



1.5 Million Natural Gas Connections Project in 11 Governorates

Environmental and Social Impact Assessment Ashmoon-PRS and its High- Pressure Pipeline

Monofeya Governorate
Final Report

October 2020



EGAS

Egyptian Natural Gas Holding Company

Developed by



"Petrosafe"

Petroleum Safety & Environmental Services
Company



EcoConServ Environmental Solutions

List of acronyms and abbreviations

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.
CAPMAS	Central Agency for Public Mobilization and Statistics
CDA	Community Development Association
EEAA	Egyptian Environmental Affairs Agency
EGAS	Egyptian Natural Gas Holding Company
EIA	Environmental Impact Assessment
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMF	Environmental and Social Management framework
ESMP	Environmental and Social Management Plan
FGD	Focus Group Discussion
GPS	Global Positioning System
HH	Households
HP	High pressure
HSE	Health Safety and Environment
IFC	International Finance Corporation
LGU	Local Governmental Unit
LDC	Local Distribution Companies
LPG	Liquefied Petroleum Gas
mBar	milliBar
NG	Natural Gas
NGO	Non-Governmental Organizations
PAPs	Project affected persons
P&A	Property and Appliance Survey
PE	Poly Ethylene
PRS	Pressure Reduction Station
SDO	Social Development Officer
SIA	Social Impact Assessment
Egypt Gas	Egypt Gas (LDC)
WBG	The World Bank Group
WHO	World Health Organization
\$	United States Dollars
€	Euros

Exchange Rate: US\$ = 15.8 EGP as of October, 2020

Exchange Rate: € = 18.6 EGP as of October, 2020

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0. Executive Summary

The objective of the proposed project is to construct a Pressure Reduction Station (PRS) and its HP pipeline at Talia village, Ashmoon district, Monofeya Governorate in order to install the NG to a wider segment of clients. The PRS for Ashmoon will be designed to reduce an inlet pressure of 25-70 Bar to an outlet pressure of 7 bar at a flow rate of 5000 m³/h.

The ESIA is undertaken to assess and propose mitigations for environmental and social impacts of the PRS and its HP pipeline. Impacts of NG exploration, extraction, refining, and transmission are outside the scope of this ESIA. Impacts of distribution networks for different areas are addressed in separate Environmental and Social Management Plans (ESMPs). A new 241 m 25-70 Bar HP pipeline will connect the Pressure Reduction Station (PRS) to the Off-Take point.

The local distribution company responsible for project implementation in Ashmoon is Egypt Gas. In order to install the PRS, there was a need for a plot of land of 2500 m² (14.3 Qirate). The land (state owned land) was obtained according to the allocation decree, issued by The General Authority for Development & Agriculture projects dated 15-12-2016 to EGAS. Additionally, a permanent land acquisition of 100 m² was obtained in accordance to the Willing Buyer Willing Seller basis to construct the off-take point on GASCO high-pressure pipeline and valves room ([Annex-10](#)). Where more than three lands alternatives were inspected, consultation with neighboring land owners to determine the prevailing price, and negotiations with landowners have taken place to select the more technically accepted plot of land. Moreover, a new HP pipeline “25-70 bar system” with a length of 241 meter will be installed and cross a narrow road (a state-owned land) for a distance of 4-5 meter then it will pass through agriculture lands (temporary land use). Those land plots are private and state-owned lands, occupied by three farmers for a distance of 236-meters length and 10-meters width leading to the new PRS location. Accordingly, an ARAP will be prepared and compensations will be paid for the affected farmers following the WB requirements and the National legislations. ARAP will be prepared as a separate document for review and clearance of the Bank 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.

The proposed pressure reduction station (PRS) will be located on Gesr El Bahar road in Ezbet Sidi Ibrahim within Talia village, Ashmoon district, Monofeya Governorate.

The nearest residential building is located approximately 250 m north east of the PRS site.

The project will be regulated by both the World Bank and Egyptian regulations pertaining to environmental and occupational health and safety. Long list of laws was presented in chapter 3 of this report.

Ashmoon District is affiliated to Monofeya Governorate, which lies in the south of Delta region between Rosetta and Damietta branches to the north of Cairo.

The average annual temperature is 20.5 °C and the average annual rainfall is 34 mm.

Ashmoon PRS is located about 0.41 km East Rosetta branch of the Nile River which represents the main freshwater stream, the Nile River extends northwards from Ashmoon for about 213.5 km to boundary of the Nile Delta.

The air quality at the proposed site of the proposed PRS is exhibiting permissible limits of classic air pollutants in fact the levels are way below the national and international guidelines. The project site relies upon two sources of water, namely, the Nile water carried to the Governorate by a pipeline and rain water that is harvested during winter season.

With respect to flora of significance, none were encountered in the proposed project area, where PRS and its HP pipeline site are constructed. The current PRS area is free of significant vegetation. Planned Off-Take from national grid to the gas route shall not come into contact with flora and the uncultivated vegetation cover as the HP pipeline located along the road.

Ashmoon district is a city located in Monofeya Governorate. Municipal solid waste collection points, used as open transfer systems, where waste is collected and then transferred to the main Kafr Dawood in Sadat city dumpsite, located approximately 70 km from the PRS location.

The PRS in Ashmoon is located in an area characterized as agricultural land. Ashmoon district is one of the semi-urban areas in Monofeya Governorate. The district hosts many industrial activities. Consequently, the traffic tends to be dense.

The total population of Ashmoon district is estimated at 845486 people in 2017 with a total area of 298 km². According to CAPMAS data of 2017, nearly 100% of individuals using electricity, 95-100% of individuals having public water network, while the percentage of individuals having public sanitation network is about 83%. Thus, the new PRS will be supplied with the basic services.

The project will result in various positive impacts pertaining to job opportunities and potential supplies. However, it may result some potential negative impacts. Following is a summary table listing the impacts of relevance to the project:

Table 0-1: Impacts of relevance to the project

Potential Negative Impact	Impact significance
During Construction:	
Deterioration of soil quality	Medium
Air emissions	Minor
Noise	Minor - Medium

Potential Negative Impact	Impact significance
Occupational Health and safety	Medium
Impacts due to Covid-19 pandemic	Medium
Labor Influx	Medium
Child labor	Minor -Medium
Waste generation	Medium
Traffic	Minor
Ground water contamination	Minor
Community health and safety	Minor
Impacts related to lands	Medium
During operation:	
Occupational Health and safety	Medium
Impacts due to Covid-19 pandemic	Minor
Hazardous material and waste management	Medium
Noise	Minor

A long list of mitigation and monitoring measures was presented in this report in chapter-7. The PRS related consultation activities in Ashmoon district 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 consultation activity is still an ongoing process for the project activities, especially for HP land acquisition and compensation process. The project-affected persons (PAPs) expressed their eagerness to host the project as the natural gas will reduce their agony with the LPG cylinders. Surprisingly, there was no single comment raised about the safety of the PRS. The landowner expressed his satisfaction with the value of the Off-Take land. The PRS did not raise any concerns among the community in the vicinity areas.

1. Introduction

1.1 Project Objectives

The objective of the proposed project is to construct Pressure Reduction Station (PRS) and its related HP pipeline at Ashmoon district in order to install the NG to wider segment of clients. The PRS for Ashmoon will be designed to reduce an inlet pressure of 25-70 bar to an outlet pressure of 7 bar at a flow rate of 5000 m³/h.

1.2 Environmental and Social Impact Assessment (ESIA)

The ESIA is undertaken to assess and propose mitigations for environmental and social impacts of the PRS and its HP pipeline. Impacts of NG exploration, extraction, refining, and transmission are outside the scope of this ESIA. Impacts of distribution networks for different areas are addressed in separate Environmental and Social Management Plans (ESMPs). It is worth mentioning that in **March 2014**, an Environmental and Social Impact Assessment Framework (ESIAF) was developed for the project's Governorates including Monofeya Governorate. Also, in December 2017, an ESMP study has been conducted for three districts named Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka districts. And lastly in August 2019, an ESMP study has been conducted for five districts named (Shoubra Bakhom (Qwesna), Alshouhada, El Qum El Akhdar/El Batanoon, Ganzor and Ashmoon districts) The aforementioned studies were cleared by the World Bank and disclosed on EGAS website and the Bank info shop

A 241 m HP pipeline connects the Off-Take to the PRS. HP pipeline installation works will take place and will pass through agriculture lands (temporary use) occupied by three farmers (one landowner and two tenants). Accordingly, an ARAP will be prepared and compensations paid for the affected farmers following the WB requirements and the National legislations. ARAP will be prepared as a separate document for review and clearance of the Bank.

The ESIA objectives includes:

- Describing project components and activities of relevance to the environmental and social impacts assessments.
- Presenting project alternatives and the no project alternative.
- Identifying and addressing relevant national and international legal requirements and guidelines
- Describing baseline environmental and social conditions
- 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 local distribution company responsible for project implementation in Ashmoon district is Egypt Gas.

1.3 Contributors

The ESIA prepared by Petrosafe (Petroleum Safety & Environmental Services Company) and Ecoconserv Environmental Solutions (Cairo, Egypt) with collaboration and facilitation from EGAS, Egypt Gas HSE and Engineering Departments. The names of the Petrosafe and Ecoconserv experts who have participated in the preparation of the ESIA study listed in [Annex-1](#) attached to this report.

Table 1-1: List of Main Contributors

Team Member	
• Geo. Mohamed El-Ghazaly	• Dr. Khaled Gamal
• Dr. Zeinab Farghaly	• Chem. Mohamed Saad Abdel Moein
• Chem. Mohamed Abdel Moniem Aly	• Economist/ Osama Kamal

2. Project Description

2.1 Background

Natural Gas (NG) is processed and injected into the high-pressure lines of the national Grid (25-70 bar) for transmission. Upon branching from the main lines to regional distribution networks, the pressure of the NG is lowered to 7 Bar at the PRS. An odorant is added to the NG at PRSs feeding distribution networks to residential areas¹ in order to facilitate detection in the event of leaks. In addition to excavation, key activities of the construction phase also include installation of mechanical equipment.

The diagram below **Figure (2-1)** presents the components of a city's distribution network. The component covered in this ESIA is lined in red. Other components are addressed in a separate ESMP:

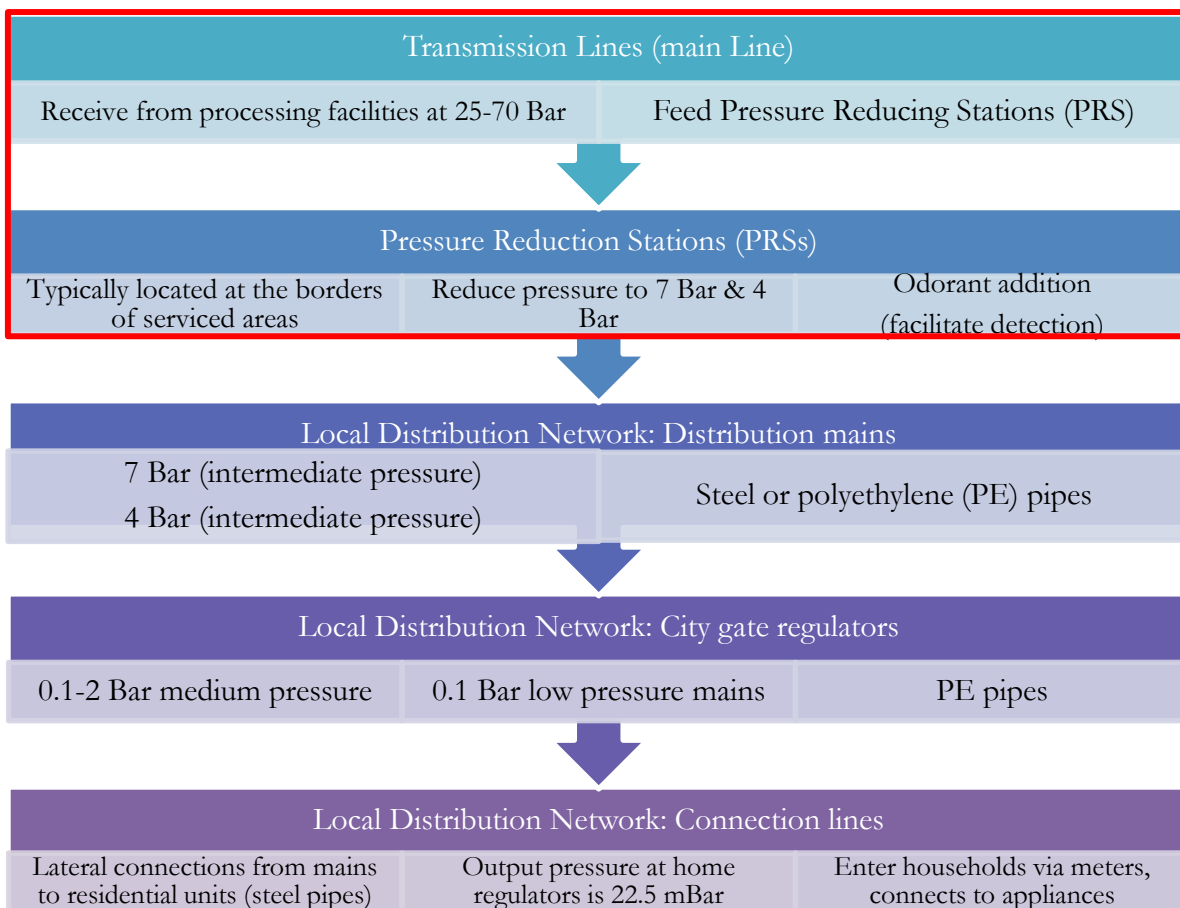


Figure 2-1: General components of the city's distribution network

¹ Because natural gas is odorless, odorants facilitate leak detection for inhabitants of residential areas.



2.2 Project Work Packages

2.2.1 Pressure Reduction Station (PRS)

A PRS consists of the following components: an inlet unit (isolated cathodic system), a liquid separation unit, a filtration unit and equipment for automatically reducing and regulating the pressure (active regulator and monitor regulator). In addition, auxiliary devices include safety valves (Slam Shut), relief valves, an odorizing unit and ventilation equipment as shown in [Figure 2-2](#).

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

The PRS for Ashmoon will be designed to reduce an inlet pressure of 25-70 Bar to an outlet pressure of 7 bar at a flow rate of 5000 m³/h. in order to feed Ashmoon area.

2.2.2 Off-Take and HP pipeline

The national grid pipeline network has a Maximum Operating Pressure of 25-70 Bar. The Off-Take is the point on the HP national grid pipeline where a branch of the pipeline is constructed to connect the PRS to the national grid. In Ashmoon, the HP pipeline connection between Off-Take and PRS will have an approximate length of 241 m. At the Off-Take location, valve rooms/valve ditching is constructed so as to control the flow of the natural gas through the pipeline (branch).

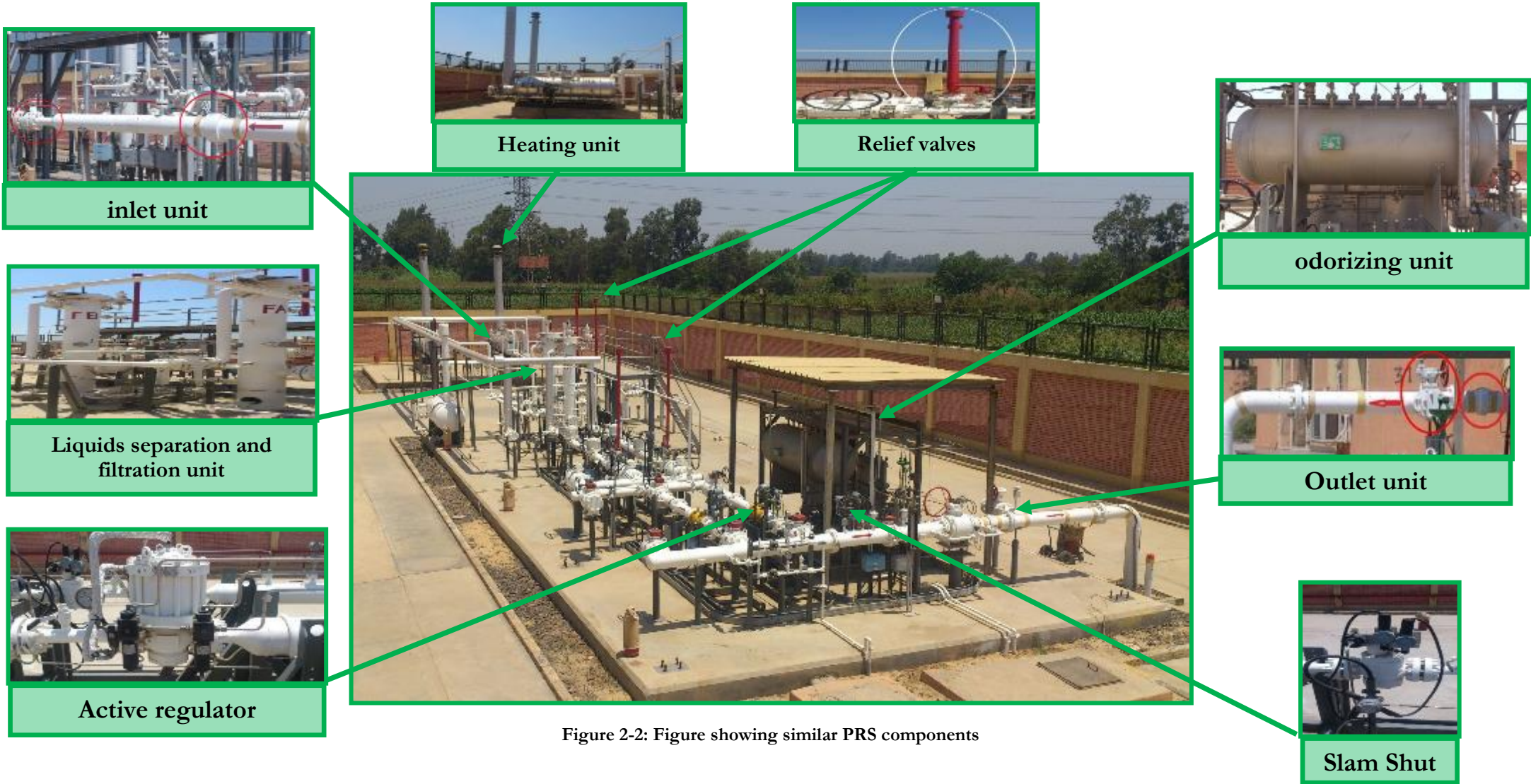


Figure 2-2: Figure showing similar PRS components

2.3 Project location

2.3.1 Pressure Reduction Station (PRS)

The proposed pressure reduction station (PRS) will be located on Gesr El Bahar road in Ezbet Sidi Ibrahim within Talia village, Ashmoon district, Monofeya Governorate. The proposed PRS will be located about 1.1 Km from Ezbet Sidi Ibrahim road, 3.4 Km Ashmoon-Al Kawady road, 0.7 km North west Ezbet Gamal Al Faransawy, 1.2 km North east Al Qata village, 6 km south east Abou Ghaleb village, 5.2 km south west Al Khour village and 4.6 km west Al Kawady village. The geographical coordinates of the proposed PRS location are (Lat. 30° 13' 42.3"N, long. 30°58' 38.7"E). The nearest residential building (Ezbet Sidi Ibrahim) is located approximately 250 m north east of the PRS site as shown in [Figure 2-3](#), [Figure 2-4](#) and [Figure 2-5](#)

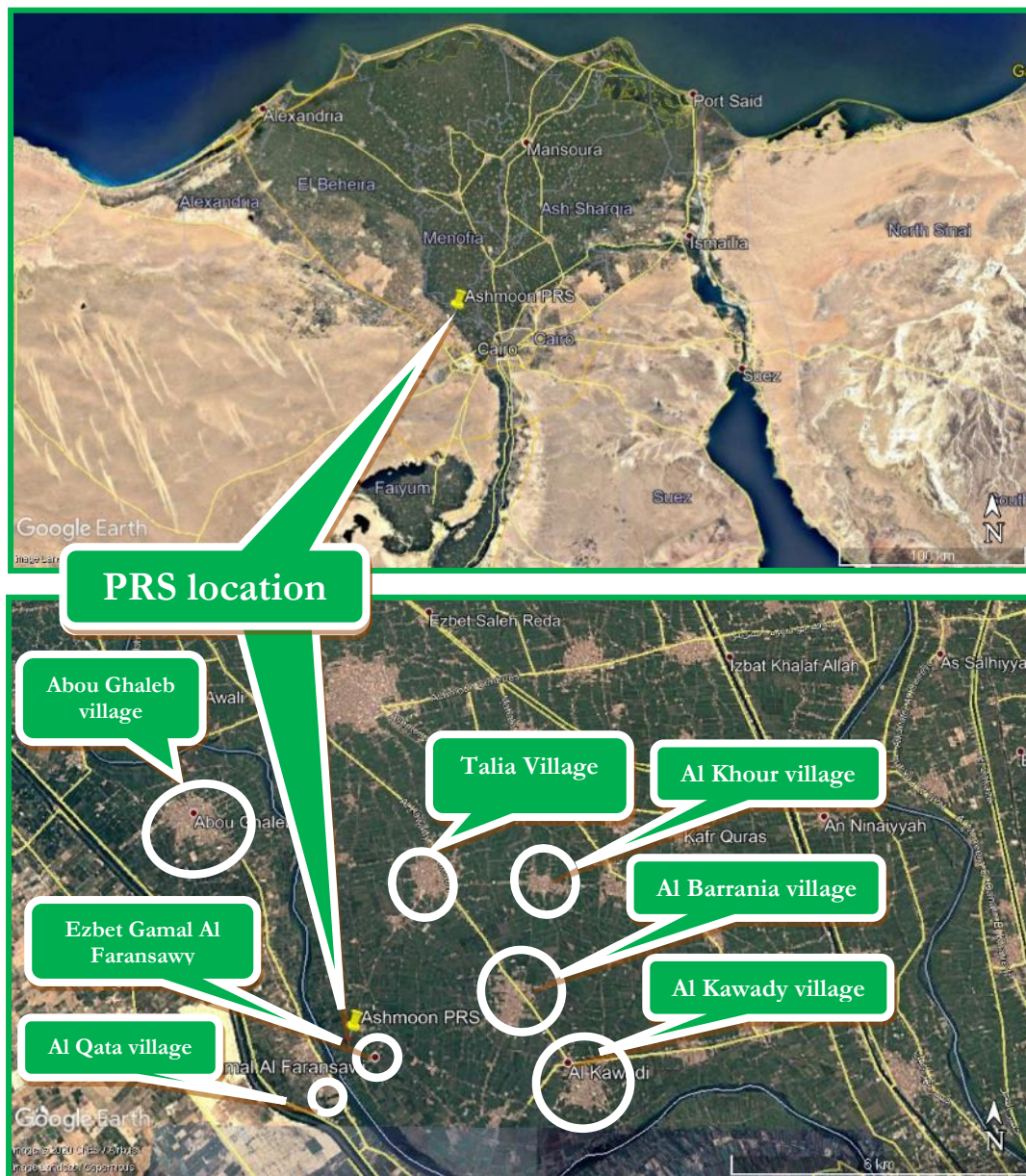


Figure 2-3: Satellite map showing the proposed Location of Ashmoon new PRS and nearest residential areas.



Figure 2-4: The proposed Location of Ashmoon new PRS feeding Ashmoon area

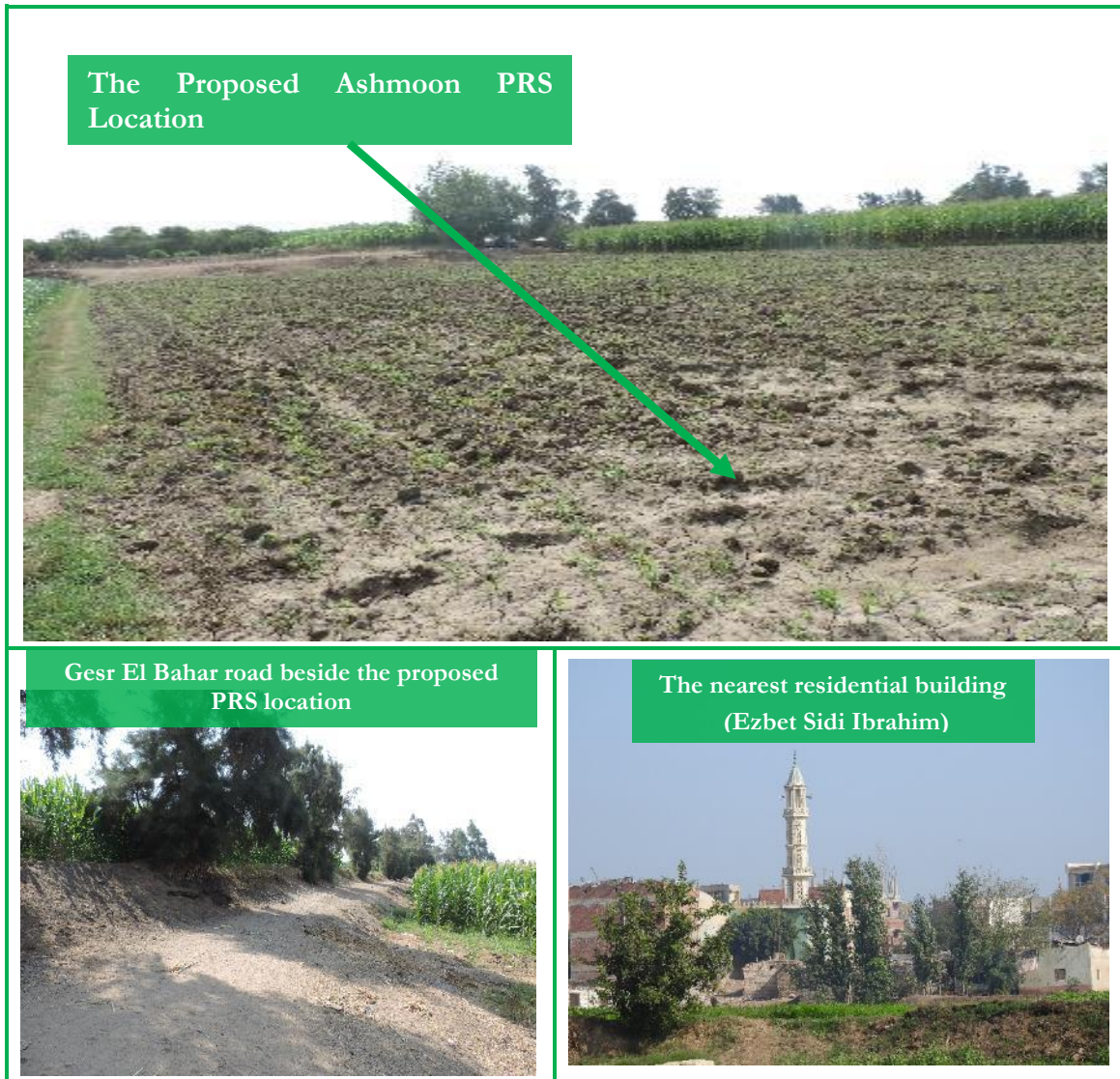


Figure 2-5: Pictures showing the proposed PRS surroundings

2.3.2 Off-Take Location

The proposed Off-Take point will be located on Gesr El Bahar road in Ezbet Sidi Ibrahim within Talia village, Ashmoon district, Monofeya Governorate. About 241 m south east from the proposed PRS location. The geographical coordinates of the proposed Off-Take location are (latitude 30°13'40.20" N, longitude: 30°58'49.70" E). **Figure 2-6** and **Figure 2-7**



Figure 2-6: The proposed Location of the Off-Take point.



Figure 2-7: Pictures showing the proposed Location of the Off-Take point.

2.3.3 HP Pipeline Route

The total length of the proposed pipeline route is about 241 meters. The proposed pipeline route will start from the Proposed Off-Take point, heading north west to cross a narrow road (Gesr El Bahar road) using open cut technique for a distance of 5 meter then will pass through agriculture lands (private and state-owned lands) for a distance of 236-meters length to reach the end point at the proposed PRS location. [Figure 2-8](#) and [Figure 2-9](#).

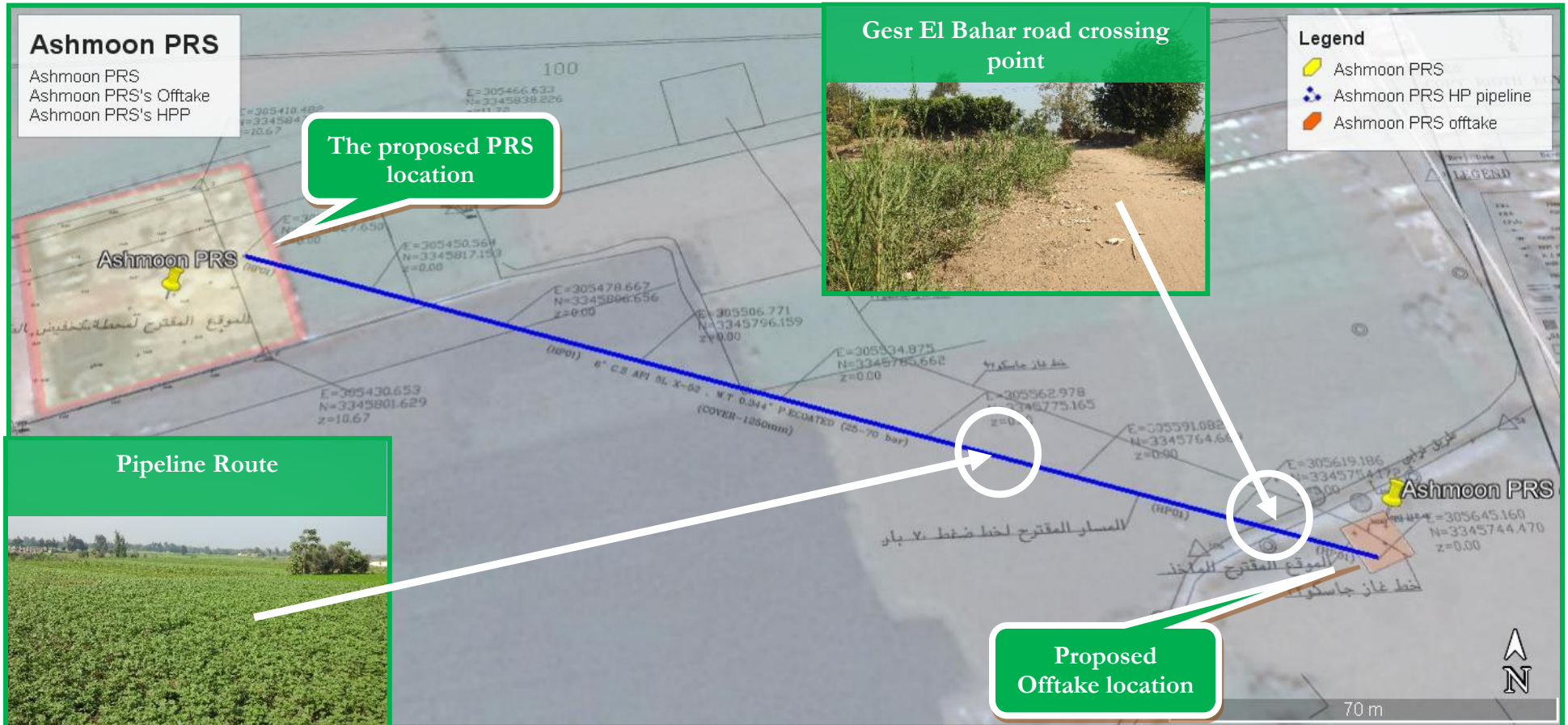


Figure 2-8: The proposed Pipeline Route

2.4 Project Execution Methodology

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.
- Identifying the location of the new PRS location and new Off-Take location.
- Identify the route of inlet connection “25-70 Bar system”

2.4.2 Land acquisition for The Project Activities.

In order to construct the new PRS, Off-Take location and the new HP pipeline, the following lands are required as per EGAS procedure for land acquisition for PRS construction ([Annex-2](#)):

- A permanent land acquisition of 2500 m² for the PRS construction, the land has obtained from state owned lands at Talia village (which affiliated to Ashmoon Markaz) The land has obtained according to the allocation decree, issued by The General Authority for Development & Agriculture projects dated 15-12-2016 to EGAS.
- A permanent land acquisition of 100 m² to construct a valves room and the off-take point on GASCO high-pressure pipeline. The land has obtained in accordance to the willing Buyer Willing Seller basis ([Annex-10](#)). Based on investigations for the land obtaining process, the following results were comprehended:
 - Four landowners offered to sell their lands to EGAS. The prices were relatively very high (250 -300 thousand EGP/ Qirate) because of the limitation of the required land (100 meter).
 - Consultation has taken place with other neighboring landowners to determine the prevailing price (market price) of the land in the target area. Prevailing price ranged from 90 to 100 thousand EGP/Qirate
 - All lands were inspected; one of them was not technically suitable to the project.
 - One of the lands selected was owned by more than one owner and there were critical constrains related to the official contract of the land.

- Negotiations with the other landowners have taken place, and the land was purchased on 27/6/2019 at a total cost of 150,000. EGP (approximately 262,500 EGP/ Qirate) and a cheque was issued and received by the landowner.
- There were no tenants or encroachment in the selected land.
- A temporary land acquisition for a distance of 236 m length * 10 m width (with a total area of 2360 m²) for installing a new high-pressure pipeline from the off-take point on GASCO high-pressure pipeline to the PRS location. The new high-pressure pipeline will pass through agriculture lands (private and state-owned lands) occupied by three farmers (one owner and two tenants), so compensation will be applied. An abbreviated Resettlement Action Plan (ARAP) will be prepared at a separate document according to WBG and Egyptian laws requirements.

2.4.3 Design and material take-off (MTO) including procurement

Once the final location of project components is finalized, a final design of the Off-Take, PRS and HP pipeline 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 critical components and PRSs, regulators, and metering stations.

2.4.4 Construction works

2.4.4.1 Construction works of PRS

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 the operation of reducers. 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). Currently, there are scattered buildings in the agricultural land surrounding the PRS. The closest buildings are around 250 m north east of the proposed PRS location, (**Figure 2-5**). In the event that buildings are constructed in the area surrounding the PRS, Recommendations of the Institute of Gas Engineers Safety for buffer zones will be applied knowing that:

- PRS should have free areas from each side to allow for emergency vehicle access.
- The nearest residential building to the proposed PRS is far about 250 m.

The PRS is to be accessible by an existing road (Gesr El Bahar road) to ensure quick response in event of repairs and/or emergencies.

Pressure Reduction Station Civil Works:

About a 6-month construction schedule is planned for the Ashmoon PRS with site preparation expected to commence in the second half of 2020.

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 6-m 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 4-inch firefighting line) both above and below ground, are installed.

- Construction of an 80 m² control room with a bathroom, an electrical unit's room, and a security room adjacent to the PRS.

Pressure Reduction Station Mechanical Works:

The Ashmoon PRS comprises of two pressures streams, the upstream (inlet) high pressure 25-70 Bar and the downstream (outlet) low pressure 7 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.

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

Please refer to **(Figure 2-2) and (Figure 2-10)**

Testing:

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

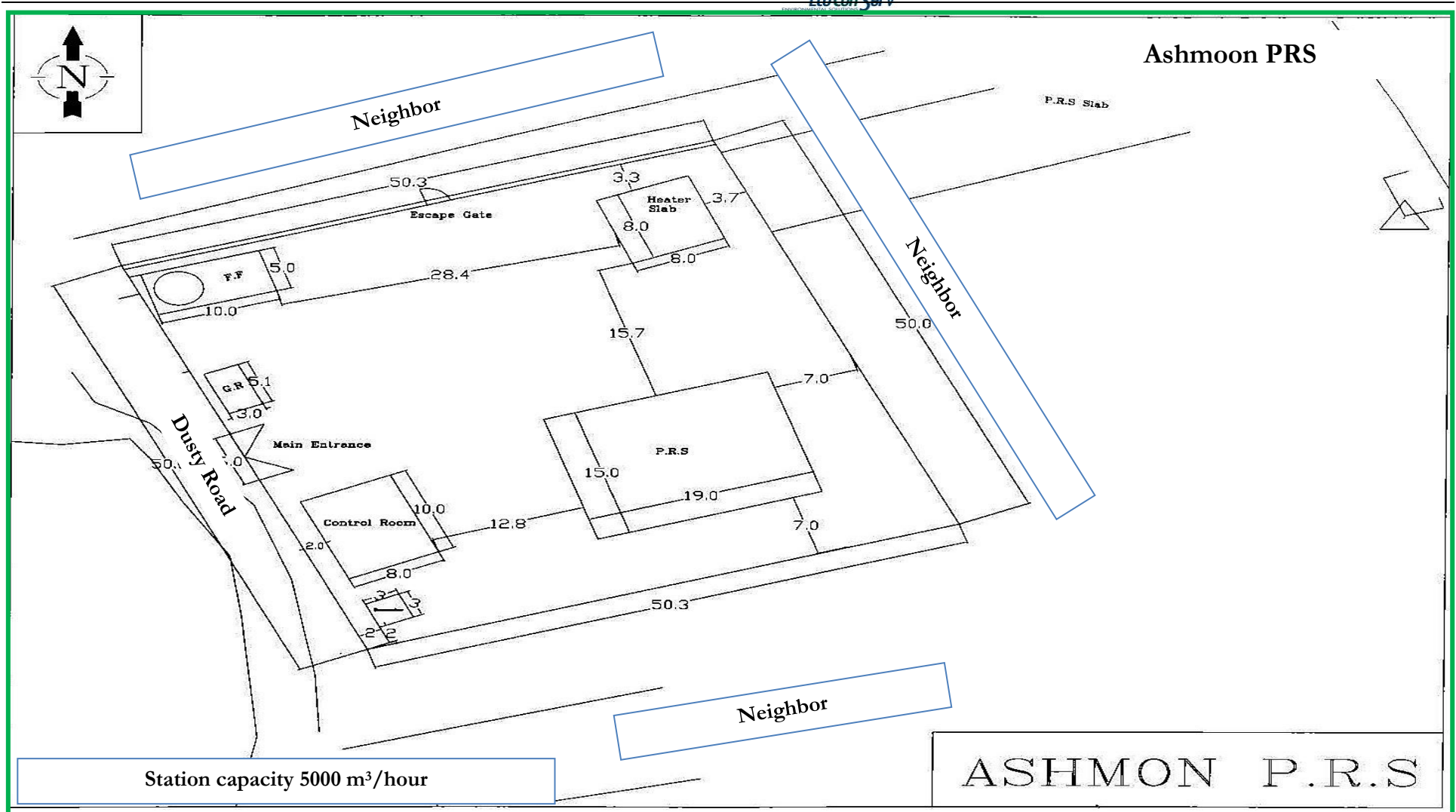


Figure 2-9: The proposed layout of Ashmoon new PRS.

2.4.5 Construction works for the Off-Take and HP pipeline

The off-take point and valves room will be constructed on GASCO high-pressure pipeline, the land for the off-take point (100 m²) was purchased in accordance to the willing Buyer Willing Seller basis. The off-take location is remotely located, away from any residential areas. The new 241-meter High-Pressure pipeline will pass through agriculture lands (private land, and state-owned lands occupied by three farmers) to connect the Off-Take with the proposed PRS. Thus, OP 4.12 will be applicable to Ashmoon HP pipeline and an ARAP study will be prepared separately in line with the World Bank guidelines. Construction activities of the off-take and HP pipeline include excavation, pipeline placement, and pipeline connection welding and then surfacing. The construction activities will be located within the allocated site. The duration of the construction of the pipeline will be about 1 month. All safety precaution will be applied as per EGAS HSE guidelines ([Annex-3](#)) including:

- Clearing and grading activities and pipe transportation and storage
- Site preparation
- Excavation
- Pipe laying
- Welding
- Backfilling and road repair
- Leakage testing

The construction activities will temporarily involve roads. The main roads will be used on a temporary basis to transport personnel, equipment and material to the project site

Clearing and grading activities and pipe transportation and storage

The first step of construction includes flagging the locations of the approved access route of the pipeline; installing a temporary workshop for the crew; erecting fences surrounding the working areas; and land clearing. Grading is conducted where necessary to provide a reasonably leveled work surface. Additionally, equipment and piping will be transported to the site and stored at a temporary storage area along the pipeline route and will not left more than one day in the construction location. Quality control procedures during the transportation and handling of pipes should take place to ensure protection from any effects that may damage the pipes, and prevent any traffic accidents.

Site preparation

Before any excavation activities, Egypt Gas shall coordinate with the different authorities to determine the existing infrastructure in the project's area (e.g. water lines, sewage lines, electrical cables and telecommunication lines) so as to avoid any undue damage. In case of lacking sufficient information on the available infrastructure, inspections on the presence of underground utilities will be carried out by drilling exploratory drills and/or using utility detection devices. Pipeline routes are then identified and marked in the field.

Excavation

Pipe laying of the high-pressure line in Ashmoon will not involve main crossings (e.g., railways or water bodies), therefore, the excavation technique applied will be open cut. Trenches for steel high pressure pipes will be excavated at depths of 1.2 m. The diameter of the steel-HP pipelines is 6 inches.

Excavation works start by removing the base soil and excavated either by a backhoe excavator or by manual excavation.

Excavated soils will be used in backfilling, other waste materials during excavation will be loaded onto trucks and transferred to disposal areas. Because of the limited available space, loading waste trucks shall be done upon excavation, whenever possible, in order to avoid stockpiling waste on site.

Pipe laying

Before pipe laying, the bottom of the trench is cleaned of any rocks or solid objects which may damage the pipes. In some cases, where the ground water is shallow, the trench should be dewatered before pipe laying. Dewatering pumps typically discharge into a drain or sewer manhole, according to arrangements with local authorities. To conserve water, if dewatered water is free of perceivable pollution, it will be- to the extent possible- used on- or around the work site or discharged into the nearest canal to be used for irrigation.

Welding

Arc welding is used with HP steel pipes. Steel pipes are protected from corrosion by isolating coats, and by fixing an anode for cathodic protection. For long segments of the steel-HP pipelines, the impressed current protection system is employed with the aid of electrical components such as transformers. Once the trench is excavated and cleared, the pipe stretch shall be laid down.

Backfill and road repair:

After laying and welding works, the trench containing the HP pipe is backfilled with sand either by a front loader or manually. The trench will be backfilled immediately after the pipeline has been laid considering that the finished backfilling level will be the same as the road level. The initial backfill will be to a minimum height 20 cm of fine sieved sand either by a front loader or manually to protect the pipeline. The backfill will be then compacted by wet sand layers of 15 cm thickness in order to avoid road settlements and subsequent cracks. Natural gas pipes are surrounded by sand in order to absorb loads from the road.

A yellow warning tape marked “Natural Gas” is placed on top of the sand layer.

In some cases, if the street width is not enough to fulfill the proximity required in standards for safety to sustain pressure, an inverted U-shaped reinforced concrete slab is constructed around the pipeline after laying in order to improve shock resistance.

Upon completing the backfilling works, the contractor will proceed to restore the road surface to its original status.

Hydrostatic leakage testing

Following construction activities, the piping will be tested to locate possible leaks using hydrostatic testing, which consists of filling pipes with water and then pressurizing to 1.5 times the operating pressure and measuring the pressure at different locations. Pressure drop indicates leakage. The water is then drained. This drainage takes place by the "pigging process", which includes forcing an object, the "pig", through the pipe by liquid or air pressure to totally drain the line before NG is fed.

In order to prevent deformation, dislocation, and rupture of the pipes, leakage testing through pressurization is performed after backfilling the excavation under (10 cm), around (10 cm), and above the pipes (20 cm, at least).

2.5 Operation phase

2.5.1 Operation of the PRS

Operation of the PRS involves operation of the various components outlined in the construction phase as shown in (Figure 2-2). Risks associated with those activities are further addressed separately in a Quantitative Risk Assessment (QRA) (Annex-4) and all its outputs will be adhered, and its recommendations will be included in the developing Emergency Response Plan (ERP) if necessary.

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 measure of protection during strikes and current.

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.

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 comprise 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)

The PRS is equipped with two heaters in parallel (one of them being on standby in case of emergencies).

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.

Active and Monitor Regulator

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

Slam Shut Valve

The purpose of Slam shut is to totally, 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.

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 dosing of the odorant indicated in the subsection below.

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 Tertiobutylmercaptin (80%) and Methylsulphide (20%). The normal dosing rate of the odorant is 10-20 mg/cm³. The odorant system consists of a stainless-steel storage tank, which receives the odorant from 200-liter drums, injection pumps, and associated safety devices.

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. Please refer to [Figure 2-2](#)

2.5.2 Operation for the Off-Take and HP pipeline

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.

2.6 Resources consumption

2.6.1 During Construction

Water:

Water is mainly used during the construction phase by the workers and engineers. There is a permanent source of water from Egyptian Holding Company for Drinking Water and Sanitation

Water is mainly used during the construction phase in concrete preparation and domestic uses by the workers and engineers. Water for construction is sourced from trucks. Bottled water will be used for drinking purposes. The expected amount of water to be used during the construction phase of this project is:

- Domestic uses by the workers and engineers: about 5 m³/day
- Construction activities including hydrostatic testing: about 70.5 m³

Fuel:

Diesel fuel will be mainly used for:

- Diesel generators that supplies electricity to the construction activities including welding.
- Trucks and excavators fuel
- The expected amount of diesel fuel to be used in the construction phase of the PRS, Off-Take and HP pipeline is about 60 liters per day. The fuel will be delivered to the construction site via trucks when needed

2.6.2 During operation

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 source will be determined during the construction phase: either the PRS will be connected to the public water network or water will be delivered by trucks.

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 supplied by electricity from the National electricity grid network existing in the area.

2.7 Waste Generation

All solid wastes generating during the construction phase will be managed and disposed in accordance with applicable regulations and established best management practices. All generating wastes will be reused and/or recycled to the maximum extent possible ([Table 7-2](#)).

2.7.1 During construction

Solid wastes

Solid waste generated during the construction phase will comprise of construction wastes, domestic wastes as following:

- 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.
- Domestic waste will be generated by approximately 24 workers per day over a period of 6-months during the project construction activities. Workers will utilize public facilities



provided by the village or city and use public resources (bins) to dispose of food waste, packaging materials etc.

- Excavated soil is used for backfilling. Small amounts of leftover soil may remain and are disposed of in legal dumpsites as per contract between the Contractor and the supplier

Hazardous wastes

Some hazardous wastes will comprise of construction wastes as paint containers, batteries, chemicals containers (solvents, lubricants, etc..) and used oils.

Liquid waste

Liquid waste will comprise mainly of domestic wastewater, vehicle/equipment wash down water and the hydrostatic test water. Domestic water is the only continuous source during construction. Workers during the construction phase will use the nearest public washroom or the Mosque's bathrooms, the hydrostatic test water will be sampled and analysed before selecting appropriate disposal method, if the results within the limits it will be discharged into a drain or sewer manhole with arrangements with local authorities and if not meet with the limits it will be collected in tanks and transported via a certified contractor to the nearest wastewater treatment station..

2.7.2 During operation

Solid waste

Solid waste generated from the PRS is expected to be minimal and limited to domestic waste and it will be collected regularly by trucks belonging to Ashmoon local units.

Hazardous waste

Mainly empty odorant containers and filters- will be treated on-site, transported (using certified hazardous waste vehicles and personnel) to the Egypt Gas storage facility in Abu Rawash (Giza) for final disposal at the UNICO hazardous waste facility near Alexandria.

Wastewater

the only wastewater source is domestic wastewater. 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 Legislation 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 and its Executive Regulation (ER) No 338 for Year 1995 and the amended regulation No 1741 for Year 2005, amended with Prime Ministerial Decree No 1095/2011, prime ministerial decree No 710/2012, Prime Ministerial Decree No 964/2015, Prime Ministerial Decree No 26/2016 and Prime Ministerial Decree No 618 & 1963/2017
 - EEAA guidelines on ESIA's preparation
 - EGAS HSE guidelines, LDCs will comply with EGAS HSE Guidelines which work as regulation on PRS construction and operation (provided in [Annex-3](#) from the report)
- Law 10/1990 for Land Acquisition and its Amendments.
- Law 38/1967 for General Cleanliness
- Law 93/1962 for Wastewater
- Traffic planning and diversions
 - Traffic Law 66/1973, amended by Law 121/2008 and Law 142/2014.
 - 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 including Decree 211/2003

3.2 World Bank Safeguard Policies²

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/BP 4.11 will not be applicable to this ESIA as there is no cultural resources located in the project area. Concerning OP/BP 4.12, it will not be applicable to either the new PRS or the Off-Take, since the land for the PRS has obtained according to the allocation decree, issued by The General Authority for Development & Agriculture projects dated 15-12-2016 to EGAS and the land for the off-take point has obtained in accordance to willing buyer willing seller approach ([Annex-2](#)). With regard to the HP pipeline (241 m) which will be constructed, it will cross a narrow road for a distance of 4-5 meters owned by the state, and then will pass through cultivated lands for a distance of 236 m length and 10 m width, owned and rented by three farmers (compensation will be applied). An abbreviated Resettlement Action Plan (ARAP) will be prepared at a separate document. Therefore, OP/BP 4.12

² <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694>

and the Egyptian laws will be applicable to the HP pipeline activities and it will define the Gap analysis between both of them.

3.2.1 World Bank Group General Environmental, Health, and Safety Guidelines³ & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems⁴

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. Gaps between requirements outlined by WBG guidelines and the Egyptian Law 4/1994 for Environment protection and the LDCs EHS guidelines have been analyzed. There are no significant differences between the requirements outlined by the WBG EHS GUIDELINE 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 Information⁵ will be followed by the Project.

3.3 Permits Required

- _ Approval from the ministry of Agriculture to construct the PRS on agriculture land in accordance with the presidential decree number 615 of year 2016.
- _ Army forces permit to construct the PRS.
- _ Constructions permit to be obtained from the local Governmental unit (LGU) in Ashmoon – Monofeya Governorate.
- _ 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 (after construction phase)

³<https://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES>

⁴<https://www.ifc.org/wps/wcm/connect/9c6e3d0048855ade8754d76a6515bb18/Final%2B-%2BGas%2BDistribution%2BSystems.pdf?MOD=AJPERES&id=1323162128496>

⁵ <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694>

4. Environmental and Social Baseline

4.1 Description of the Environment

Ashmoon city is located in Ashmoon Markaz about 37.2 km from Cairo, bordered from north west by Izbet Al Hwayti and from south by Ezbet Khaleel Mohamed and from east by Ezbet Elsyed Salamah and from west by Ezbet Ismail Mohamed. (**Figure 4-1**)

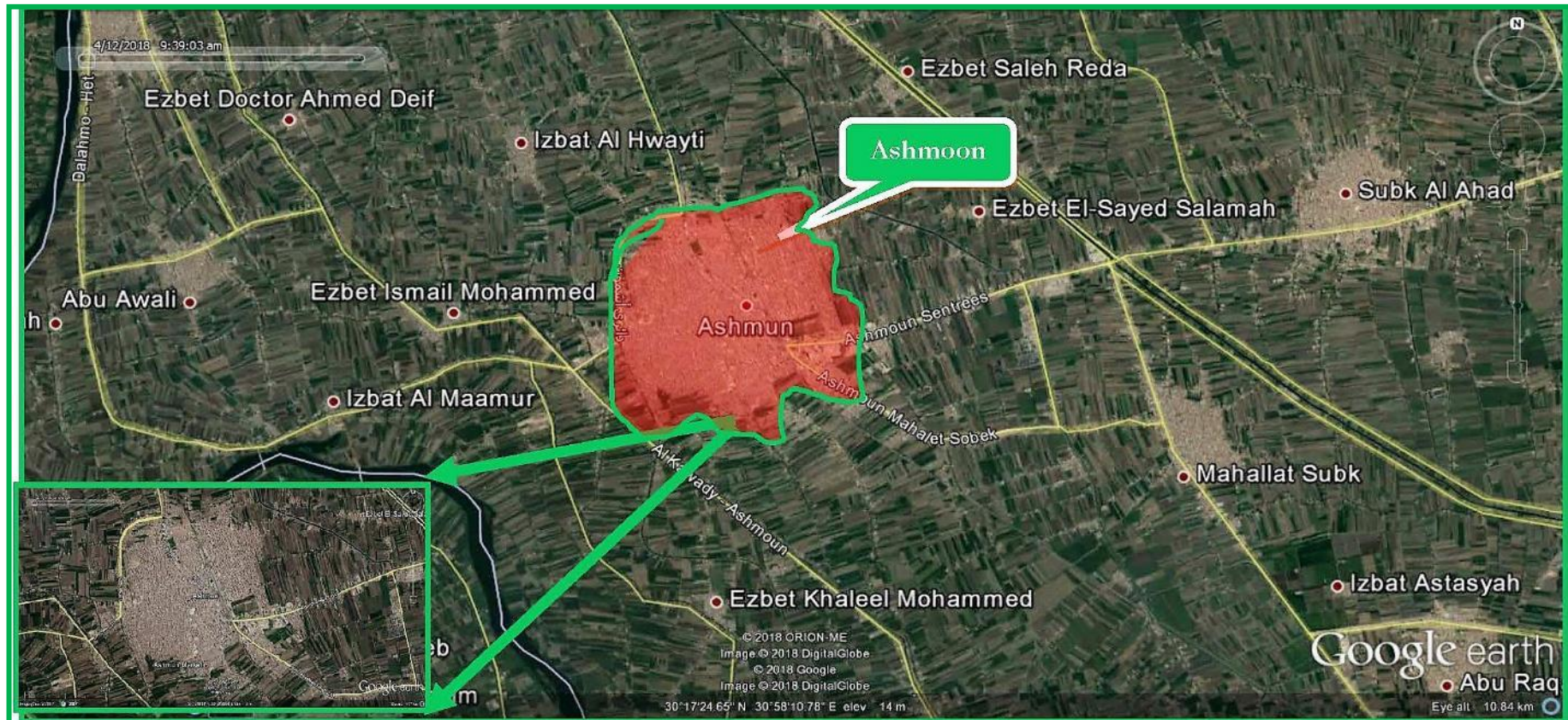


Figure 4-1: Satellite map showing Ashmoon district and surrounding communities

The proposed project aiming to construct PRS in Ashmoon district (Markaz Ashmoon) within Monofeya Governorate.

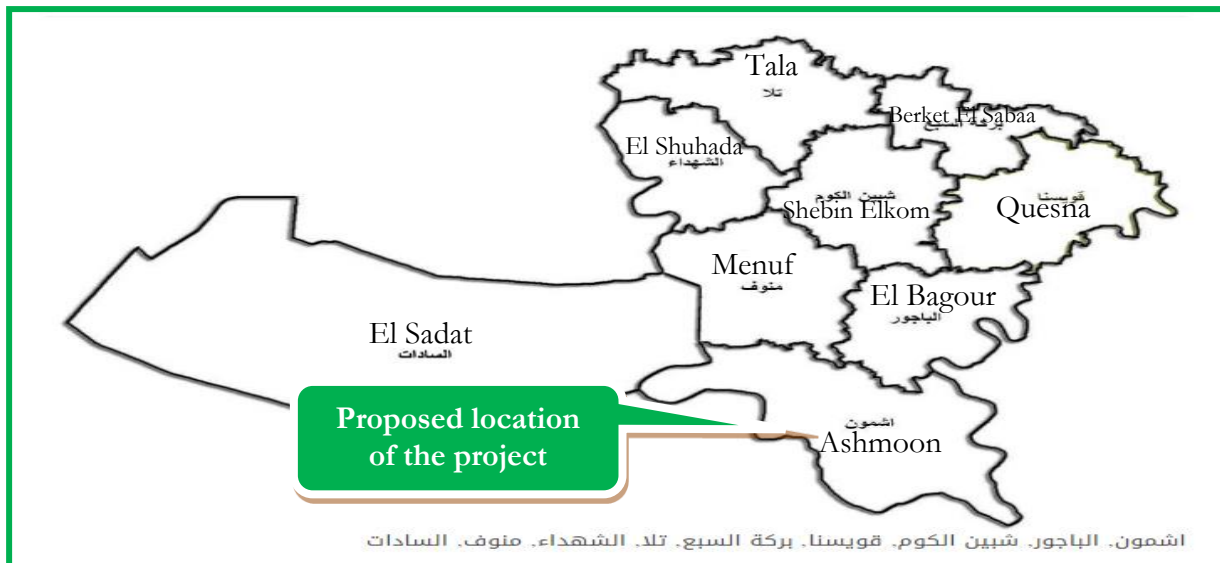


Figure 4-2: A layout showing the location of Ashmoon PRS.

4.1.1 Air Quality

4.1.1.1 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 receptors 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.

The measurement location was chosen on the basis that it is beside a main road and close to the PRS location.

One-hour average results for 8 hours' continuous measurements were conducted for pollutants of primary concerns, namely, carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), Total Suspended Particulates (T.S.P) and particulate matter (PM10).

Methodology, instrumentation and results of Ambient Air Quality are detailed in Annex-5 attached to this report

Results of ambient air quality measurements:

The concentrations of measured air pollutants in the studied areas are below national and WBG guidelines. All the measurements for the gaseous pollutants are 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 618 in April 2017". Accordingly, the ambient air quality in the project area is one of the tolerable

areas in Egypt in terms of ambient air quality, which can be attributed to the absence of any major industrial sources.

Construction engines are certified, i.e., exhaust is below permissible levels. Ambient concentrations of gaseous pollutants, NO_x, SO_x 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 6 and 7. During the construction phase, excavation and construction activities will likely cause dust levels to surpass permissible levels at the construction areas. 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 dust concentration beyond permissible levels are further addressed in chapter 7.

4.1.2 Noise

4.1.2.1 Site specific noise measurements

One-hour average results for 8 hours continuous measurements were conducted for noise level measurements in the same location of the ambient air quality measurements.

Methodology, instrumentation and results of Noise measurements detailed in [Annex-5](#)

Results of noise measurements

The noise measurements in the studied area are below national and WBG guidelines. They are complying with the maximum allowable limits according to law 4/1994 for Environment protection and its amendments. The excavation and construction activities may cause noise levels to 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.

4.1.3 Climate

The average annual temperature is 20.5 °C and the average annual rainfall is 34 mm

4.1.4 Water resources

Groundwater

There is no accurate data about the estimate volume of the groundwater water in Monofeya but it is constantly renewable by the Nile River and irrigation water. The groundwater aquifers are the Nile delta and Moghra aquifers which located in a very far depths from the soil surface.

Surface water:

Ashmoon PRS is located about 0.41 km East Rosetta branch of the Nile River which represents the main freshwater stream, the Nile River extends northwards from Ashmoon for about 213.5 km to boundary of the Nile Delta.

The surface water resources of Monofeya Governorate are limited to the Nile River Branches (Rosetta and Damietta) where it supplies about 1.6 billion cubic liters annually for agriculture, industrial and domestic uses. There are three main Canals within the governorate as following:

1. **Alrayah Al Monofy**; supplies about 1345.800 Million cubic liters annually.
2. **Alnagil**; supplies about 186.500 Million cubic liters annually.
3. **Dowrah**; supplies about 75.500 Million cubic liters annually.

4.1.5 Terrestrial Biological Environment:

The current land use for the location of the PRS is for agricultural purposes. Therefore, it is a modified habitat and has no ecological importance, the project area is eventually free from any endangered species as shown in [Figures 4-4 and 4-5](#).

Flora

There had not been flora recorded in the studied areas except some cultivated species such as Pomegranate (*Punica granatum*) and Mango trees (*Mangifera indica*).

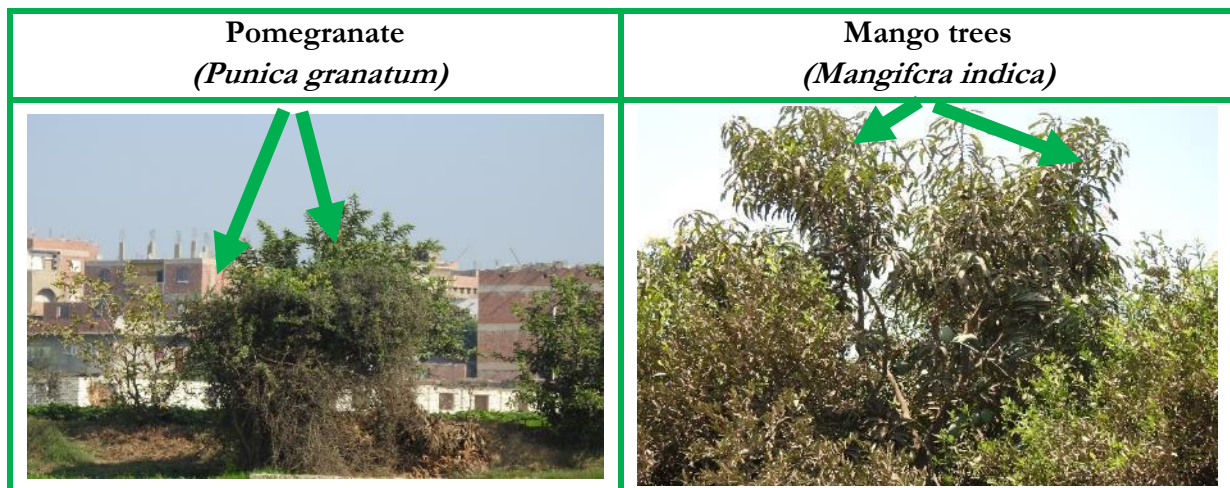


Figure 4-3: Shows flora at Study area.

Fauna

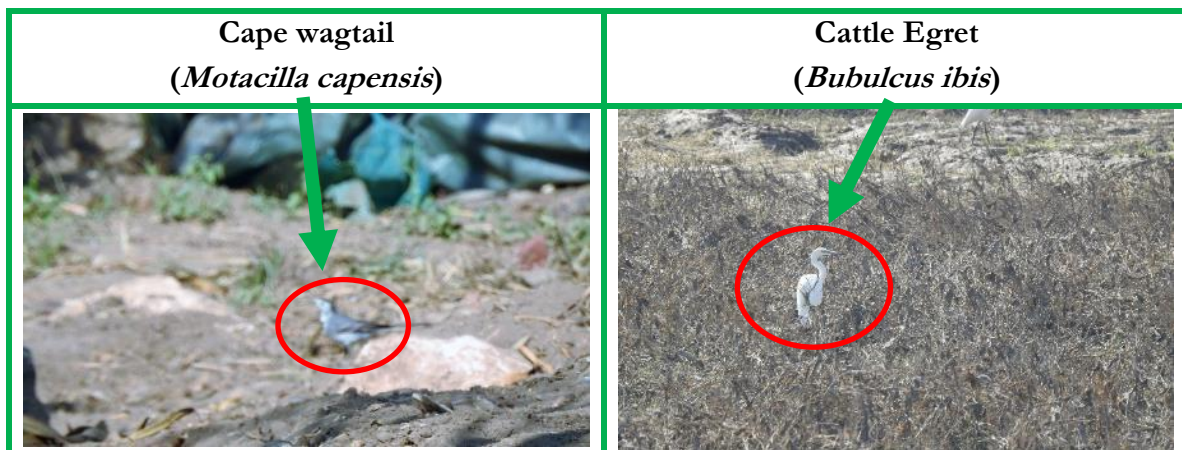


Figure 4-4: Shows fauna at study area

In conclusion, the project area is eventually free from any endangered species.

4.1.6 Waste Management:

Solid Waste:

The responsibility of service planning, delivery and monitoring in Al Monofeya Governorate is delegated to Cleansing and Beautification Agency managed by Presidency of the City Council.

Solid wastes will be transferred by local units Trucks to intermediate waste handling areas then to be transferred by larger trucks to the main Kafr Dawood in Sadat city dumpsite.



Figure 4-5: Shows intermediate waste handling areas at Ashmoon district.

Liquid Waste:

The project location within Ashmoon district is well covered by public sanitation network which take all the municipal sewage to be treated in Ashmoon sewage treatment plant.

People in the streets can use available public sanitary facilities which can be located within the existing mosques, restaurants or any public coffee shops.

Hazardous Waste:

There are no hazardous wastes site within Ashmoon district, any hazardous Waste generated within Ashmoon will be Temporarily stored in isolated area (in the generated site) and will be transported- by licensed hazardous waste handling vehicles and personnel for final disposal at a licensed hazardous waste facility (Nassreya or UNICO in Alexandria).

4.1.7 Traffic Profile

The traffic in Ashmoon district is relatively of moderate density. The rush hours can be divided into two major periods. The first is between 7-10 a.m., and the second one is between 2-4 p.m.

There are many types of vehicles moving inside and outside Ashmoon district including private cars, minibuses, motorcycle and tricycle (Tuk Tuk). Main streets were defined in this study. They were Portsaid St., Al Shohada St., Alsaat St., Alsbha St. and Saad Zaglol St. The traffic is relatively of high density in Portsaid St. particularly, as of its commercial and service nature and moderate in rest of main streets. The traffic around the PRS and along the HP pipeline route is very low.

Types of roads close to PRS

Paved Road

The closest road to the PRS area is Gesr El Bahar road as shown in [Figure 4-6](#).



Figure 4-6: Shows Gesr El Bahar road

4.2 Socioeconomic Baseline

The Social Impact Assessment (SIA) study is carried out through a combination of desktop and field survey in order to fully describe the social baseline of the Project area. The main methodology for the SIA is semi-quantitative assessment to convey accurate and relevant information for the project area. There has been substantial data gathering on socioeconomic conditions in the area. A number of site visits to the project area were conducted during July 2018, August and November 2019. SIA tools were employed during the field trips including observation and interviews with local officials, community leaders, local administrative units, LPG warehouse, local health units, and NGOs.

4.2.1 Administrative affiliation

According to LGU of Ashmoon, there are only one city (Ashmoon city) and (54) villages falling under the jurisdiction of Ashmoon Markaz. Ashmoon Markaz located in Monofeya governorate. The total area of Ashmoon district is 298 km² and the total population is estimated at 845486 people in 2017. Talia (where the PRS will be constructed) is a small village within Ashmoon Markaz.

4.2.2 Urbanization Trends

According to the frequent site visits to Ashmoon Markaz and the field observations, Ashmoon is classified as urban area (Ashmoon city) and rural areas (54 villages). Almost all of the samples surveyed live in urban houses (apartments). The conditions and characteristics of urban houses are in compliance with the bases and preconditions for connecting NG. The majority of buildings at Ashmoon ranged between 4 to 6 stories high, some high buildings at Ashmoon (more than 10 stories high have been noticed by the research team). At the PRS location (Talia village), the majority of buildings is ranged between 2-3 stories high only but they are convenient for NG installations. With regard to the legal status of buildings; all buildings and neighborhoods are

mostly legal as reported by the LGU. However, the research team has documented some illegal or unplanned neighborhoods at the project area, especially for the high building.



Figure 4-7: Pictures showing Building Condition at Ashmoon.

Regarding the condition of the streets at Ashmoon District, the average width of main streets range between (2 to 3) lanes wide, and side streets range between (1 to 2) lanes wide. Despite the modest conditions and maintenance of the asphalt, they are mostly paved out and convenient for NG installations. According to the (LGU), the Governorate is giving high priority on infrastructure upgrade, which included roads and streets, sanitary and sewage systems, and restoring main squares.



Figure 4-8: Pictures showing Streets Conditions at Ashmoon.

4.2.3 Demographic Characteristics

According to the published data by CAPMAS, the total number of populations at Ashmoon Markaz is 845.5 thousand people representing about 20% of the total population of Monofeya Governorate.

Ashmoon Markaz accommodates 201.2 thousand households. The average households' size is 4.2 persons, which is nearly the same at the governorate level. Nearly 13% of the total population of Ashmoon, live in urban area (Ashmoon city), while 87% live in rural areas. The birth rate in Monofeya Governorate is 31.6 births per 1000 persons. The adult mortality rate is 6.2 per 1000 people. That gives a natural growth rate of 25.4 per 1000 persons in Monofeya Governorate. The total population of Talia village is only 37 thousand people representing about 4% of the total population lives in Ashmoon Markaz.

Table 4-1 Population, Households and Households' size of the project areas⁶

	Male	Female	Total	Households	households' size
Monofeya Governorate	2219798	2081803	4301601	1046632	4.1
Ashmoon Markaz	440354	405132	845486	201216	4.2
Talia Village	19921	17096	37017	8739	4.2

4.2.4 Access to basic services

Access to basic services, water supply, sanitation and electricity is one of the main pillars that determine the economic well-being of the community. According to the frequent site visits to the project district, statistics data collected and the focus group discussions, the project district have access to basic services. Nearly 100% of individuals using electricity, 95-100% of individuals having public water network, while the percentage of individuals having public sanitation network is about 83%. Thus, the new PRS will be supplied with the basic services.

4.2.5 Human development profile

Educational and work status, poverty index, income and expenditure should be highlighted in order to determine the current socioeconomic conditions of the project district at Monofeya Governorate

4.2.5.1 Education:

The education level is very important to choose the suitable channels for information sharing and negotiation with the PAPs. The review of secondary data showed that the intermediate education is prevalent among all project districts ranged between 20 – 35%, while the illiteracy rate tends to be high in Ashmoon Markaz (28.3%) and (51%) at Talia village. There is a significant gap between males and females, as females' illiteracy rate is higher than males in project areas. The highest percentage for female's illiteracy rate recorded is (57%) at Talia village. This can be attributed to the reluctance of rural residents to educate females, especially, those above 30 years old.

⁶ Source: CAPMAS 2017

Table 4-2: Project Areas Education and Illiteracy Rate⁷

	University Education %	Intermediate Education %	Illiteracy rate %	Illiteracy rate among females %
Monofeya Governorate	12.3%	35%	22.5	27.6
Ashmoon Markaz	9%	29%	28.3	35.2%
Talia Village	5%	20%	51	57

4.2.5.2 Health Facilities

Ashmoon district has two public and central hospital, twelve private hospitals and one medical units for family and childcare. Many participants of the focus group discussions and a number of Government officials reported that the level of medical services, in Monofeya Governorate, is poor in terms of quality and the availability of medication. Providing health facilities is important to safe workers during accident and emergency cases. All contractors are obliged (according to the signed agreements with LDC) to provide the necessary medical services to the workers. In addition, Egypt Gas in the emergency cases provides the worker with all the required medical services.

4.2.5.3 Poverty index

According to Poverty Mapping developed by CAPMAS in 2013, the percentage of poor people in Ashmoon district is (18%) and the majority of households in the project districts are not below the poverty line. Based on the frequent site visits and the focus group discussions, the majority of households in the project districts expressed their willingness to be connected to the NG and that they can afford to pay NG installation costs in installments.

4.2.5.4 Income and expenditure

According to the frequent field visits to Ashmoon district, and data collected, the average monthly income for each household is estimated to be about 3700 EGP. This indicates that the households can afford to pay NG installation costs. However, the samples surveyed provide information that their monthly expenditure is almost equivalent to their income and they prefer to pay NG installation costs in installments.

4.2.5.5 Human activities in the project districts

According to the data collected from the (LGU), agriculture is the main economic activities at Ashmoon. The total areas of the cultivated lands are 61792 acres. Monofeya Governorate is famous

⁷ Source: CAPMAS, 2017

for growing cotton, maize, wheat and vegetable. In addition, it is involved in exporting major part of the vegetable production such as potatoes and green beans. Ashmoon has also some industry activities such as spinning and textile. Furthermore, it is famous for the silk carpet industry in Sakyet Abu Sha'ra village for export purposes, and the sea shell crafts in Sakyet El Monkedy. So, increasing the capacity of the NG grid to Monofeya Governorate will help so much for achieving the social and economic development plans, hence the standard of living for people there.

4.2.5.6 **Unemployment and work status**

With regards to the frequent site visits and the focus group discussions, the majority of population resides in Ashmoon are working as farmers, in addition to some other activities such as drivers, workers and traders...etc. According to the data obtained from LGU, the unemployment rate at Ashmoon is 9%. The percentage of unemployment among females to the total unemployment is nearly 32.3%.

Table 4-1 Unemployment Rate at Ashmoon district⁸

District	Unemployment Rate	Unemployment Rate between Females
Ashmoon	9%	32.3%

Also, the formal Statistics obtained from the CAPMAS Poverty Mapping Data 2013, regarding manpower reflected that the age of starting work is 15 years old. Both the Child Law and the Labor Law state that children shall not be employed before they complete 14 years old, nor shall they be provided with training before they reach 12 years old; however, children between 12 and 14 years old are permitted to work as trainees. Furthermore, the governor concerned in each governorate, in agreement with the Minister of Education may permit the employment of minors aged 12-14 years in seasonal work which is not harmful to their health and growth, and which does not conflict with regular school attendance. Consequently, there is always a high probability to detect child labor in most of the projects implemented in Egypt. In the project districts where agriculture work and sales activities are in place, there is a big number of underage laborers were noticed. As a conclusion, there is a risk that the contractors might employ young people below 18 years old. **Therefore, rigid restrictions to employ this category must be added to the contractor obligations.**

⁸ Source: Data collected from LGU

4.2.6 Perception towards the project

Throughout the various consultation and focus group discussions, the team experienced and recorded remarkable and overwhelming public acceptance, even eagerness, by the community towards the proposed project. The burdens and financial hardships experienced by the community people (especially women) in obtaining LPG cylinders (the current household fuel) created an actual need to install NG.

It is obvious that the majority of the samples surveyed in the project district have positive perceptions about NG connections project. They reported that NG has many benefits:

- NG will save community people effort and money
- It is reliable, safe, and available
- It will put limitation to the quarrels and fights occurring from obtaining an LPG
- It also will put limitation to the crisis of the LPG shortage
- It will save electricity that is used in electricity heater and reduce the cost of electricity bill

4.2.7 Gender dimension of the current type of fuel

Females are the main player when it comes to play a major role in the domestic labor relating handling LPG. According to the interviews and the focus group discussions, women are responsible for carrying the LPG cylinders from the outlets and installing them to their stoves or water heaters, which adds more pressure on women in terms of time, effort and money.

4.2.8 Physical cultural resources

The proposed PRS will be located within Ezbet Sidi Ibrahim in Talia village, Ashmoon district, Monofeya Governorate, which characterized as agricultural land. These areas have been excavated before for agricultural purpose or installing other public utilities such as water, sanitary, sewage and electricity networks. For this reason, it is presumably less likely to chance find any artifacts or antiquities in the construction areas. Additionally, there are no identified archeological sites or sites with cultural or historical value, located within the project area, shall be affected by the PRS construction works, , however in case of any unanticipated archeological discoveries within the project areas; [Annex-6](#), entitled 'Chance Find Procedure,' details the set of measures and procedures to be followed in such cases.

5. Environmental and Social Impacts

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 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 presented in [Annex-7](#), attached to this report

5.1 Impact Assessment Methodology

To determine and assess the impacts of the project phases on environmental and social receptors, a semi-quantitative approach based on Leopold was first adopted. 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 and addressed if both magnitude and importance are of minor severity. The impact assessment methodology adopted for this ESIA is a “cause-effect” matrix modified from Leopold; and Buroz’s Relevant Integrated Criteria to evaluate the impacts. The environmental impact assessment methodology encompasses a semi-quantitative assessment that considers the following:

- Probability of the impacts
- Spatial and temporal scale
- Intensity of the impacts (which also considers the sensitivity of receptors, and the reversibility nature of the impact)

Each impact was identified considering:

- Type of impact: The negative or positive influence on the receptor.
- Magnitude: The extent of the impact within a scale (0-10)
- Significance: That includes the probability of occurrence, frequency, intensity of the impact, etc., within a scale (0-10)

The “cause-effect” matrix identifies the impacts during the mentioned phases, considering the elements of the environment and social context (receptor of the impact).

Table 5-1 Impact Assessment Methodology

Importance of Impact	Impact Rating	Color Code
0-25	None or irrelevant (no impact);	
26-50	Minor severity (minimal impact; restricted to the work site and immediate surroundings);	Yellow
51-75	Medium severity (larger scale impacts: local or regional; appropriate mitigation measures readily available);	Orange
76-300	Major severity (Severe/long-term local/regional/global impacts; for negative impacts mitigation significant).	Red

Detailed impact assessments results presented in two tables in Annex-7.

5.2 Impacts during Construction

5.2.1 Positive impacts

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 Ashmoon PRS and its HP pipeline expected to result in the creation of job opportunities, both directly and indirectly. Based on similar projects implemented recently by EGAS and Egypt Gas, the daily average number of workers during the peak time will be about 16 workers, being 14 Laborers and 2 supervisors. The workers can also include drivers, digging staff, technicians and welders. About half of them can be recruited from the local community.

- **Indirect benefits**

As part of the construction stage, many indirect benefits 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 accommodation, food supply, transport, trade, security, manufacturing... etc. For example, the transportation of workers from different villages to Talia (the PRS location) will work for the benefit of car lease offices.

5.2.2 Negative Impacts

The process of environmental impact assessment during construction phase indicate that some receptors have irrelevant impacts for the proposed project; those receptors include surface water, Ecological (fauna or flora), vulnerable structures and cultural vulnerable sites. The receptors which might be affected during the construction phase will be as follows:

5.2.2.1 Deterioration of soil quality

The excavation activities will result in the disturbance of soil characteristics and cause soil erosion and soil compaction as a result of heavy equipment take place. In addition, potential soil contamination may occur as a result of oil spills and leaks.

The PRS is located in a relatively small agriculture area (2500 m²) and its related HP pipeline will cross a narrow road for a distance of 4-5 meter then will pass through agriculture lands (private and state-owned lands) in a relatively short distance (236 m).

The duration of the impact is expected to be short-term, with its spatial extent being limited to the boundaries of the Project site.

The impact on soil considered **Medium**.

5.2.2.2 Air Emissions

Construction of the PRS and the HP pipeline will include several activities such as excavation, concrete foundations, transportation of construction material and equipment, burial of cables and pipes, etc. Those activities in consequence are expected to emit air pollutants to the ambient air, however it will be conducted for short periods of time. The following air pollutants are foreseeable for most of the construction activities:

- Fugitive dust emissions (PM10, PM2.5)
- Exhaust from excavation equipment and heavy machinery (excavators, loaders, trucks) containing SO_x, NO_x, CO, VOCs, etc.

Dust emissions will slightly negatively impact ambient air quality, particularly during the initial phases of construction. The nearest residential building is located approximately 250 m north east of the PRS site and the HP pipeline route passes through an agricultural area. Therefore, it is expected that the dust impact will be moderate slightly impact the surrounding area (agriculture land). Soil characteristic at PRS site is mainly hard soil.

Emissions of CO₂, CO and PM will result from the operation of the construction machinery and road vehicles during construction of the PRS and the HP pipeline. Air pollutants emitted from construction machinery 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.

Therefore the impact is assessed as **Minor**

5.2.2.3 Noise

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 noise emissions that will have an impact on receptors.

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

- Onsite workers and neighbor farmers
- The residences

It is worth mentioning that the proposed PRS site and the HP pipeline located about 250 m from Ezbet Sidi Ibrahim village (the nearest residential area), beside Gesr El Bahar road, where the noise baseline is low and does not exceed the national and international standards. Construction activities may increase the already existing baseline ambient noise. However, increased noise emissions are anticipated to be for a short duration of time.

The main sources of noise and vibration during the PRS and HP pipeline construction are the operation of the construction equipment and machinery such as diggers, cranes, loaders; farmers in the nearby agriculture land and workers are the main receptors.

Regarding the Construction of the PRS and the installation of the high-pressure pipeline it is expected that the generated noise will mainly have an impact on workers and Neighbor farmers.

The impact of construction on workers and neighbor farmers is assessed as **Medium**

The impact of construction on the residences is assessed as **Minor**

5.2.2.4 Impact on worker health and safety

Potential health and safety impacts are expected to workers during construction of the Ashmoon PRS and its HP pipeline, in general, are the same as those associated with any construction project involving earthmoving, use of large equipment, transportation of overweight and oversized materials, working in trenches, and construction and installation of facilities.

The occupational health and safety impacts is assessed as **Medium**

5.2.2.5 Impacts due to COVID-19 pandemic

Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by the SARS-CoV-2 virus. It has spread from China to many other countries around the world. Depending on the severity of COVID-19's international impacts, outbreak conditions—including those rising to the level of a pandemic—can affect all aspects of daily life, including travel, trade, tourism, food supplies, industrial and financial markets.

During construction of the Ashmoon PRS, Movement of staff inside and outside the project borders can increase the risk of transmission of COVID-19 to the workers and Community health. Infection with COVID-19, can cause illness ranging from mild to severe and, in some cases, can be fatal. Symptoms typically include fever, cough, and shortness of breath.

Some people infected with the virus have reported experiencing other non-respiratory symptoms. Other people, referred to as asymptomatic cases, have experienced no symptoms at all. Symptoms of COVID-19 may appear in as few as 2 days or as long as 14 days after exposure.

The occupational health and safety impacts is assessed as **Medium**

5.2.2.6 Temporary Labor Influx

Generally speaking, having workers in small villages might result in unfavorable impacts on the available resources (e.g. pressure on accommodation, food, health care and medication and potable source of water). It may also result in inconvenience to the local communities, particularly in the areas where communities are conservative or not accustomed to having outsiders. Given the fact that only limited number of workers exist in each of the location during working hours, portion of those workers are local workers and that the LDCs are imposing rules and code of conduct on the contractors to ensure good behaviors and limit any potential conflict with the communities.

The impacts related to Labor Influx will be **Medium**.

5.2.2.7 Child Labor

As mentioned in the baseline, child Labor is a common practice in the project communities in the project areas. Children below 18 works almost in all 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 obligations.

Child Labor risk is assessed as **Minor -Medium**

5.2.2.8 Inappropriate waste management

Normal construction non-hazardous solid wastes include scrap concrete, steel, bricks, packaging waste, used drums, wood, scrap metal, welding belt, building rubble and HP pipeline hydrostatic test water will be generated. Domestic wastes by construction Labors, including sewage and garbage collected from the Labors onsite will be also generated. if those wastes not disposed to adequate sites, it will lead to a negative environmental impact.

Solid hazardous waste generated is likely to include empty containers, spent welding materials, solvents, paints or adhesives, and other hazardous waste 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.

Adverse impacts on the environment from the possible improper disposal of the solid wastes and hazardous waste.

Therefore, impact is assessed **Medium**

5.2.2.9 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 the 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 exiting the site will not have significant impacts on the road (Gesr El Bahar road) which has a very low traffic.

Based on observation during the site visits, it is predicted that during transportation of the equipment and raw materials, only one lane will be used by the trolleys and the movement of one trip will not last more than 8 hours (during the midnight – morning).

Therefore, impact on traffic in the project site is assessed **Minor**

5.2.2.10 Impact on ground water

Ground water may be impacted in case of improper disposal of sanitary wastewater, construction wastes or debris (generated from activities like ditching, and excavation). Generated sanitary wastewater, as well as water resulting from the HP pipeline hydrostatic test (if not meet with the limits to be discharged into a drain or sewer manhole) or dewatering activities (if existing) during excavation, will be collected in tanks, analyzed and transported via a certified contractor to the nearest wastewater treatment station.

Therefore, the impact is assessed **Minor**

5.2.2.11 Community health and safety

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

Taking into consideration that both the PRS and the offtake planned to be located about 250-m, 300 meters respectively from the nearest residential area (Ezbet Sidi Ibrahim village) and no residential building was noticed on the HP pipeline route which is planned to penetrate agricultural lands in the project area, we will find that the above-mentioned impacts will be greatly minimized.

Therefore, the impact is assessed **Minor**

5.2.2.12 Land Related Impact

The PRS construction will require a plot of land of 2500 m². The land was obtained according to the allocation decree issued by The General Authority for Development & Agriculture projects dated 15-12-2016 to EGAS. An off-take point and valves room will be constructed on GASCO high pressure pipeline (HP) “25-70 Bar system” which will require a small piece of land (100 m²), this land was obtained according to the Willing Buyer Willing Seller approach. Based on investigations for

the land obtaining process, the following results were comprehended:

- More than three landowners were negotiated with, regarding selling their lands to EGAS.
- One of the negotiated persons expressed his reluctance to sell his land to EGAS. Therefore, EGAS searched for another alternative land.
- One of the selected plots was not technically suitable for the project. Therefore, EGAS searched for more technically accepted plots of lands.
- One of the lands selected was owned by more than one owner and there were critical constrains related to the official contract of the land.
- One plot of land was technically accepted and, might result less damage during the installation of the high-pressure pipeline.
- The land plot was owned by one landowner and there were no tenants nor encroachments on the selected land plot
- Consultation with other neighboring land owners to determine the prevailing price (market price) of the land in the target area. Prevailing price ranged from 90 to 100 thousand EGP/Qirate.
- Negotiations with the landowner have taken place and the land was purchased on 27/6/2019 at a total cost of 150,000. EGP (approximately 262,500 EGP/ Qirate) and a cheque was issued and received by the land owner.

A new high-pressure pipeline with an approximate of 241 m length will be installed to connect NG from the off-take point to the new PRS location, it will pass through a dusty road which is a state-owned land for about 5 m, then it will penetrate agriculture lands for about 236 m (temporary use). The lands are occupied by three farmers (one owner and two tenants) and cultivated by seasonal crops. Accordingly, an ARAP for the said HP pipeline will be prepared and compensations paid for the affected farmers following the WB requirements and the National legislations. ARAP will be prepared as a separate document for review and clearance of the Bank

Therefore, the impact is assessed **Medium**

5.3 Impacts during Operation

5.3.1 Positive impacts

5.3.1.1 Impacts related to employment

The project may result in the creation of job opportunities during the operation phase.

Provide direct job opportunities to skilled and semi-skilled laborers

The operation of Ashmoon PRS and HP pipeline expected to result in the creation of job opportunities, the average number of workers during operation of the Ashmoon PRS will be about 12 workers in two shifts (6 workers/ shift) from the permanent workers of the LDC; 4 technicians, 2 engineers and 6 security staff. In addition to that, 4 police staff will be security permanently to guard the PRS. With regards to health and safety, one person will be assigned from the staff of Egypt Gas.

5.3.2 Negative impacts

Various impacts assessed in accordance to the impact assessment methodology. The project relevant impacts will be as follows:

5.3.2.1 Impact on worker health and safety

Possible impacts to health and safety during operations include exposures to odorant release, gas leak, fire, noise, accidental injury to workers. In addition; health and safety issues, working around energized equipment, and possible contact with natural hazards. However, during the operation and maintenance phase, if there is any incident or emergency situation after applying all the control measures and safety precautions in the EGAS HSE guidelines ([Annex-3](#)), the impact will negatively endanger the surrounding community and establishment.

Odorant handling is part of the operation of the PRS. An odorant is added to the NG in order to enable detection upon leakage. The odorant containing Tertiobutylmercaptin (80%) and Methylthylsulphide (20%) is classified as a hazardous substance.

Odorant leak can result from improper handling of the odorant includes: Storage in unsafe conditions, in terms of occupational health and safety. In case of emergency, the risk resulting from odorant release or gas leak will be managed by Ashmoon PRS's emergency response plan.

Therefore the impact is assessed as **Medium**

5.3.2.2 Impacts due to COVID-19 pandemic

During the operation of the Ashmoon PRS, Movement of staff inside and outside the project borders may increase the risk of transmission of COVID-19 to the workers and Community health. Given the fact that the average number of workers during operation of the Ashmoon PRS will be about 6 workers/ shift from the permanent workers (well trained) of the LDC and maintain social distancing.

The Infection with COVID-19 between workers or from workers to the community is relatively minor but still more precaution can be applied.

The occupational health and safety impacts is assessed as **Minor**

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 temporarily, 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.

Therefore the impact is assessed as **Medium**

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 80 db. The generated noise is constant (not intermittent). Assuming ambient noise levels are complying with WBG requirements and Law 4/1994-9/2009-105/2015 standards for low noise residential areas, a 20-meter buffer distance kept between the reducers and the PRS fences should lead to minimal impact outside the PRS borders. Additionally, the PRS is located beside Gesr El Bahar road where the noise baseline is low and does not exceed the national and international standards.

Therefore, the impact is assessed as **Minor**

5.4 Impacts 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 Ashmoon 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 Limit⁹⁾ region. So there are some points (Study Recommendations) need to be considered to keep the risk tolerability, and this will be describe under item (7.4) (for more details refer to the QRA Study under [Annex-4](#))

⁹ 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.

Table 5-2 Impact Assessment

 Detailed impact assessments results are presented in two tables in [Annex-7](#).

Impact	Description	Type	Significance
During Construction			
Deterioration of soil quality	PRS and HP pipeline construction will lead to 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	Medium
Air emissions	WBG requirements and Law 4/1994 (modified by laws 9/2009 & 105/2015) stipulates strict air quality standards. Air emissions (gases and particulates) during construction (from transportation and machine operation) shall arise from: <ul style="list-style-type: none"> - Particulate matter and suspended solids from excavation/backfilling operations - Possible dispersion from stockpiles of waste or sand used for filling excavations. - Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SO_x, NO_x, CO, VOCs, etc. - Traffic congestions resulting from road closure or slowing down of traffic due to excavation works. <u>Dust</u> The impact of dust generation (particulate matter) will be limited to the working hours as excavation and other construction activities. Which lead to temporary reduction of air quality, however is unlikely to cause major air emissions impacts as the nearest receptors are around 250 m from the PRS construction site and no residential buildings noticed on the HP pipeline route.	Negative	Minor
	<u>Gaseous pollutants emissions</u> 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 WBG permissible levels.	Negative	Minor
	<u>Noise impact on worker</u> Noise impacts on construction workers, technicians and engineers in direct vicinity of the excavation works and heavy machinery are considered more significant than those on residents.	Negative	Medium
Noise	<u>Noise impact on nearby farmers</u> Noise impacts on farmers in nearby agriculture land will be affected by the increased noise levels during the construction phase.	Negative	Medium
	No major noise impacts on the nearest receptors expected during construction of the PRS and HP pipeline as they are about 250 m away and the construction period is limited.	Negative	Minor

Impact	Description	Type	Significance
Risks on Occupational health and safety	Inhalation of air pollutants, high noise levels, injuries and potential death as a result of operating heavy equipment, and handling hazardous materials.	Negative	Medium
Impacts due to Covid-19 pandemic	During construction of the Ashmoon PRS, Movement of staff inside and outside the project borders can increase the risk of transmission of COVID-19 to the workers and Community health.	Negative	Medium
Impacts related to Labor Influx	If not properly managed, there is a risk that labor inappropriate behaviors or misconduct might pose negative impacts on the community groups, particularly on women, children and other vulnerable groups (including inconvenience and impacts on the work site).	Negative	Medium
Child Labor	As mentioned in the baseline, child Labor is a common practice in the project communities in the project areas. Children below 18 works 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 obligations	Negative	Minor - Medium
Waste generation	Inappropriate waste disposal and improper management of construction waste materials which could lead to spillages that will cause soil contamination. Excavated soil and concrete/bricks waste are inert materials. Improper disposal of such wastes will only have aesthetic effects on the disposal site. The legal standards of 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. 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.	Negative	Medium
Reduction of Traffic Flow	The traffic flow that will be created during the 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 exiting the site will not have significant impacts on the road (Gesr El Bahar road) which has a very low traffic.	Negative	Minor
Ground water pollution	Ground water that might exist in area may be affected by inappropriate liquid and hazardous waste during construction.	Negative	Minor

Impact	Description	Type	Significance
Risk on Community health and safety	Negligent workers may cause accidents harmful to the community members, particularly children and old people, especially close to the digging site. Impacts associated with Community Health and Safety are limited to the inside the fence of the PRS and no residential buildings was noticed on the HP pipeline route. Therefore, there are minor impacts related to community health and safety during construction.	Negative	Minor
Impacts related to lands	<ul style="list-style-type: none"> - The PRS: 2500 m², obtained by the allocation decree issued by The General Authority for Development & Agriculture projects to EGAS. - Off-take: 100 m², obtained by willing Buyer Willing Seller approach. - HP pipeline: 241 m length, pass through agriculture lands (compensation will be applied). An abbreviated Resettlement Action Plan (ARAP) will be prepared at a separate document according to WBG and Egyptian laws requirements. 	Negative	Medium
Operation			
Risks on Occupational health and safety	<p>At PRS site, 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 equipment and handling hazardous materials.</p> <p>In case of emergency / accidents, resultant risks are studied in details in the attached Quantitative Risk Assessment, that show that the required mitigation measures are already in place and no further measures are needed.</p> <p>In cases, where further mitigation measures are required, action plans are set for implementation and follow up by the concerned departments</p>	Negative	Medium
Impacts due to Covid-19 pandemic	<p>During the operation of the Ashmoon PRS, Movement of staff inside and outside the project borders may increase the risk of transmission of COVID-19 to the workers and Community health.</p> <p>Given the fact that the average number of workers during operation of the Ashmoon PRS will be about 6 workers/ shift from the permanent workers (well trained) of the LDC and maintain social distancing.</p>	Negative	Minor

Impact	Description	Type	Significance
Hazardous material and waste	<p><u>Hazardous material</u> Odorant handling will be according to Odorant Material Safety Data Sheet (MSDS) and Egypt Gas procedures. Odorant leak can result from improper handling of the odorant and storage in unsafe conditions, in terms of occupational health and safety. According to Ashmoon QRA study, modeling the vapor release will be limited inside the PRS boundary, and Egypt Gas Ashmoon PRS ERP will cover this point.</p> <p><u>Hazardous waste</u> During operation and maintenance of the PRS, industrial hazardous wastes will be generated (e.g., lubricating oils, odorant containers, chemical containers). Poor waste management practices may have a significant impact on environment (soil, ground water, visual, and health and safety).</p>	Negative	Medium
Noise	The pressure reducers normally cause noise. Maximum noise level expected from the reducers is 80 db. The generated noise is constant (not intermittent).	Negative	Minor

6. Analysis of Alternatives

6.1 No Project Alternative

The main target of the proposed project is to supply natural gas to households in Ashmoon District and other surrounding areas in the future. This Natural Gas Connections to Households Project 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-Project alternative is not favored as it simply deprives the Egyptian Public and Government of the social, economic, and environmental advantages.

6.2 Technology Alternatives

6.2.1 Outlet Pressure

The Pressure Reducing Station (PRS) will reduce the Natural Gas pressure from 25-70 Bar in the HP pipeline to 7 bar to be suitable for distribution or use in domestic or industrial applications.

Ashmoon PRS will produce 7 bar outlet pressure for the local distribution network (intermediate pressure). The LDC choose to produce 7 bars instead of 4 bars due to high consumption rate expected in Ashmoon city. It is designed to accommodate future extensions in order to feed other cities and/or villages surrounding Ashmoon district.

6.2.2 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 odorant 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.

6.3 Location Alternative

As mentioned in item 2.4.2 and item 5.2.2.11 (land related impacts), the main criteria for 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
- The PRS construction will require a plot of land of 2500 m². The land was obtained according to the allocation decree, issued by The General Authority for Development & Agriculture projects dated 15-12-2016 to EGAS.

Additionally, a permanent land acquisition of 100 m² was obtained in accordance to the Willing Buyer Willing Seller basis to construct the off-take point on GASCO high-pressure pipeline and valves room ([Annex-10](#)). Where more than three lands alternatives were inspected, consultation with neighboring land owners to determine the prevailing price, and negotiations with landowners have taken place to select the more technically accepted plot of land. Moreover, a new HP pipeline “25-70 bar system” with a length of 241 meter will be installed and cross a narrow road (a state-owned land) for a distance of 4-5 meter then it will pass through agriculture lands (temporary land use). Those land plots are private and state-owned lands, occupied by three farmers for a distance of 236-meters length and 10-meters width leading to the new PRS location. Accordingly, an ARAP will be prepared and compensations will be paid for the affected farmers following the WB requirements and the National legislations. ARAP will be prepared as a separate document for review and clearance of the Bank.

7. Environmental and Social Management & Monitoring Plan

7.1 ESMMP Objectives

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 in the previous chapter. The ESMMP distinguishes between mitigation measures and monitoring that should be implemented during the construction and operation of the project.

The ESMMP identifies certain roles and responsibilities for different stakeholders for implementing, supervising and monitoring the environmental and social performance of the project as well as some of their estimate costs during its life cycle. 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. During the operation phase, the PRS shall have at least one permanent staff member for health, environment and safety.

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 LDCs. [Annex-3](#) attached to this report

In the following Management and monitoring measures, the term Local Distribution Company (LDC) refers to the gas company in charge of project implementation: **Egypt Gas.**

7.2 Environmental and Social Management Measures

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	Impact on soil	<ul style="list-style-type: none"> - Decrease erosion by minimizing disturbances and scarification of the surface - Best practices for soil management should be followed - Good housekeeping to minimize spills/leaks - Proper handling and management of wastes 	Minor	Contractor	LDC –HSE department	Field supervision (audits)	<ul style="list-style-type: none"> - Contractor costs - LDC management costs
	Air emission	<ul style="list-style-type: none"> - Monitoring of wind speed and direction to manage dust-generating activities during undesirable conditions. - Management of number of vehicles and equipment in the site. - Appropriate maintenance, engine tuning and servicing of construction equipment to minimize exhaust emissions - Minimize unnecessary journeys or equipment use - Adopt a policy of switching off machinery and equipment when not in use (idle mode). - Minimizing drop heights for material transfer activities such as unloading of friable materials. - Transportation of construction waste by a licensed contractor. - Sheeting of Lorries transporting friable construction materials. - Appropriate sitting and covering of stockpiles of friable materials with adequate cover in addition to regular water spraying so as to minimize dust blow. 	Negligible	Contractor	LDC –HSE department	Contractual clauses + Field supervision (audits)	<ul style="list-style-type: none"> - Contractor costs - LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Noise	<p>Worker and nearby farmers</p> <ul style="list-style-type: none"> - Application of the normal precautions normally taken by construction workers. <p>Residence</p> <ul style="list-style-type: none"> - Notification to the surrounding establishment prior to the construction phase. - Time management and construction schedule according to the WBG regulation provided by the contractor prior to the construction phase 	Minor - Negligible	<ul style="list-style-type: none"> - LDC - Excavation Contractor 	LDC-HSE department	Contractual clauses + Field supervision (audits) Field supervision Complaints receipt from local administration	<ul style="list-style-type: none"> - Contractor costs - LDC management costs
Physical receptor	waste generation	<ul style="list-style-type: none"> - Temporary storage in areas with impervious floor - Safe handling using PPE and safety precautions - Empty cans of oil-based paint resulting from painting the steel connection pipes of the PRS project are to be collected and sent back to nearest LDC depots (Abo Rawash) for temporary storage until disposal at a hazardous waste facility (Nassreya or UNICO in Alexandria). - 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. - Hand-over selected oils and lubricants and their containers to Petrotrade Co. for recycling <p>Table 7-2 present more details about waste management</p>	Minor	<ul style="list-style-type: none"> - LDC - Excavation Contractor 	LDC HSE department	Field supervision and review of certified waste handling, transportation, and disposal chain of custody	<ul style="list-style-type: none"> - Indicative cost items included in contractor bid: - Chemical analysis of hazardous waste - Trucks from licensed handler - Pre-treatment (if needed) - Disposal cost at Nassreya - Approximate cost of the above (to be revised upon project execution): 8000 EGP -10000 EGP per ton

Social receptor (health and safety)	Impacts on occupational health and safety	<ul style="list-style-type: none"> - The project management unit will ensure that HS action plans and procedures are integral part of the contractors' contracts, workers are fit to their assigned jobs, appropriately trained on following HS measures, continuous supervision for high risk jobs,...etc. Failure to comply with HS measures from contractors will result in penalties against the contractor, stopping work at the contractor cost and would reach termination of contract in case of repeated severe violations. Special measures to respond to prevent spread of COVID-19 are considered mandatory to all contractors, workers and visitors on site. These measures are currently added as addendum to contractors' contracts - Standard protection by placing clear project signs. - Time management for vehicles movement; especially avoiding the peak hours - Standard protection for the workers especially working at elevated heights or trench. - Regular inspection to compelling worker to used their PPE - Training and licensing industrial vehicle operators of specialized vehicles. - The contractor also should keep attendance worksheet and Laborers ID in order to verify the age of workers - Health insurance should be applicable to the contractor workers and workers contracted by a sub-contractor - Full compliance to EGAS and LDC HSE requirements, manuals, and actions as per detailed manuals adopted by EGAS - The safety work Permits in general will be issued before each activity on site by the LDC safety team according to the EGAS HSE guidelines (Annex-3) - Ensure the provision of the appropriate personal protective Equipment and other equipment needed to ensure compliance to HSE manuals 	Minor	<ul style="list-style-type: none"> - LDC - Excavation Contractor 	LDC HSE Department	Field supervision and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> - Contractor costs - LDC management costs

Impacts due to COVID-19 pandemic	<p>Assessing Workforce Characteristics</p> <ul style="list-style-type: none"> - minimize contact and keep a distance not less than 1 meter with community people <p>Entry/Exit to the Work Site and Checks on Commencement of Work</p> <ul style="list-style-type: none"> - Confirm that workers are fit for work - Check and record temperatures of workers - Update daily personnel count log(in/out) in each area/ working site - Provide briefings to workers prior to commencing work, focusing on COVID-19 specific considerations, and reminding workers to self-monitor for possible symptoms and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell - Prevent a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or isolating such worker for 14 days. - Prevent sick workers from entering the site, referring them to local health <p>General Hygiene</p> <ul style="list-style-type: none"> - Train workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular hand washing and social distancing) and what to do if they or other people have symptoms - Place informative, illustrative posters and signs around the site, - Ensure hand washing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout the site, if such facilities aren't available then Alcohol based sanitizers should be supplied <p>Cleaning and Waste Disposal</p> <ul style="list-style-type: none"> - Provide adequate cleaning equipment, materials, and appropriate PPE (face masks, gloves,...) as necessary - Train on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas 	Minor	- LDC	- LDC Patrolling committee s - EGAS HSE departme nt	- Field supervision and review of HSE report+ Field supervision (audits)	- Contractor costs - LDC management costs

- Train on proper hygiene, how to use PPE and waste control
- Adjusting Work Practices**
- Adapting work processes to enable social distancing and training workers on these processes
 - Continuing with usual safety trainings include use of PPE, adding COVID-19 specific considerations
 - Review overall work schedule and assess whether adjustments are needed, considering Government advice and instructions
- Project Medical Services**
- Local Medical and Other Services**
- Any suspected case should leave site immediately and referred to the nearest hospital / local medical facility for medical examination
 - any suspected cases should self-quarantine for 14 days
- Instances or Spread of the Virus**
- If a worker has symptoms of COVID-19, the worker should be removed immediately from work activities
 - The worker should be referred to the local health facilities to be tested.
 - Implement sanitization practices in affected sites
 - Inform fellow workers of possible exposure to the virus if a worker is confirmed to have Covid-19 infection but maintain confidentiality
- Training and Communication with Workers**
- Workers are made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing them
 - Training are conducted regularly, providing workers with a clear understanding of how they are expected to behave and carry out their work duties
 - **in addition to EMOP and WBG Guidelines related to COVID-19 infection (Annex-8).**

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Child Labor	<ul style="list-style-type: none"> - The project will hire a qualified contractor/sub-contractor with the high 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. - Rigid obligations and penalties will be added to the contractor ToR in order to warrantee no child Labor is occurred in the project - The ToR also will oblige the contractor to keep a copy of IDs of Laborers in order to monitor the hired staff below 18 years old The contractor also will be obliged to maintain daily attendance sheets in order to verify the attendance of workers to ensure first, that workers below 18 years old are not included on site, second, in case of accidents the injured persons will be provided with proper health insurance.	Minor - Negligible	<ul style="list-style-type: none"> - LDC - Excavation Contractor/s subcontractor 	<ul style="list-style-type: none"> - LDC HSE department 	<ul style="list-style-type: none"> - Field supervision and review of HSE report+ Field supervision (audits) 	<ul style="list-style-type: none"> - Contractor costs - LDC management costs

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"> - Preparation of appropriate code of conduct that stipulates the different commitment of labor towards community groups and the different behavior that should be avoided (please see Annex-9 of this report). - All workers should be trained on the Code of Conduct. - All workers should sign their attendance of the code of conduct training. - Code of conduct to be signed by sub-contractor. - Code of conduct induction to be done every 2 weeks for the recurrent workers and the new comers before starting work. - ESMP will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during operation, in addition to EMOP and WBG Guidelines related to COVID-19 infection (Annex-8). - According to availability, try to rent all apartments in the same building. - Apply the full requirements related to operating the grievance mechanism including anonymous channels - Raising awareness of the local populations about the project commitment towards communities' and the measures taken for that through public consultation and focus group discussions - Apply Penalties to workers violating the code of conduct. 	Minor	Contractors and subcontractors	LDC HSE for guidance supervision	-Field supervision by LDC and EGAS. Received grievances	_ Contractor costs _ LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Community	Traffic	<ul style="list-style-type: none"> - Time management for transporting the materials, equipment, debris, etc. - Clear sign surrounding construction site and the exit gate. - Coordination with traffic department (ministry of interior) for vehicles route and movement. - Vehicle speed restrictions should be applied across the project site - Flag man will be considered whenever needed - Safety precautions taken during night driving will be according to EGAS HSE guidelines (Annex-3) 	Negligible	Contractors	LDC + Traffic department	Contractor has valid conditional permit + Field supervision	<ul style="list-style-type: none"> - Contractor costs - LDC management costs
	Land related impact	<ul style="list-style-type: none"> - The installation of the new high-pressure pipeline (an approximate of 241 m length, will require a temporary land acquisition. It will pass through agriculture lands. - An abbreviated Resettlement Action Plan (ARAP) will be prepared at a separate document according to WBG requirement. - PAPs will be consulted and a fair compensation will be applied and paid before any construction work - Enable grievance mechanism and disclose it to community 	Minor	LDC HSE department	EGAS SDO	Field Supervision	<ul style="list-style-type: none"> - LDC - EGAS management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Concerns of Community	- The detailed grievance mechanism (GRM) is presented in Annex-11 attached to this report is to be shared with the community beneficiaries. Posters will be prepared and made available to the beneficiaries in the contracting office ¹⁰ . Additionally, they will be availed in the customer services office. Thus, sufficient and appropriate information about the GRM will be disseminated to the communities prior to the construction phase. Information dissemination about the GRM should be shared with the beneficiaries during the process of contracting and disclosed in the contracting office and other publicly accessible venues.	Negligible	Contractors	- LDC – HSE department	Contractual clauses + Field supervision	- Contractor costs - LDC management costs

¹⁰ Falls under the budget of the LDCs

Table 7-2: Waste management During Construction Phase

Waste Type	Hazardous/ Non-Hazardous	Treatment and Disposal
Cement and Concrete Wastes (Including Cement Contaminated Soil)	Non-Hazardous	- Will be sent to the main Kafr Dawood in Sadat city dumpsite
Domestic Waste (food waste, packing,)		
Wood – Scrap	Non-Hazardous	- Temporarily stored in isolated area on-site, then transported to Abu Rawash storage site (Egypt Gas facility) to be sold as scrap.
Tires		
Cardboards		
Containers		
Paints containers	Hazardous	- Temporarily stored in isolated area on-site, then transported to Abu Rawash storage site. final Disposal will be UNICO.
Batteries		
Chemicals (solvent, lubricants,...) containers	Hazardous	- Temporarily stored in isolated area of the site, the transported- by licensed hazardous waste handling vehicles and personnel- to Abu Rawash storage site (Egypt Gas facility) for final disposal at Nassreya hazardous waste facility.
Used Oils	Hazardous	- Temporarily stored in isolated area on-site, then transported to Abu Rawash storage site. Final disposal will be by Petrotrade Co.

Table 7-3: Environmental and Social Management Matrix during Operation

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Social –Health	Occupational health and safety	<ul style="list-style-type: none"> - ESMP will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during operation. - Remote actuation of isolation and slam-shut valves by LDC for PRS and pipelines - Produce Hazardous Area Classification drawings - Control room exit design. - Preventive maintenance policy and station manual - Provision of self-contained breathing apparatus (2 pieces for each station) for handling odorant leaks - Apply jet fire rated passive fire protection system to all critical safety shutdown valves ESDVs or Solenoid valves (As applicable) - Place signs in Arabic and English "Do Not Dig" and "High Pressure Pipeline Underneath" - Install an elevated wind sock and provision of portable gas detectors The design should fully comply with IGE TD/3 code requirements	Minor	<ul style="list-style-type: none"> - LDC project Department Designer 	<ul style="list-style-type: none"> - LDC project department - Engineering dep. - HSE dept. EGAS 	<ul style="list-style-type: none"> - Drawing and design Document Review - Policy and manual review - Inspection by operators Signage inspection and site visits 	<ul style="list-style-type: none"> - Project cost LDC management costs

Impacts due to COVID-19 pandemic	<p>Assessing Workforce Characteristics</p> <ul style="list-style-type: none"> - minimize contact and keep a distance not less than 1 meter with community people <p>Entry/Exit to the Work Site and Checks on Commencement of Work</p> <ul style="list-style-type: none"> - Confirm that workers are fit for work - Check and record temperatures of workers - Update daily personnel count log(in/out) in each area/ working site - Provide briefings to workers prior to commencing work, focusing on COVID-19 specific considerations, and reminding workers to self-monitor for possible symptoms and to report to their supervisor or the COVID-19 focal point if they have symptoms or are feeling unwell - Prevent a worker from an affected area or who has been in contact with an infected person from returning to the site for 14 days or isolating such worker for 14 days. - Prevent sick workers from entering the site, referring them to local health <p>General Hygiene</p> <ul style="list-style-type: none"> - Train workers and staff on site on the signs and symptoms of COVID-19, how it is spread, how to protect themselves (including regular hand washing and social distancing) and what to do if they or other people have symptoms - Place informative, illustrative posters and signs around the site, - Ensure hand washing facilities supplied with soap, disposable paper towels and closed waste bins exist at key places throughout the site, if such facilities aren't available then Alcohol based sanitizers should be supplied <p>Cleaning and Waste Disposal</p> <ul style="list-style-type: none"> - Provide adequate cleaning equipment, materials, and appropriate PPE (face masks, gloves,...) as necessary - Train on appropriate cleaning procedures and appropriate frequency in high use or high-risk areas 	Negligible	- LDC	- LDC Patrolling committees - EGAS HSE department	- Field supervision and review of HSE report+ Field supervision (audits)	- Contractor costs - LDC management costs
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- Train on proper hygiene, how to use PPE and waste control
- Adjusting Work Practices**
- Adapting work processes to enable social distancing and training workers on these processes
 - Continuing with usual safety trainings include use of PPE, adding COVID-19 specific considerations
- Project Medical Services**
- Local Medical and Other Services**
- Any suspected case should leave site immediately and referred to the nearest hospital / local medical facility for medical examination
 - any suspected cases should self-quarantine for 14 days
- Instances or Spread of the Virus**
- If a worker has symptoms of COVID-19, the worker should be removed immediately from work activities
 - The worker should be referred to the local health facilities to be tested.
 - Implement sanitization practices in affected sites
 - Inform fellow workers of possible exposure to the virus if a worker is confirmed to have Covid-19 infection but maintain confidentiality
- Training and Communication with Workers**
- Workers are made aware of the procedures that have been put in place by the project, and their own responsibilities in implementing them
 - Training are conducted regularly, providing workers with a clear understanding of how they are expected to behave and carry out their work duties
 - **in addition to EMOP and WBG Guidelines related to COVID-19 infection (Annex-8).**

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of Supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Physical receptor	waste generation	<ul style="list-style-type: none"> - Strict use of chemical-resistant suits and PPE when handling odorant barrels, tanks, or spills - Evacuation of odorant from barrels into holding tank with utmost care and full PPE - Covering possible odorant spills immediately with sand and treatment with sodium hypochlorite as per EGAS and LDC practices - On-site treatment of empty containers with sodium hypochlorite and detergent as Per EGAS and LDC practice - Ship empty containers to a certified hazardous waste facility via company depot using certified handling and transportation contractors - Ensure full and empty (treated) odorant containers are accompanied by a trained HSE specialist during transportation to and from the depot and to/from the hazardous waste disposal facility (UNICO and/or Nassreya) <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"> - Pre-Plan the anticipated amounts of odorants to be used in order to minimize leftovers and residuals. - Handle with extreme care and always perform visual checks on the integrity of the odorant container - Avoid rough handling rolling or dropping of odorant containers - Avoid exposure to direct sunlight during storage or transportation - Ensure odorant containers are always sealed properly and secured from tipping/falling/damage during transportation and storage (temporary and long-term) - Always have sufficient amounts of sand, sodium hypochlorite and detergent on standby during usage of odorant - ALWAYS handle containers or spills with care and full PPE compliance - 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 	Minor	PRS staff	LDC HSE Dpt.	Quaternary auditing	- Project cost LDC management costs

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"> - NEVER use empty odorant containers for any other purpose - In case of odorant spillage: <ul style="list-style-type: none"> - avoid inhalation and sources of ignition - immediately cover and mix with sufficient amounts of sand and sodium hypochlorite using necessary PPE and tools - collect contaminated sand in clearly marked secure containers/bags - Add sand to inventory of hazardous waste 					

7.3 Monitoring and Review

Procedures to monitor and measure the effectiveness of the management program, as well as compliance with any related legal and/or contractual obligations and regulatory requirements will be established. In addition to recording information to track performance and establishing relevant operational controls, dynamic mechanisms, such as internal inspections and audits, where relevant, to verify compliance and progress toward the desired outcomes will be utilized.

Monitoring will normally include recording information to track performance and comparing this against requirements in the management program. The monitoring results shall be documented and the necessary corrective and preventive actions in the amended management program and plans shall be identified consequently.

7.3.1 Monitoring procedures

In order to fulfil the monitoring requirements and to ensure that any non-compliances are corrected, the following tasks should be followed:

- LDC HSE staff is responsible to carry out periodic audits to follow up on ESMP implementation.
- Any observed non-compliance is recorded and corrective actions requested.
- LDC report these non-compliances and the corrective actions taken to EGAS in their monthly reports.

EGAS also conduct supervisory visits to ensure that all mitigation measures are appropriately adhered to, non-compliances are reported to the LDC and an action plan to correct the situation is requested and followed within the LDC monthly reports to EGAS.

Table 7-4: 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
Ambient air quality	Increased air emissions and dust	<ul style="list-style-type: none"> - Inspection of vehicle and machinery maintenance schedule - Inspection of the construction activities - Exhaust emissions concentrations from diesel generators 	LDC HSE	Monthly during construction + before construction and each three month for machines	Vehicles licensing Department	Measurements and reporting of exhaust emissions of construction activities machinery Complaints log	LDC management costs
	Ambient noise levels	Increased noise levels	<ul style="list-style-type: none"> - Noise intensity, exposure durations and noise impacts - Use of earmuffs by Construction workers 	LDC HSE	Regularly during site inspections	Construction site	Measurements of noise levels Complaints log
Physical receptor (soil, ground water, visual)		Waste generation	Complaints from Farmers	LDC HSE	Weekly during construction.	Construction site	Documentation in HSE monthly reports
	Observation of accumulated waste piles		LDC HSE	During construction. Monthly reports	Construction site	Observation and documentation	LDC management costs
	Observation of water accumulations resulting from dewatering (if encountered)		LDC HSE	During construction. Weekly reports	Around construction site	Observation and documentation	LDC management costs
	Chain-of-custody and implementation of waste management plans		LDC HSE	Area 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

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Labor conditions	Occupational Health and safety	Make sure that health insurance are applicable. Total number of complaints raised by workers Periodic Health report Periodic safety inspection report Incident register	LDC HSE	Two times per year for the PRS	Construction site	Safety supervisor should follow commitment of workers to use the protective equipment -Inspection & recording of the performance -Reports about the workers and complaints	LDC management costs
		Provide a suitable tool for wind direction (Windsock) to be installed in a suitable place to determine the wind direction.	LDC HSE and Projects Dpt.	Daily during construction	Construction site	Supervision & reporting	LDC management costs
		Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.	LDC Projects Dpt.	Daily during construction	Construction site	Supervision & reporting	LDC management costs
	COVID-19 pandemic	- Number of Suspected or confirmed Covid-19 cases, their location, condition, and all related actions taken - Periodic Health report	LDC Covid-19 Patrolling committee EGAS HSE	Daily	Construction site	As per the instructions of the Ministry of Petroleum (MoP), Patrolling committees have been formed across all LDCs to ensure that mitigation measures are being implemented on all construction sites, these committees report to EGAS on daily basis whereas EGAS report to MoP on weekly basis	LDC management costs

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Local traffic and accessibility	Child Labor	<ul style="list-style-type: none"> - Attendee's lists with workers IDs are in place. - Complaints and accidents reports. 	LDC HSE	Biannual for PRS	Construction site	Safety supervisor observe the Laborers Random checkup for Laborers IDs	LDC management costs
	Disturbance to local community due to labor influx	<ul style="list-style-type: none"> - Code of conduct is in place - A list of workers who have attended the proper training on code of conduct (with dates). - Complaints raised by the local community GRM. - Conduct spot checks/audits on the worker's behaviors during field visits. 	LDC HSE	When reported and during field visits	Construction sites	Supervision & reporting	Contractor Cost
	Reduction of traffic flow and accessibility to local community	Comments and notifications from Traffic Department	LDC HSE	Weekly during construction.	Construction site	Documentation in HSE monthly reports Complaints log	LDC management costs

Table 7-5: 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"> - Log of spillage incidents - Number of treated containers - Odorant delivery forms 	LDC HSE	Quarterly for each PRS	- PRSs	Compare Environmental Register with odorant delivery forms, observation of site	LDC management costs
Ambient noise levels	Noise of PRS operation	<ul style="list-style-type: none"> - Noise intensity 	LDC HSE	Quarterly for each PRS	- PRSs	- Noise meter	LDC management costs
Physical receptor (soil, ground water, visual)	Waste generation	<ul style="list-style-type: none"> - Best practice of handling and intermediate storage - Disposal to appropriate and license land field 	LDC HSE	Quarterly for each PRS	- PRSs	- Hazardous waste Register	LDC management costs
Labor conditions	Occupational Health& safety	<ul style="list-style-type: none"> - Total number of complaints raised by workers - Periodic Health report - Periodic safety inspection report 	LDC, EGAS	Four times per year, each three months	<ul style="list-style-type: none"> - Safety supervisor should follow the commitment of workers to use the protective equipment - Inspection and recording of the performance - Reports about the workers& complaints 	Complaints log LDC	No cost
		Review the emergency response plan and update the plan to include all scenarios in this study and other needs including:	LDC HSE (ERP document)	Yearly (ERP doc.)	PRS location	HSE annual audit	LDC management costs

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
		Firefighting brigades, mutual aids, emergency communications and fire detection / protection systems.	LDC HSE (ERP document)	Yearly (ERP doc.)	Area head office / PRS location	HSE annual audit	LDC management costs
			LDC HSE and Operation Dpt. for facilities.	Weekly	PRS location	Inspection checklist	
		Dealing with the external road in case of major fires.	LDC HSE (ERP document)	Yearly (ERP doc.)	PRS location	HSE annual audit	LDC management costs
		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.	LDC HSE (ERP document)	Yearly (ERP doc.)	Area head office / PRS location	HSE annual audit	LDC management costs
			LDC HSE and Operation Dpt. for facilities.	Weekly	PRS location	Inspection checklist	
		Safe exits in building according to the modeling in this study.	LDC HSE (ERP document)	Yearly (ERP doc.)	Area head office / PRS location	HSE annual audit	LDC management costs
			LDC HSE and Operation Dpt.	Daily	PRS location	Inspection checklist	
		Inspection and maintenance plans and programs are according to the manufacturers guidelines to keep all facility parts in a good condition.	LDC Operation and maintenance Dpt.	Periodic maintenance plan according to manufacturers	Area head office / PRS location	HSE annual audit	LDC management costs
		All operation is according to standard operating procedure for the PRS operations and training programs in-place for operators.	LDC Operation Dpt.	Daily for operation	Area head office / PRS location	HSE annual audit	LDC management costs
				Yearly for training			

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
		Provide the site with SCBA “Self-Contained Breathing Apparatus” (at least two sets) and arrange training programs for operators.	LDC HSE and Operation Dpt.	Daily	PRS location	Inspection checklist	LDC management costs
		Cooperation should be done with the concerned parties before planning for housing projects around the PRS area.	LDC Security Dpt.	Daily	Around PRS location	Patrolling and recorded in logbook	LDC management costs
	COVID-19 pandemic	- Number of Suspected or confirmed Covid-19 cases, their location, condition, and all related actions taken Periodic Health report	LDC Covid-19 Patrolling committee EGAS HSE	Daily	Construction site	As per the instructions of the Ministry of Petroleum (MoP), Patrolling committees have been formed across all LDCs to ensure that mitigation measures are being implemented on all construction sites, these committees report to EGAS on daily basis whereas EGAS report to MoP on weekly basis	LDC management costs

7.4 Ashmoon Quantitative Risk Assessment Study Recommendations

Regarding to the modeling scenarios and risk calculations to workers / public which found in Acceptable region (workers and public), therefore 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
<ul style="list-style-type: none"> • Ensure that: 	
<ul style="list-style-type: none"> - All PRMS facilities specifications referred to the national and international codes and standards. 	Design
<ul style="list-style-type: none"> - Inspection and maintenance plans and programs are according to the manufacturers guidelines to keep all facility parts in a good condition. 	Operation
<ul style="list-style-type: none"> - All operations are according to standard operating procedures for the PRMS operations and training programs in-place for operators. 	Operation
<ul style="list-style-type: none"> - Emergency shutdown detailed procedure including emergency gas isolation points at the PRMS and Off-Take Point in place. 	Operation
<ul style="list-style-type: none"> - Surface drainage system is suitable for containment any odorant spillage. 	Design
<ul style="list-style-type: none"> • Considering that all electrical equipment, facilities and connections are according to the hazardous area classification for natural gas facilities. 	Design
<ul style="list-style-type: none"> • Preparing an emergency response plan and for the PRS including all scenarios in this study and other needs like: (Not Provided by EG) 	Operation
<ul style="list-style-type: none"> - Firefighting brigades, mutual aids, emergency communications and fire detection / protection systems. 	Operation
<ul style="list-style-type: none"> - Dealing with the external road in case of major fires. 	Operation
<ul style="list-style-type: none"> - 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. 	Operation
<ul style="list-style-type: none"> - Safe exits in building according to the modeling in this study, and to the PRS from other side beside the designed exit in layout provided. 	Design
<ul style="list-style-type: none"> • Provide the site with SCBA “Self-Contained Breathing Apparatus (at least two sets) and arrange training programs for operators. 	Operation
<ul style="list-style-type: none"> • Provide a suitable tool for wind direction (Windsock) to be installed in a suitable place to determine the wind direction (the PRMS layout need to be reviewed for correction of the North direction) 	Construction
<ul style="list-style-type: none"> • Cooperation should be done with the concerned parties before planning for housing projects around the PRMS area. 	Operation / Design / Construction

7.5 Reporting of Mitigation and Monitoring Activities

During construction and operation, environmental performance against targets is reviewed by 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 collated and input into the LDC's (Egypt 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; and
- Internal reporting and external regulatory notification.

7.5.1 During the 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 accident caused during construction or any complaints received should be reported in the monthly report prepared by the construction contractor supervisor. And /or permits and any comments or recommendations by Traffic Department
- Monthly report should include any incidents of high dust emissions or smoke during construction works 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 location where it has been received from.
- The monthly report of HSE supervisor from LDC should include an evaluation of the contractor's compliance to 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 the monthly basis of the accident or the worker's obedience.
- Reporting on the monthly basis, the total number and the type of heavy equipment use 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.
- Monthly report on GRM. This report will include (as a minimum) number of received grievances monthly, type of grievance received, number of grievances solved and closed / unsolved (reasons for not solving them).
- Daily report to be prepared on construction work of the pressure reduction station and HP pipeline construction works.
- Daily report in a logbook to consider any outside construction works around the PRS location that related to public or industrial buildings.

7.5.2 Reporting of severe incidents

- In case of worker/community work-related severe accidents or fatalities, immediate reporting should take place by the LDC to the relevant regulatory authorities and to the Project Management at EGAS.
- EGAS will report the major accident to the World Bank within 24 hours at the latest.
- The report will be including all actions taken by LDC to investigate the root cause of the accident and the plan to prevent the occurrence of future accidents will be included in the final investigation report

7.5.3 During the operation phase reports should include as a minimum

According to law 4/94 amended by law 9/2009 and its executive regulation, each facility should prepare an environmental register. Components of the environmental register are presented in annex three 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 response plan,).

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 and /or Nassreya.

7.6 Emergency Response Plan

Egypt Gas is developing an Emergency Response Plan (ERP) which 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 and responses and procedures to be followed by personnel based in the field in the event of an emergency. For the meanwhile Egypt Gas mainly depend on EGAS's Emergency Response Plan Main Elements & Notification Procedures Summary, kindly refer to [Annex-12](#) attached to this report.

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.

7.6.1 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.

7.7 Institutional Framework for ESMMP Implementation

7.7.1 Environmental Management Structures

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

Being the implementing body of the natural gas network in project areas, Egypt Gas has a direct involvement with the environmental management and monitoring of the natural gas network. Egypt Gas has good environment, occupational health and safety and social background.

One of the standard tasks of the HSE Departments of Egypt 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.

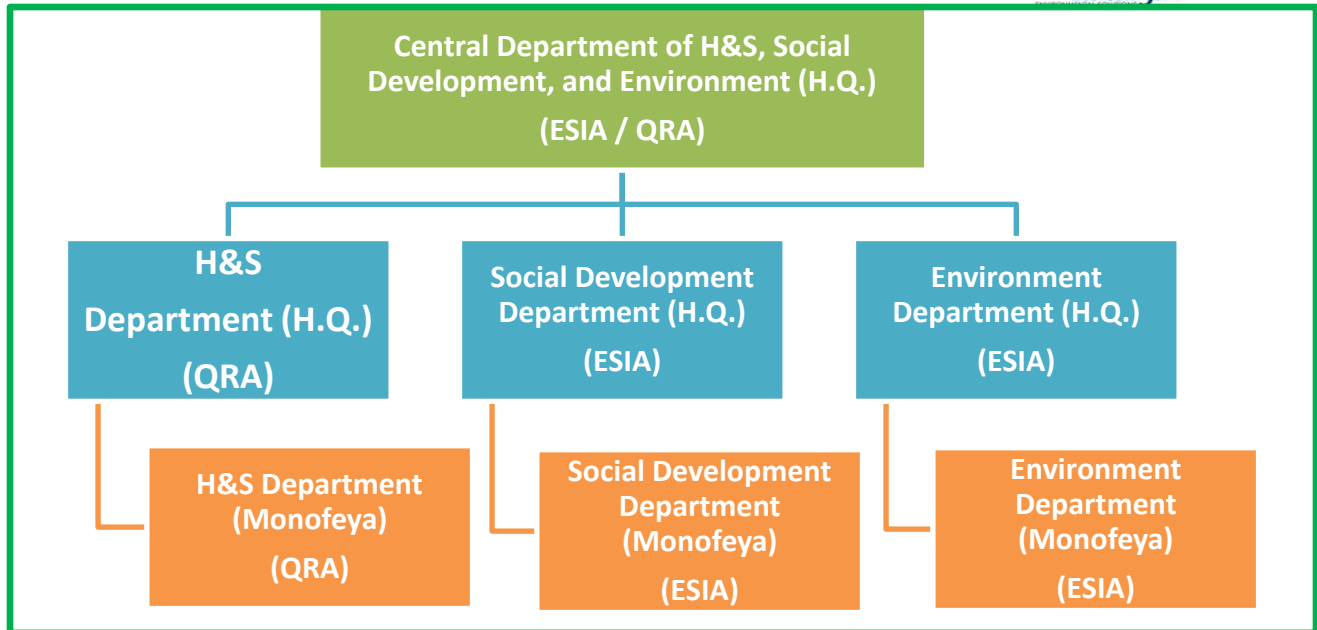


Figure 7-1: Egypt Gas ESMP organogram.

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

- Worker and contractor compliance to EGAS HSE manuals and procedures
- Occurrence of HSE incidents and suggestions for incident avoidance (Refer to Item 7.4)
- Management of broken asphalt (if any), unused backfill, solid waste, metal scrap
- Management of paint cans, refueling & lubrication, soil contamination
- Management of liquid waste such as leaked condensate hydrocarbons (if any) or chemicals used in heaters; and
- 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
- Using analyzers to measure noise, SO₂, CO, CH₄ and NO₂ in ambient air, and detect possible natural gas leaks
- Ensure and log compliant handling of odorant/odorant containers, odorant-contaminated-soils (in case of spillage)
- Measure noise at different locations of the PRS
- Other tasks as outlined in ESM & MP

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

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

7.7.2 Required Actions

- 1- Involvement of environmental and social officers during the design, costing, tendering, and construction phases would be advantageous.
- 2- An updated and detailed assessment of Egypt Gas EHS institutional capacity and available resources for implementation of the ESMP
- 3- Specifically, Egypt Gas 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.

7.7.3 Management of grievances (E&S Grievance Redress Mechanism)

EGAS and the LDCs aim to be recognized as a responsible operator exemplary in the management of the impacts of its activities. As such, 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. Well-designed and implemented GRMs can help project management significantly enhance operational efficiency in a variety of ways, including generating public awareness about the project and its objectives; deterring fraud and corruption; mitigating risk; providing project staff with practical suggestions/feedback that allows them to be more accountable, transparent, and responsive to beneficiaries; assessing the effectiveness of internal organizational processes; and increasing stakeholder involvement in the project. For task teams more specifically, an effective GRM can help catch problems before they become more serious or widespread, thereby preserving the project's funds and its reputation. Also, the Egyptian worker law No. 12 for the year 2003 provides for the Formal Grievance Procedure in case a worker, who has been laid-off, discharged, dismissed, removed, or otherwise terminated from employment. The LDC has an internal division responsible of receiving, record and track resolution of grievances.

Effective grievance management helps to:

- Build trust through having a dialogue with stakeholders.
- Detect weak signal and propose solution.
- Reduce risk of conflict between the affiliate and local communities.
- Reduce risk of litigation by seeking fair solutions through mediation in the event of an established impact.
- Identify and manage unanticipated impacts of operation.
- Avoid delays to operations and additional costs.
- Avoid future impacts through analysis of weak signals.

The detailed grievance mechanism (GRM) below is to be shared with the community beneficiaries. Posters will be prepared and made available to the beneficiaries in the contracting office.

Additionally, they will be availed in the customer services office. Thus, sufficient and appropriate information about the GRM will be disseminated to the communities prior to the construction phase. Information dissemination about the GRM should be shared with the beneficiaries during the process of contracting and disclosed in the contracting office and other publicly accessible venues. Following are the various stages of grievances. The proposed mechanism is built on three tiers of grievances:

1. The level of site engineer of Egypt Gas in the project area.
2. On the level of LDC headquarter
3. On the level of EGAS

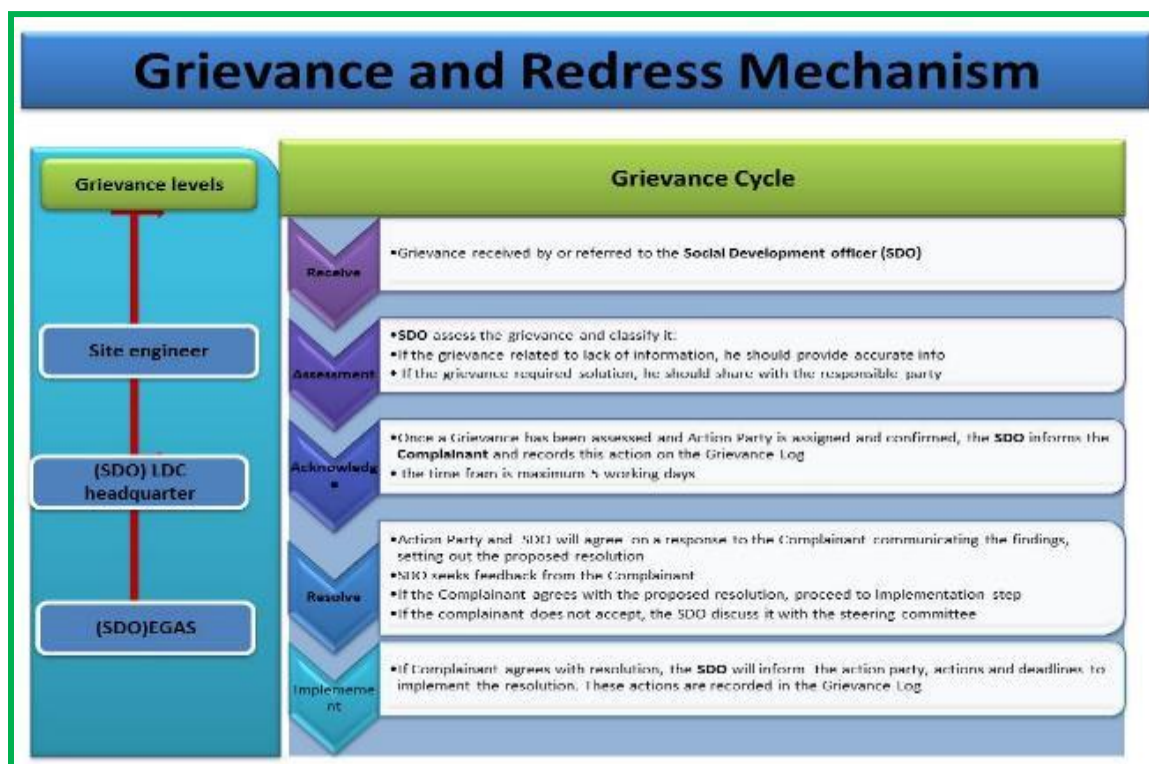


Figure 7-2 Proposed Grievance and Redress Mechanism

7.7.3.1 First tier of grievances

In order to ensure high level of responsiveness to the local communities, it is essential to ensure that a local grievance mechanism is functioning and that the communities are aware of it. Egypt Gas has assigned a Social Development Officer (SDO) (can be more than one) who will be working closely with the assigned SDO of EGAS. It is the responsibility of Egypt Gas SDO to ensure that the GRM system is widely known and well explained on the local level. Moreover, s/he will follow up on the complaint until a solution is reached. The turnaround time for the

response/resolution should be 10 business days and the complainant should know that he/she should receive response by then. (a complain form is attached see [Annex-11](#))

The grievances should be presented to the following:

- The foreman working on the ground in the study area,
- The project manager in the study area,

The regional department of Egypt Gas in Monofeya Governorate, it is worth noting that most of the previous experience of EGAS is suggesting that complaints are usually handled efficiently and resolved on the local level. However, the management of the complaints including level of responsiveness, providing feedback and the documentation of the complaints needs to be significantly strengthened. In case the problem is not solved, the complainant may reach out to the second level of grievance

7.7.3.2 Second tier of grievances:

If the aggrieved person is not satisfied with the decision of the first tier, they can present the case to Egypt Gas headquarters. SDO where they should provide resolution within 10 business days, following is the second level of grievances:

- The Social Development Officer in Egypt Gas headquarters will handle technical, environmental and land acquisition complaints. Egypt Gas headquarters SDO should receive the unsolved problems. Thereafter, the SDO gets in contact with the petitioner for more information and forwards the complaint to the implementing entities for a solution.
- The SDO should follow the complaints and document how they were solved within 10 business days.

7.7.3.3 Third tier of grievances:

If the aggrieved person is not satisfied with the decision of the SDOs of Egypt Gas at Stage 2, they can present the case to EGAS SDO where they should provide resolution within 10 business days. The following section presents the third level of grievances:

- The Social Development Officer in EGAS will handle technical, environmental and land acquisition complaints. He should receive the unsolved problems. Thereafter, they get in contact with the petitioner for more information and forward the complaint to the implementing entities for a solution.
- The SDO should follow the complaints and document how they were solved within 10 business days.
- The SDO should update the complainant on the outcome of his/her complaint.

7.7.3.4 Grievance channels

Due to the diversity of the context in different governorates and the socioeconomic characteristics of the beneficiaries, the communication channels to receive grievances were locally tailored to address all petitioners concerns and complaints. The following are the main channels through which grievances will be received:

- 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.
- Phone numbers of site engineer and SDO.
- Hotline: 129 is the hotline for Egypt Gas.
- The SDO within the LDC and EGAS
- Trustworthy people, community leaders and NGOs/CDAs will be an appropriate channel to guide petitioner about the various tiers of grievances, particularly, in rural areas.

7.7.3.5 Response to grievances

Response to grievance will be through the following channels:

- The response to grievances should be through an official recognized form to ensure proper delivery to the complainant. It is the responsibility of the SDOs to ensure that complainants were informed about the results of handling their complaints.
- Response to grievances should be handled in timely manner as mentioned above, thereby conveying a genuine interest in and understanding of the worries put forward by the community.
- EGAS and Egypt Gas should maintain record of complaints and results.
-

7.7.3.6 Worker Grievances

The Project Management Unit (PMU) will require the Contractor/subcontractors to develop and implement a Grievance Redress Mechanism (GRM) for their own workforce before the start of civil works. The GRM must be well circulated and written in a language understood by all. The workers GRM will include:

- A channel to receive grievances such as comment/complaint form, suggestion boxes, email, a telephone hotline
- Stipulated timeframes to respond to grievances;
- A register to record and track the timely resolution of grievances;
- A responsible section/committee to receive, record and track resolution of grievances.

7.7.3.7 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. The following indicators will be monitored.

Table 7-6 Means of verification and indicators

Monitoring dimensions	Means of verification and indicators
GRM is fully operational	<ul style="list-style-type: none"> ○ Number of received grievances monthly (Channel, gender, age, basic economic status of the complainants should be mentioned) ○ Type of grievance received (according to the topic of the complaint) ○ Documentation efficiency
Efficiency of responses and corrective procedures	<ul style="list-style-type: none"> ○ Number of grievances solved and closed ○ Feedback offered to the grievances ○ Number of unsolved grievances and the reasons behind not solving them ○ Time consumed to solve the problem
Efficiency of information sharing about GRM	<ul style="list-style-type: none"> ○ Dissemination activities undertaken ○ Total number of brochures distributed (if any) ○ Total number of awareness meetings conducted (if any)

7.7.3.8 Institutional Responsibility for the Grievances

The entity responsible for handling grievances will mainly be the Environmental Affair Department within the implementing agency (EGAS). The Social Development Officer (SDO) working within EGAS in cooperation with the Egypt Gas will address all grievances raised by community members. The main tasks related to grievances of the SDOs on the various levels are:

- Raise awareness about channels and procedures of grievance redress mechanisms
- Collect the grievances received through different communication channels
- Document all received grievances
- Transfer the grievance to the responsible entity
- Follow up on how the problem was addressed and solved
- Document, report and disseminate the outcome of received grievances
- Ensure that each legitimate complaint and grievance is satisfactorily resolved by the responsible entity
- Identify specific community leaders, organizations and citizen groups required to enhance the dialogue and communication through a public liaison office to avoid or limit friction and respond effectively to general concerns of the community
- Monitoring grievance redress activities

8. Stakeholder Engagement and Public Consultation

The new PRS aims to connect NG to Ashmoon district in Monofeya Governorate. Which is an extension to the current existing natural gas connection network. The natural gas connection project has a wide range of the consultation activities, during its different phases, since the early stages in December 2013 until now. ESIA's and ESMP's for other areas were prepared, stakeholder engagement and public consultation activities were held, and studies were cleared by the Bank and disclosed on both WBG info shop and EGAS website. For the current study, a consultation meeting session was conducted on 11th of July 2018 at the premises of Ashmoon Markaz. The consultation activity is still an ongoing process for the project activities, especially for land acquisition and compensation process. Stakeholders were clearly identified, a work plan was developed, information adequately disclosed, used different engagement instruments. Fair gender-based participation and engagement of the different stakeholders and documentation of all conducted events were made. All public concerns were discussed and responded to and addressed in the ESIAF /ESIA's/ESMP's of the project.

Consultation activities showed an overwhelming acceptance of the consulted participants to host the NG. Their willingness to be connected to the NG, some potential beneficiaries expressed their willingness to pay the installation cost in cash, while others were much in favor to pay in installment. This high level of enthusiasm from the local communities towards the project is attributed to the high level of awareness of the benefits of the natural gas and the current hardships that the households are facing to secure LPG provision and usage.

8.1 Legal Framework for Consultation

The consultation activities used multiple tools and mechanisms (scoping, interviews, focus group discussions, public hearings/consultations) with various stakeholders and community people in the host communities were held for the proposed 1.5 million household NG connections project in compliance with the following legislations:

- WBG policies and directives related to disclosure and public consultation, namely,
- Directive and Procedure on Access to Information
- World Bank Operational Policy (OP 4.01)
- Egyptian regulations related to the public consultation
- 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

While WBG safeguards and regulations state that a minimum of two large-scale, well-publicized public consultation sessions are a must for projects classified as category "A" projects like the one at hand, additional consultation efforts were implemented to reach the most difficult to reach

community members. Additionally, in order to obtain larger scale and more quantifiable information, the consultant should assess conducting surveys in the different sites.

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 accordingly.

8.3 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.

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 include in the Governorate level ESMP). In the meantime, local communities of both men and women of projects beneficiaries, local NGOs/CDA's were among the key stakeholders on the local level. The following table includes a list of key stakeholders of both men and women within the project areas.

Table 8-1: A list of key stakeholders of both men and women within the project areas.

Stakeholder	Role/ concern
Local Governmental entities	
Governorate	The main role of the governorate is the provision of support to the project through mobilizing people to gain information about the project.
Local Governmental units (District authorities and village authorities)	Permissions for PRS construction should be prepared by the governorate and approved by the LGU. Rehabilitation of roads, will be performed by the LGU.
Egyptian Environmental Affair Agency (HQ and RBOs)	Responsible for reviewing and approving ESIA's, and monitoring implementation of the Environmental Management Plan
Security Department	Secure the construction sites and prevent people from in- flushing into it
Ministry of Health	Providing health facilities to the project workers
Media	
Television and radio representatives	Inform the community about the project and its impacts and support dissemination of ESIA studies
Press people	
Websites editors	
NGOs working on environmental and social related aspects	
NGOs on the central level	Play an active role in any awareness-raising related to the project
Universities and Educational institutes	
Faculty of Engineering	Review and enrich the ESIA study with feedback
Secondary vocational schools	Propose needed capacity building for their students to potentially find employment with the project
Researchers/consultants	Review results of the study and provide feedback
Other	
Private companies	Mainly potential tenderers for construction works
Traders	Provide workers with food and amenities.
Contractors	From the project adjacent areas, may be affected.
Community people	
Community leaders	Main cornerstone in mobilizing the communities.
Potential beneficiaries	Potentially benefit from the project
Potential Project Affected Persons (PAPs)	Farmers whose lands may be traversed by project components. LPG distributors (formal and informal), LPG storage workers.
Vulnerable groups within the local communities	Vulnerable groups may be likely to be adversely affected by environmental and social impacts, while also being least likely to benefit from the Project. Women, disabled, old people and children might get injured if they crossed the excavated areas in main streets and allies. Children also may fall down in the excavated areas

Stakeholder	Role/ concern
Natural Gas companies	
EGAS	Implementing agency overseeing activities of the Environmental and Social Management Plan
Egypt Gas	Local distribution company (LDC) who will implement, operate, and manage the ESMP
Butagasco	May be affected due to the installation of the NG
Petro Trade	They are the responsible entity for collecting the consumption fees and the bank installment

8.4 Consultation Methodology and Activities

The research team for this study has adopted multi-dimensional consultation activities that enable the marginalized, voiceless, youth and women to gain information about the project. As well as, gaining information about their concerns and worries that regarding the project during various implementation phases. It is worth to mention that the consultation activities have 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 studies for the Low pressure network.

Following are the methodology and the main consultation activities adopted by the research team:

1. The study team visited the project area in order to define various stakeholders.
2. The study team divided the various engagement activities of the project to:
 - Scoping phase,
 - Data collection phase,
 - Consultation activities and final public consultation.
3. The study team has adopted many tools during the consultation process such as:
 - Conducting Focus Group Discussions (FGDs) with the local communities.
 - Conducting panel meetings with the governmental officials and potential affected people.
 - Public consultation sessions.
 - Various NGOs participated actively in the preparation of the FGDs and providing data collectors to assist the team in collecting the data.
4. Consultation activities have been developed for the different communities through the following phases:
 - a. Phase I: Preparation of the framework study 2013.
 - b. Phase II: Consultation activities and Final public consultation conducted in Monofeya on 16 April 2017
 - c. Consultation meeting session was conducted on 11 July 2018 at Ashmoon Markaz
 - d. Consultation activities at Talia village (PRS location) during August, and November 2019 with the PAPs.

All activities conducted were documented with photos and lists of participants in order to warrantee appropriate level of transparency.

Table 8-2: Summary of Consultation Activities in Monofeya Governorate (2013-2018)

Participants	Number	Methods		Date	
		Males	Females		
During the preparation of framework					
Potential beneficiaries and Government officials	59	23	Scoping session at Monofeya University' hotel	28 th November 2013	
Potential beneficiaries	52	48	Structured questionnaire	December 2013 Data collection	
Potential beneficiaries	31	1	FGD	December 2013	
and government officials	4	0	In-depth	December 2013	
Governmental and NGOs	61	13	Public Consultation	21 st December, 2013	
Total (During the preparation of framework)	207	85			
Consultation Activities during the preparation of ESMP for four Districts, 2017					
Potential beneficiaries	Shintina El-Hajar	6	3	FGD In depth	February 2017
	Um Saleh	9	5		
	Tilbant Abshish	7	2		
	Salaka	7	4		
LPG vendors	Shintina El-Hajar	2	-	Structured questionnaire	February 2017
	Um Saleh	3	-		
	Tilbant Abshish	2	-		
	Salaka	2	-		
Governmental and NGOs	Shintina El-Hajar	6	3	In depth	February 2017
	Um Saleh	4	1		
	Tilbant Abshish	6	3		
	Salaka	5	2		
	Shintina El-Hajar	15	5		

Participants		Number		Methods	Date
		Males	Females		
Community people	Um Saleh	10	8	FGD Structured questionnaire	February 2017
	Tilbant Abshish	8	4		
	Salaka	12	6		
Representatives from Egypt Gas		5	2	in-depth	January and February 2017
Total		109	48		
Potential beneficiaries, government officials, and NGOs		81	13	Public Consultation	16 th of April, 2017
Consultation Activities at Ashmoon district, July 2018					
Governmental and NGOs		62	59	Meeting Session	July 2018
LPG vendors		6	1	in-depth meetings	July 2018
Community people		15	5	FGD	July 2018
Total		83	65		
Egypt Gas representatives		5		in-depth Meetings	July 2018
Consultation Activities during the preparation of ARAP , August, November, 2019					
Community people		8	2	Meeting Session in-depth meetings FGD in-depth Meetings	August, November, 2019
Affected Persons		3			
Government officials		7			
Egypt Gas representatives		5	3		
Total		23	5		



A panel discussion with government officials at LGU headquarters



Consultation meeting at LGU headquarters, Ashmoon Markaz



Figure 8-1: Consultation activities at Ashmoon.

8.5 Summary of consultation activities

The field research team engaged in a number of social activities. These activities include focus group discussions with potential beneficiaries; and with potential affected people (LPG vendors), in-depth discussions with government officials, representatives of civil society, and community leaders. A consultation meeting was held at the Local Governmental Unit in Ashmoon, where the public officials of Governorate stressed on expediting the implementation of the project in their villages.

Throughout the discussions, interviewees were asked about the following main points:

- The type of fuels currently in use, and its associated problems.
- The criteria of areas to be connected to natural gas.
- The upsides and downsides of NG, compared to other types of fuels.
- The effects of the project during constructions and operations.
- The cost of NG installation to households.
- The future positive/negative impact of NG connections project.
- The effects of installing the new HP pipeline on their lands and how they will be compensated for.

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.

Table 8-3: Key comments and concerns raised during the different public consultation activities, and the way they were addressed.

Subject	Questions& comments	Responses	Addressed in
Cost of installing NG to households and options for payments	How much is the cost of NG installation, can you inform us if there is a system of monthly installments to settle the installation fee?	<p>The cost of the installation fees is expensive but the Government of Egypt provides a huge subsidy to enable all citizens' benefit from the NG, and NG cost is cheaper than LPG.</p> <p>There is an agreement with the Egyptian Banks to finance the cost of connection to the client, and he/she can pay the cost in installment.</p> <p>AFD in cooperation with EU provide a grant of 1500 EGP for poor people according to illegibility criteria. Moreover, Ministry of Petroleum has announced for new initiative to encourage more people to connect NG by paying the cost in installment for 6 years at zero-interest rate.</p>	<p>ESMP Study¹¹, Section 4. Environment and Social Baseline. And section 5</p> <p>Table 5-2 Impact Assessment</p>
Criteria for natural Gas connection	Why all the households and villages are not included in the connection plan	<p>Connection to villages is depending on the availability of other public utilities (water, sewage, and electricity)</p> <p>Additionally, the village should be close to the national NG grid.</p> <p>The Government is giving a high priority to connect NG to all households.</p>	ESMP Study, Section 2. Project Description
Information sharing about NG	The people should be informed about NG. Group meetings will be useful	<p>The NG project team provided information to the communities as follow:</p> <ol style="list-style-type: none"> 1- During the site visits for P&A survey 2- During the preparation of the ESIA 3- During contracting process 4- Through the hotline 129 	ESMP Study, Section 7. ESM&MP and Section 8. Stakeholder engagement
Complaint system	What if we have any complaints about the project, where we can raise our complaints	<p>The project is adhering to a grievance mechanism. This enable anyone to submit a complaint and respond to in 10 working days. The NG project team provided information about the different channels to submit complaints. Additionally, the contracting offices give the clients all information about the project and GRM.</p>	ESMP Study, Section 7. (GRM)
Street rehabilitation & land refill	-who is responsible to rehabilitate the street and land refill after the end of construction works?	<p>Egypt Gas responded to this question as they will be the implementing agency responsible for street rehabilitation in terms of budget. However, the local Council Centre will implement the streets rehabilitation.</p>	ESMP Study, Section 7. ESM&MP
Loses of income for LPG Vendors	The NG connection project will affect the source of income for	<p>NG is not going to cover all areas, the Local Council Center will give new license in another areas.</p>	ESMP Study, Section 7. ESM&MP

¹¹ <https://www.egas.com.eg/sites/default/files/2019-10/Monofeya%20ESMP.pdf>

Subject	Questions& comments	Responses	Addressed in
	LPG vendors and the distributors		
Impacts on lands	Will there be permanent impacts on land productivity after installing the HPP	No permanent impacts on land productivity. It will only be affected during the construction phase, which last for few days only. The land should return to its original productivity after that.	ARAP Study.
	Can we build on the land after installing the pipeline?	According to the Egyptian law, it will not be possible to build on the land because it is an agriculture lands. However, in case of urbanization, Two options are allowed : <ul style="list-style-type: none"> • The farmer should construct his buildings two meters away from the pipeline according to the law. • Alternatively, Egypt Gas/EGAS buys the land from the owners at replacement value in line with market prices. 	
Compensation	Are only formal owners allowed compensations?	Any persons who can prove that they have access to the land for long time are entitled to compensations.	
	Will the compensation be fair? How much will be?	It will be according to the market price in coordination with the Agricultural Association.	
	When the compensations will be paid before or after he Construction?	It will be paid before the construction. However, in case of affecting anything additional during the construction you will be compensated for it as well.	
	Who is responsible for compensation of the damages associated with construction activities?	Egypt Gas will be responsible to pay all compensation for the affected people before starting any construction activities.	

8.6 Summary of Consultation Results

The consultation outcomes revealed that:

- The interviews with the implemented companies revealed that, they are fully aware about security and safety procedures in accordance with the nature of the region.
- The AFD in cooperation with the European Union will provide the poor with a kind of grant to be able to install the NG (nearly 50% of the NG connection cost according to

specific criteria). This initiative has been approved and will be applied to all project districts.

- The Ministry of Petroleum Initiative to encourage more people to connect NG by paying the cost in installment for 6 years at zero-interest rate.
- The study recommended the participation of the community people in sharing information about NG project with the other people especially the illiterate groups. (the recommendation is not obligated for the project)
- There are many problems related to LPG cylinders such as: (high cost, price fluctuations, unavailable, the exerted effort to hold and install the cylinder, and the risks related to the existence of LPG cylinder within the household)
- The interviews and the focus group discussions revealed some concerns raised by the community regarding the NG connection such as:
 - Actual need to provide clear information about the project and some concerns about NG security and safety.
 - The majority of the community people cannot afford to pay NG installation costs in one installment, they strongly recommended to pay in installments.
 - Some concerns about LPG security and safety.
 - Impacts on lands and compensation procedures and responsibility (will be addressed clearly in the RAP study).
 - Actual need to response to grievances in timely manner.

**The key message from the consultation events carried out for this project is that:
The acceptance and the support of governmental officials and the Public for the project are very strong.**

8.7 ESIA disclosure

As soon as the ESIA gets clearance from the World Bank and approval from EEAA, a final report will be published on the WBG, EGAS and Egypt 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.