governorate Authority



- Health services providers
- Community people
- Sinai Gas staff
- NGOs

**Stakeholders of Phase III:**

- The Consultation session was conducted in Ismailia Governorate on the 10<sup>th</sup> of April 2017
  - Consultants (EcoConServ environmental and social) attended meeting
  - Representatives of EGAS and Sinai Gas
  - Representatives of EEAA accompanied the teams
  - Administrative managers
  - Community people

**8.5 Consultation processes**

It is worth to mention that the public consultation has covered both the PRS and all the Low pressures pipelines networks activities. All questions raised during the public consultation were related to the connection activities (Low pressures pipelines networks), where most of the people are not familiar of the PRS activities. So all questions, comments and responses were concentrated on the NG connection activities and have been addressed in the ESMP study for the Low pressure network.

**Table 8-1: Summary of Consultation Activities in Qantra Gharb**

Participants		Number		Methods	Date
During the framework		Male	Female		
Potential beneficiaries and governmental bodies		16	8	FGD	December 2013
Potential beneficiaries		53	71	Structured questionnaire	
Potential beneficiaries, government officials, NGO representatives,		31	48	Public consultation	
<b>Total</b>		<b>100</b>	<b>127</b>		
During Site-Specific ESIA		Male	Female		
<b><i>During data collection and scoping meetings</i></b>					
Potential beneficiaries	Qantra Gharb City	6	6	FGD	February 2017
Government/public officials	Qantra Gharb City	4	1	In-depth interview	
NGOs/CDAs representatives	Qantra Gharb City	0	1	In-depth interviews	
<b>Total</b>		<b>10</b>	<b>8</b>		
<b><i>During final public consultation</i></b>					
Various stakeholders *		39	18	Public consultation	10 <sup>th</sup> of April 2017
<b>Total during site specific ESIA</b>		<b>49</b>	<b>26</b>		



Main results of consultation during the data collection phase:

The predominant majority of respondents expressed very strong approval of the project. It is noteworthy to mention that the different groups concurred on the point that NG is, by all means, a far better substitute for LPG cylinders. The general viewpoint of the local community is that the benefits of NG outweigh its downsides. The only downsides associated with NG are firstly, the impact on the streets during construction; secondly, the cost of NG installation to households. It is worth noting that the PRS did not attract the attention of the surrounding community as the nearest settlement is far from the PRS.

Stakeholders' engagement and public consultation activities were conducted in order to ensure that the views and concerns of the local communities are integrated, and guarantee that they are taken into account by the different parties in charge of implementing the project. The views and concerns of local communities are an integral part of the project, and they are to be thoroughly taken into account throughout the different phases of the project.

It was notable that the reactions and attitudes of the local communities towards the project are in favor of the project. The field research team noted a strong public support and eagerness towards the project. Beside some legitimate concerns expressed by the public, the field research team recorded the general view that NG is a far better substitute for the type of fuel currently in use. The following table illustrates the different subjects, questions, comments and responses that were discussed throughout the different public consultation activities.

The results of the public consultation will be presented in the ESMP allocated for Ismailia Governorate





**Table 8-2: Key comments and concerns raised during the different public consultation activities, and the way they were addressed in the ESIA study**

Subject	Questions and comments	Responses	Addressed in the ESIA Study
Time plan	It was noticeable that the LDC applies a flexible time plan. The land of the PRS has been purchased a long time ago but no construction activities took place to date	Sinai Gas has purchased the PRS lands after long negotiation with the sellers. As soon as they know that this is a gas company the price was duplicated. Therefore, alternative lands were targeted. Eventually, an agreement and a contract was signed with the seller in the 4 <sup>th</sup> of May 2016. Thereafter, the WB was planned to finance the PRS.	Discussion of lands and required permits is presented in the legislation section number 3
Street rehabilitation & land refill	Who should bear the cost for street rehabilitation and land refill after the end of construction works?	The LDC is responsible for rehabilitating any damaged streets. They have two scenarios either the LDC can rehabilitate damaged streets on their own expenses otherwise the LDC pays the cost of rehabilitation to the local governmental unit who will be responsible for rehabilitating the streets	The comment is addressed in the impact and mitigation sections 5 and 7



Subject	Questions and comments	Responses	Addressed in the ESIA Study
Clear information	The gas company needs to provide clear information about everything related to NG. -shouldn't the gas company distribute flyers or brochures with clear information about Gas	The LDC adopts multi-level of information sharing. The first level through the contracting office. Posters are installed there to share information about the NG and contracting procedures. The second level is during the P& A survey where technicians share information about contracting and NG. Additionally, there is a hotline that can share information with any of the targeted beneficiary	The comment is addressed in the mitigation section 7
Contracting in Qantara Gharb	There is no contracting office in the vicinity of Qantara Gharb	There is a contracting office inside the local governmental unit. People were informed about this contracting office. It is temporary office later on it will be permanent	It is included under sharing information and mitigation measure 7

## 8.6 Summary of Consultation Outcomes

Site-specific consultation activities in Qantara Gharb City included wide range of concerned stakeholders. This included but not limited to individuals/households affected by the project activities, civil society organizations representing the interest of the community, and governmental bodies who will play a role in facilitating or regulating the implementation of site-specific project activities.

The general perspective towards the project is very supportive; even after the disclosure of the negative impacts during construction. Community people realize that these negative impacts are temporary and that during operations the upsides will outweigh the downsides.

The main concerns raised about the project are the prolonged time plan that put limitation to benefit from the project..

## 8.7 ESIA Disclosure

As soon as the ESIA gets clearance from the World Bank and approval from EEAA, a final report in English language will be published on the WB, EGAS and Sinai Gas websites. A copy of the ESIA report in English and a Summary in Arabic will be made available in the customer service office. Additionally, an Arabic summary will be made available in the contracting offices. An A3 poster will be installed in the contracting office informing about the results of the ESIA and the website link for the full ESIA study.