



1.5 Million Natural Gas Connections Project in 11 Governorates

Low Pressure Natural Gas Network Environmental and Social Management Plan

Qena Governorate
(Qeft, Naqada, Waqf, and Farshout)

Executive Summary
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EGAS
Egyptian Natural Gas Holding Company

Developed by



EcoConServ Environmental Solutions



Petrosafe
Petroleum Safety & Environmental Services
Company



EXECUTIVE SUMMARY

1 Introduction

The proposed project represents an integral component of the national energy strategy which aims for greater use of natural gas for domestic users at Qeft, Naqada, Waqf and Farshout cities in Qena governorate.

1.1 Environmental and Social Management Plan (ESMP)

This ESMP has been prepared based on the Terms of Reference prepared by EGAS and cleared by the World Bank, additionally the ESMP follows national and IFC requirements regarding scope and detail of assessment and procedure, and gives particular emphasis to public information and stakeholder participation. **The ESMP objectives include:**

Objectives of the ESMP include:

- Describing project components at Qeft, Naqada, Waqf and Farshout areas and activities of relevance to the environmental and social impacts assessments
- Identifying and addressing relevant national and international legal requirements and guidelines
- Describing relevant baseline environmental and social conditions
- Assessing project alternatives if different from those presented in ESIA framework
- 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 areas and the total number of household which will be covered in this ESMP are illustrated in table 1-1:

Table 1-1 Number of Areas and Households

Governorate	Local Distribution Companies	Areas	Households connection			
			First year 2016/2017	Second year 2017/2018	Third year 2018/2019	Total
Qena	ReGas	Naqada	500	3500	2000	6000
		Qeft	0	4000	2000	6000
		Farshout	0	4000	2000	6000
		El-Waqf	0	4000	2000	6000
Total		4 areas	500	15,500	8,000	24,000



The local distribution company responsible for project implementation is ReGas

(شركة غاز الأقاليم)

Naqada and Qeft will be connected to an existing PRS in Qous, while Farshout and Waqf will each be connected to a new PRS which will have a separate ESIA study..

2 Project Description

2.1 Background

Excavation and pipe laying of the distribution network, key activities of the construction phase also include installation of pipes on buildings, internal connections in households, and conversion of appliance nozzles to accommodate the switch from LPG to NG.

The city distribution network comprises the following components:

2.2 Project Work Packages

2.2.1 Intermediate Pressure Network - Main feeding line/network “7 bar system – PE 100”

Naqada

The path of the intermediate pressure network starts from Qous PRS till the pressure regulating kiosk at Naqada City.

The pressure of this network is 4:7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 7 bar will be utilized

Intermediate Pipeline specification at Naqada City:

Pipe Diameter : 315 mm

Pipe length: 3,000m

Laying depth: 1.2:2m

The route of the intermediate pipeline network is shown in Figure 2-1: Naqada intermediate pipeline

Source: Regas

The intermediate pipeline at Naqada City will not cross any agriculture land. The pipeline route will be parallel and within the main road.

The intermediate pipeline network will begin from the regulator at Al Sheikh Sayed Mahmoud street (north Naqada) to the right toward Gamal Abd El Nasr main road (the road limit



Naqada from the west). Then the pipeline will go through the south edge of Naqada at El Moez Ledin Allah, than the pipeline will reach EL Gaish road (El Kornish) and the pipeline will go parallel and within the limit of EL Gaish road to the north of the Naqada again.

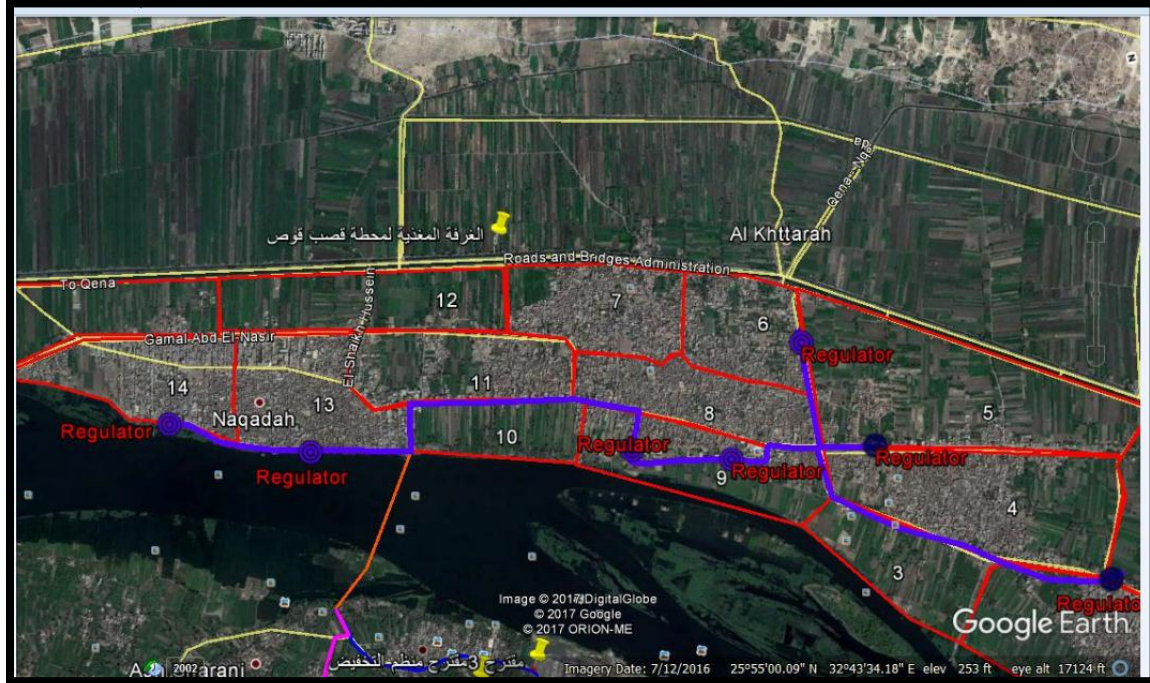


Figure 2-1: Naqada intermediate pipeline

Source: Regas

Qeft

The path of the intermediate pressure network at Qeft area starts from pressure regulating kiosk at Qous area (the regulator is part of the intermediate network at Qous area and it is fed from the outlet of the Qous PRS).

The pressure of this network is 7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 7 bar will be utilized.

Intermediate Pipeline specification at Qeft area:

Pipe Diameter: 250 mm

Pipe length: 13,000m

Laying depth: 1.2:2m

The route of the intermediate pipeline network is shown in the figure below. The intermediate pipeline at Qeft area will not cross any agriculture land. The pipeline route will be parallel and within the main road.



The path of the intermediate pipeline will begin from EL Bahaa Zoeheir street at Qous (where the Kiosk regulator will be constructed) toward the north east to reach Qous Qeft road. The path of intermediate pipeline network will continue through Qous-Qeft road until it reaches the intersection of EL Mahata road then it will be go through the road to Qeft area.



Figure 2-2:Intermediate Pressure Network in Qeft
N.B: it will not pass across any agriculture lands

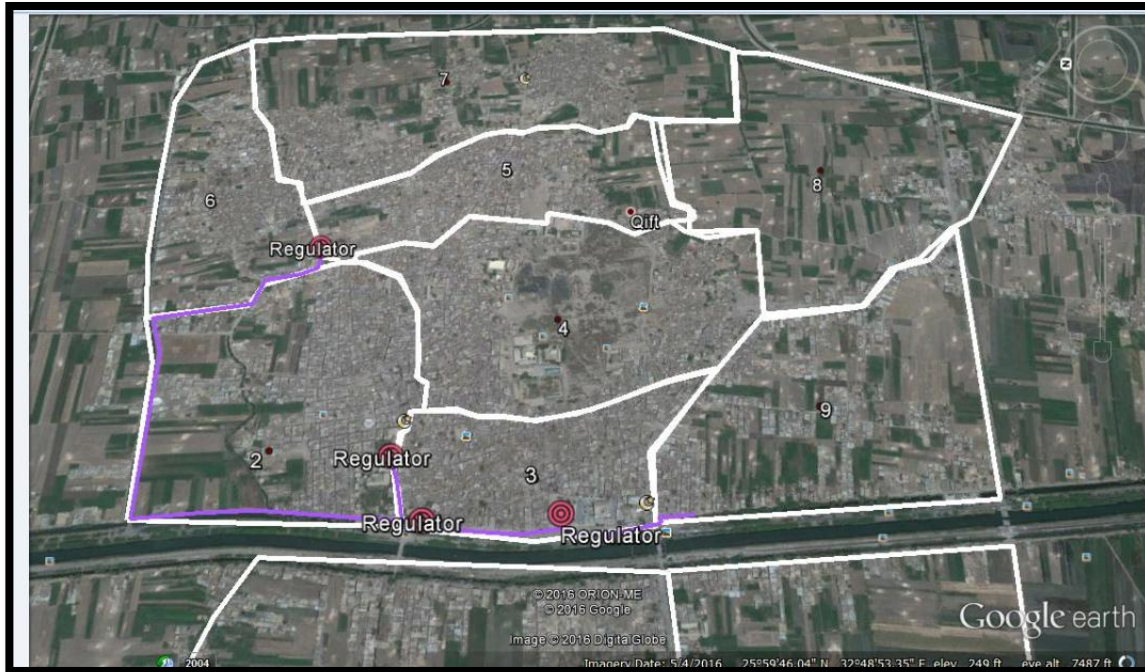


Figure 2-3: Intermediate Pressure Network - Main feeding line/network “7 bar system connecting in Qeft.

Waqf

The path of the intermediate pressure network at Waqf area starts from the proposed new PRS (north west to Waqf area- near El Marashda village) about 7 km away from Qeft.

The pressure of this network is 4- 7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 4- 7 bar will be utilized.

The route of the intermediate pipeline network will pass in the main street in El Waqf City. The intermediate pipeline at Waqf City will not cross any agriculture land.

The path of the intermediate pipeline will begin from the regulator located in the main Waqf road, the pipeline will pass through the road. It will not go through any agriculture lands till reach the intersection of Abd El Khalek street.



Figure 2-4: Intermediate Pressure Network - Main feeding line/network “4- 7 bar system connecting the new PRS to the city regulator in Waqf

Farshout

The path of the intermediate pressure network at Farshout City starts from the proposed new PRS at Farshout area and reaches Farshout City.

The pressure of this network is 4- 7 bars and made from high density polyethylene PE 100 SDR 11. High density polyethylene, HDPE, with maximum operating pressure, MOP, of 4- 7 bar will be utilized.

2.2.2 Low Pressure Network - Distributions network “Regulators, PE80 Networks”

Low pressure gas exiting city regulators is distributed via a gas distribution piping system consisting of low pressure service lines. The pressure of gas in service lines is 100 mbar. In such a system, a service regulator is not required on the individual service lines. Low pressure service lines are mainly constructed from medium density polyethylene pipes (MDPE) having a maximum operating pressure (MOP) below 100 mbar. PE80 network will be installed horizontally underground..

Lengths of pipes for Waqf and Farshout will be known when the final design for low pressure network finalized by ReGas.



Regulators

This is a subunit for gas reduction from 7 bars to 100 mbar. It is placed to serve one or two adjacent sectors in a kiosk provided with a safety device according to international standards surrounded by guard rail fence.

Naqada, Qeft, Waqf, and Farshout will each be equipped with a city regulator.

- Input pressure: 7 barg
- Output pressure: 0.1 barg
- Flow rate: 1000 m³/hr
- Inlet diameter: 3 inches
- Outlet diameter: 4 inches

Installations (Steel Pipes)

A gas distribution piping system consist of steel pipes which are connected from individual service line to vertical service pipe in a multistory dwelling which may have laterals connected at appropriate floor levels; in addition to service pipe connected to a riser and supplying gas to a meter and gas appliances on one floor of a building. Internal installation consists of pipe connecting the pressure reducing regulator/district Governor and meter Outlet (MOP 25 millibar) to appliances inside the customer's premises.

Conversions

Conversions involve increasing the diameter of the nozzle of the burner of appliances (stove and bathroom water heater) to work with natural gas as a fuel gas rather LPG and others.

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
 - Executive Regulation(ER) No 338 for Year 1995 and the amended regulation No 1741 for Year 2005, amended with ministerial decree No 1095/2011, ministerial decree No 710/2012, ministerial decree No 964/2015, and ministerial decree No 26/2016
- _ Law 38/1967 for General Cleanliness
- _ Law 93/1962 for Wastewater
- _ Law 117/1983 for Protection of Antiquities
- _ Traffic planning and diversions



- Traffic Law 66/1973, amended by Law 121/2008 traffic planning during
- Law 140/1956 on the utilization and blockage of public roads
- Law 84/1968 concerning public roads
- Work environment and operational health and safety
 - Articles 43 – 45 of Law 4/1994, air quality, noise, heat stress, and worker protection
 - Law 12/2003 on Labor and Workforce Safety

3.2 World Bank Safeguard Policies

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

OP/BP 4.12 will not be applicable to the low pressure pipelines of Qena governorate since no land acquisition or resettlement is anticipated. Particularly, as the network will pass through the main urban streets/roads and side roads without causing any damage to private assets or lands. In addition, it is not envisaged that the project will result in any physical or economic dislocation of people for the construction of low-pressure pipelines in Qefta, Naqada, Waqf and Farshout. The Pipelines network will not cross agricultural land in Naqada , Qeft, Waqf, and Farshout and accordingly no compensation will be applied.

3.2.1 World Bank Group General Environmental, Health, and Safety Guidelines & WBG Environmental, Health and Safety Guidelines for Gas Distribution Systems- IFC Guideline.

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. Gas distribution system – Health and Safety Guideline are applicable to the project.

Gaps between requirements outlined by WBG guidelines and actions detailed by the ESIA have been analyzed. There are no significant differences between the requirements outlined by the WBG EHS 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 Information¹ will be followed by the Project.

¹ <https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=3694>



4 Analysis of Alternatives

4.1 Pipeline Installation Technology Alternatives

To install a natural gas pipeline beneath the ground level, this can either be done by digging a trench or using trenchless technologies. Trenchless technologies can be further classified as guided methods and non-guided methods. In this analysis, the most famous technology in each category will be considered; namely, horizontal directional drilling representing the guided trenchless technology, auger boring representing the non-guided trenchless technology, and the open-cut representing the trench technology.

4.1.1 Trenchless Technologies

HDD has some advantages compared to auger boring and open-cut technique as follows:

- Compared to the open-cut technology, it doesn't cause interruption to traffic flow.
- Compared to the open-cut technology, it causes fewer disturbances to the surface and sub-surface soil layers.
- Compared to the auger boring technology, it can be used for larger distances and wider range of pipeline diameters.
- Compared to the auger boring technology, it is a surface-launched process which doesn't require drive pits.
- Compared to the auger boring technology, it is a guided method, and accordingly can achieve high accuracy for the pipeline path
- Can be employed for high depths, and accordingly can avoid any breakage accidents to the existing infrastructure lines/cables.

On the other hand, HDD might result in some disadvantages including:

- Like any other trenchless technology, and according to the geologic condition, soil collapse may take place during the installation.
- In case of having existing infrastructure lines/cables, there will be less flexibility in choosing the pipeline depth, the fact which may necessitate drilling through soil layers which may be of insufficient strength to withstand the slurry's pressure.
- Not favorable with soils containing gravels and cobbles.

4.1.2 Open-Cut Method

This is the traditional method for pipeline installation. It is very simple technology which just depends on excavating the soil, laying the pipeline, and backfilling. However, it is technically not possible to be used in crossings with major waterways. It can be used in crossings with major roads and railways; however, this will cause huge interruption to traffic as this will



necessitate either re-routing or reducing the number of lanes. This will lead to reduction in the average speed of the vehicles on the road, and may affect the areas devoted for parking. This may also increase the probability of having car accidents, in addition to negative socio-economic impacts as a result of interrupting the flow of people and goods. Open-cut method may be the only possible recommended solution in the 4 studied areas since the pipeline route passes through urban and local roads and does not cross any main road or railway, and this will not negatively affect the environment, and it will be a cheap and safe option

4.2 Routing

The preferred route was selected on parameters like:

- Study Area Identification: Identifying major features in the study area like main roadways, residential and commercial areas to help identify constraints during the selection of the routes
- Mapping the resources: Existing linear corridors include major streets, waterways, railroads, and utility lines. Existing linear corridors are considered opportunity areas for pipeline routing because they have already been developed and therefore are generally considered a compatible land use. In addition, these linear corridors generally provide existing access for construction and maintenance requirements.

4.3 Regulators

Two type of 100 mbar regulators outlet pressure were considered; Kiosk regulators and Wall mounted regulators, Kiosk regulators were preferred because:

- Easier maintenance
- Less expensive
- Safer to the surrounding community

4.4 Working time

As stated in the traffic baseline, some areas are overcrowded from 7 a.m. to 2 p.m. Therefore, it will be useful to apply flexible working time that can avoid working during rush hours. Additionally, in some residential areas, it will be extremely difficult to work during night. Working during morning can be applied in such areas. Moreover, in some areas, there is a weekly market e.g. the market located in Farshout city. Such market should be avoided. As a wrap up, the three alternatives related to working time are:

- Working during day time in most of project areas
- Working during night in overcrowded areas
- Avoid market working hours



4.5 Installation Costs

The average natural gas connection installation cost is about 7000 EGP. Consumers contribute a part of this cost as the balance is subsidized by the Government. The government of Egypt currently, offer flexible payment schemes for the installation cost. The customer can select between various payment schemes. Paying in installment is one of the proposed alternatives that might facilitate installation of the NG, especially, for poor and disadvantaged groups.

No financial assistance will be provided by NGOs to poor families to install natural gas connections. However, the AFD, in cooperation with the European Union, will provide poor families with financial assistance (through a grant scheme). This initiative has been approved and currently applied to all project areas in all Egyptian Governorates. NGOs interviewed expressed willingness to raise awareness about this opportunity among poor families.

5 Environmental and Social Impacts and Mitigations

The environmental and social advantages of switching household fuel from LPG cylinders to natural gas pipelines are diverse. On the residential level, the proposed project will lead to improved safety, reduced physical/social/financial hardships, and secure home fuel supply. On the national level, it promotes the utilization of Egyptian natural resources and reduces the subsidy and import burden.

A thorough 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 assessment of impacts distinguishes between the construction phase and the operation phase.

5.1 Positive Impacts

5.1.1 Positive impacts

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

- The project is anticipated to result in creation of different job opportunities. Based on similar projects implemented recently by EGAS and the local distribution company, the daily average number of workers during the peak time will be about 50-55 drilling worker, two engineers and eighteen technicians in the project sites. This number is flexible and might be changed in case of the need to work in all project sites in parallel



- In order to maximize employment opportunities in the local communities it is anticipated that on the job capacity building activities will be required for currently unskilled workers. On-the-job training will also supplement opportunities for the local workforce for both temporary construction roles and for long-term operation phase positions, where these are available.

5.1.1.2 Create indirect job opportunities

As part of the construction stage, a lot of indirect benefits are expected to be sensed in the targeted areas due to the need for more supporting services to the workers and contractors who will be working in the various locations. This could include, but will not be limited to accommodation, food supply, transport, trade, security, manufacturing... etc. For example the transportation of workers from Qena to Farshout district will work for the benefit of car lease offices.

5.1.2 During the operation phase

5.1.3 Positive impacts

- As indicated in Baseline Chapter, women are key players in the current domestic activities related to handling LPG and managing its shortage. Being the party affected most from the shortfalls of the use of LPG, the NG project is expected to be of special and major benefits to women. This includes but is not limited to; clean and continuous sources of fuel that is safe and does not require any physical effort and is very reasonable in terms of consumption cost. Time saving is among the benefits to women. The use of a reliable source of energy will allow women to accomplish the domestic activities in less time and this will potentially open a space for better utilization for the saved time.
- Constantly available and reliable fuel for home use.
- Reduced expenditure on LPG cylinders' import and subsidies, as 24 thousand connections will be installed in the area. Each household consumes on average 1.5 LPG monthly. Accordingly the total number of LPG cylinders that will be saved is anticipated to be about 36 thousand LPG cylinder per month. The subsidy value is about 90 EGP per each LPG. Consequently, the total saved monthly subsidy will be about 3.240 million EGP monthly. That will result in total annually savings of 38.880 million EGP.
- Significantly lower leakage and fire risk compared to LPG.
- Improved safety due to low pressure (20 mBar) compared to cylinders.
- Beneficiaries to benefit from good customer service and emergency response by qualified personnel/technicians.
- Eliminate the hardships that special groups like the persons with disabilities, women, and the elderly had to face in handling LPG.
- Limiting possible child labor in LPG cylinder distribution





5.2 Anticipated Negative Impacts

5.2.1 Impact Assessment Methodology

To assess the impacts of the project activities on environmental and social receptors, a semi-quantitative approach based on the Leopold Impact Assessment Methodology with the Buroz Relevant Integrated Criteria was adopted.

The table below presents the classification of impact ratings and respective importance of impact values.

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

The following tables summarize the impacts and the corresponding mitigation measures within the management plan, in addition the monitoring plans proposed for implementation.



5.3 Environmental and Social Management Matrix during CONSTRUCTION

Table 2: Environmental and Social Management Matrix during CONSTRUCTION

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Ambient air quality	Increased emissions of dust and gaseous pollutants	<ul style="list-style-type: none"> Controlled wetting and compaction of excavation/backfilling surrounding area Excavated soil stockpiles and stored sand should be located in sheltered areas. Stored fine sand should be covered with appropriate covering material² such as polyethylene or textile sheets to avoid soil dispersion. Transportation of excavation/construction waste should be through licensed and sufficiently equipped vehicles with a suitable special box or provided with a cover to prevent loose particles of waste and debris from escaping into the air or dropping on the road. Appropriate maintenance, engine tuning and servicing of construction equipment to minimize exhaust emissions Minimize unnecessary journeys and switching off machinery and equipment when not in use (idle mode). 	Minor	<ul style="list-style-type: none"> LDC Contractor 	LDC HSE department	Contractual clauses + Field supervision	<ul style="list-style-type: none"> Contractor costs LDC management costs
Noise	Increased noise levels	<ul style="list-style-type: none"> Ear muffs, ear plugs, certified noise PPE for workers Avoid noisy works at night whenever possible Complaints receipt from local administration 	Minor	<ul style="list-style-type: none"> LDC Contractor 	LDC HSE department	Contractual clauses + Field supervision (audits)	<ul style="list-style-type: none"> Contractor costs LDC management costs
Soil	Degradation of soil quality	<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	<ul style="list-style-type: none"> LDC Contractor 	LDC HSE department	Field supervision (audits)	<ul style="list-style-type: none"> Contractor costs LDC management costs
Surface water	Uncontrolled dumping of waste in canals can result in water pollution	<ul style="list-style-type: none"> Control all onsite wastewater streams and ensure appropriate collection, treatment and discharge. Prevent discharge of contaminants and wastewater streams to ground. Adequate management and proper handling and storage of construction materials, oils and fuel to avoid spillages 	Irrelevant	<ul style="list-style-type: none"> LDC Contractor 	LDC HSE department	Field supervision (audits)	<ul style="list-style-type: none"> Contractor costs LDC management costs

² Sufficient sheets should accompany work groups during the construction phase.



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Waste generation	Hazardous waste accumulation	<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 to households are to be collected and sent back to nearest LDC depots for temporary storage until disposal at a hazardous waste facility. Error! Reference source not found. describe the treatment and disposal of all waste category. Transfer to LDC depots for temporary storage Disposal at licensed Alexandria hazardous waste facilities (Nasreya) In case of damaging of asbestos pipes during excavation, the Water Authority, which will carry out the repairs, will be responsible for handling the waste asbestos according to their procedures. If dewatering is taking place from a contaminated trench, or contains hydrocarbons that could be observed or smelled, contaminated water should be collected in barrels and transported to a wastewater treatment facility. To the extent practical, seek to combine leftovers or residuals of the same liquid material/waste in order to minimize the number of containers containing hazardous residuals Ensure hazardous liquid material/waste containers are always sealed properly and secured from tipping/falling/damage/direct sunlight during transportation and storage In case of spillage: <ul style="list-style-type: none"> avoid inhalation and sources of ignition cover and mix with sufficient amounts of sand using PPE collect contaminated sand in clearly marked secure containers/bags Add sand to inventory of hazardous waste 	Minor	<ul style="list-style-type: none"> LDC Contractor Water Authority 	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 Nasreya Approximate cost of the above (to be revised upon project execution): 8,000-10,000 LE per ton
	Non Hazardous waste accumulation	<ol style="list-style-type: none"> Allocating certain areas, in each Sector, for stockpiling waste soil and construction waste, in coordination with the local authority. No soil stockpiling is allowed on banks of waterways. Segregate waste streams to the extent possible to facilitate re-use/recycling, if applicable Maximize re-use of excavation waste as backfill for natural gas pipeline trenches. Normally asphalt waste could be disposed of with other excavation waste/aggregates in the local non-hazardous waste site. Solid waste from unlikely scenarios such as domestic site activities (such as temporary offices or rest areas) should be addressed in specific waste management plans, as appropriate <p><u>If septic tanks are used in case of temporary toilet facilities, make contractual arrangements with a wastewater removal contractor (in coordination with the local unit) to purge and dispose of possible septic tanks in the case they are utilized in work sites</u></p>	Minor	Excavation Contractor	LDC HSE department	Official coordination proceedings signed by representatives of utility authorities <ul style="list-style-type: none"> Examination of site-specific reports and records Field supervision 	<ul style="list-style-type: none"> Contractor management costs LDC management costs
Local traffic and accessibility	Traffic congestion (and associated	Excavation during off-peak periods Time limited excavation permits granted by local unit & traffic department	Minor	<ul style="list-style-type: none"> Excavation contractors 	<ul style="list-style-type: none"> LDC + Traffic department 	Contractor has valid conditional permit + Field supervision	Contractor costs LDC management costs



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	noise/air emissions)	Announcements + Signage indicating location/duration of works prior to commencement of work		<ul style="list-style-type: none"> LDC Excavation contractors 	<ul style="list-style-type: none"> LDC HSE Local Unit Traffic department 	Ensure inclusion in contract + Field supervision	Additional budget not required
				Contractor	<ul style="list-style-type: none"> LDC HSE 	Field supervision	
		Traffic detours and diversion		Traffic Department	Traffic Department	<ul style="list-style-type: none"> Field supervision for detouring efficiency Complaints received from traffic department 	
		Road restructuring and closing of lanes				Fluidity of traffic flow	
Local streets	Street deterioration	<ul style="list-style-type: none"> The implementing entity (LDC) agrees a restoration fee with the local administration unit in charge of the area. The fee is used by the local unit to include the restoration in their re-pavement plans. In some cases, the restoration and re-pavement job is carried out by the Roads and bridges directorate who, in turn, schedule the re-pavements in their own plans. A key to minimize public discontentment and socioeconomic impacts of excavated streets is quick restoration and effective communication with regarding work and restoration schedules. 	Minor	<ul style="list-style-type: none"> LDC in full cooperation with the LGU 	<ul style="list-style-type: none"> LGU 	<ul style="list-style-type: none"> Site visits Complaints raised by community 	<ul style="list-style-type: none"> Part of construction activities
Occupational health and safety	Health and Safety	<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 ESMP will provide the provision of the health, safety and precaution of the environmental impacts and its mitigation measures to be followed during construction. 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 	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



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
	Risk pertaining to child labor	<ul style="list-style-type: none"> The ToR to be prepared for both contractor and subcontractors will prohibit any kind of hiring child labor in the project Rigid obligations and penalties will be added to the contractor/subcontractors' ToR in order to warrantee no child labor is occurred in the project The ToR also will oblige the contractor/subcontractor to keep a copy of IDs of laborers in order to monitor the hired staff below 18 years old The contractor/subcontractor also will be obliged to maintain daily attendance sheets in order to verify the attendance of workers not include staff below 18 years old 	Minor	<ul style="list-style-type: none"> LDC Excavation Contractor/s subcontractor 	LDC-HSE department	Field supervision and review of HSE report+ Field supervision (audits)	<ul style="list-style-type: none"> Contractor costs LDC management costs
Risk on Infrastructure and underground utilities	Damage to underground utilities resulting in water/wastewater leaks, telecommunication and electricity interruptions	<p>If maps/data are unavailable:</p> <ul style="list-style-type: none"> Perform limited trial pits or boreholes to explore and identify underground utility lines using non-intrusive equipment In case of breaking underground utility and infrastructure line, the company supervisor stops work in the affected area, calls the Police Department and emergency department in the relevant utilities company for immediate repair of the damage, which the contractor is invoiced for. <p>The mitigation measures on preventive measures and documentation:</p> <ul style="list-style-type: none"> Preparation and analysis of accidental damage reports Arrange Restoration and re-pavement (ردالشي لأصله) with local unit Communication with local community on excavation and restoration schedules. <p>Standard protocols adhering to national/local administrative requirements are to be followed:</p> <ul style="list-style-type: none"> Close and early coordination between the LDC (and the excavation contractor, if applicable), the local unit, and any other relevant authorities (in the case of public roads, the Roads and Bridges Directorate may become the counterpart to the LDC) Agreement on the restoration arrangements, schedules, fees, and payment schedules Coordination with the General Utilities before starting work especially the Traffic Department, sewerage, water, telephones and electricity departments. Payment of restoration fees by the LDC before works commencement Documentation of the agreement and adoption by all involved parties Communication with the Public and relevant authorities (such as the security and the traffic departments) regarding excavation and restoration plans 	Minor	<ul style="list-style-type: none"> LDC Local Governmental unit 	LDC	Field supervision and review of complaints Coordination minutes of meeting with the local governmental unit	LDC management costs
Local communities and businesses	Lack of accessibility to businesses due to delay in street rehabilitation	<p>Access to business due to digging out the streets will be mitigated through enabling alternative entrances to the business. Also special wooden bars will be used to enable the shoppers to get into the markets. Additionally, the duration of work will not exceed one working day. In case of digging main streets in the commercial areas, this can be only done during night after business closing</p> <p>Follow up the procedure of Grievance Redress Mechanism (please see Annex 6)</p> <ul style="list-style-type: none"> Ensure transparent information sharing The telephone numbers of the social development officer responsible for grievances should be shared with the community people 		<ul style="list-style-type: none"> LDC The sub-contractors 	LDC and EGAS SDO	<ul style="list-style-type: none"> Ensure the implementation of GRM Supervision on Contractors performance 	No cost



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Local community Health and safety	Threat to Safety of users and houses (due to limited level of awareness and misconceptions)	<p>Prepare Citizen engagement and stakeholder plan Awareness raising campaigns should be tailored in cooperation with the community-based organizations</p> <p>Following are some mitigation procedures to be adopted</p> <ul style="list-style-type: none"> Using caution tapes that help to keep people away of the site, Informing residents and shopkeepers about the timeline of the project (street by street) in order for the residents to know when to avoid certain streets Install wooden bars or decks over trenches to allow safe crossing A worker should support old people to cross the digging areas, especially, on the wooden bars 	Negligible	<ul style="list-style-type: none"> During the construction LDC 	LDC and EGAS SDO	<ul style="list-style-type: none"> List of awareness activities applied Lists of participants Documentation with photos Awareness reports 	<ul style="list-style-type: none"> 2250 \$ per awareness raising campaign 2250 \$ for brochure and leaflets to be distributed (material available by EGAS-\$ spent)

5.4 Environmental and Social Monitoring Matrix during CONSTRUCTION

Table 3: 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	HC, CO% and opacity	LDC HSE	Once before construction + once every six months for each equipment	Construction site	Measurements and reporting of exhaust emissions of construction activities machinery Complaints log	LDC management costs
Ambient noise levels	Increased noise levels	Noise intensity, exposure durations and noise impacts	LDC HSE	Regularly during site inspections and once during the night in every residential area or near sensitive receptors such as hospitals	Construction site	Measurements of noise levels Complaints log	LDC management costs
		Complaints from residents	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs
Physical state of street, soil, canal	Waste generation	Observation of accumulated waste piles	LDC HSE	Daily During construction. Monthly reports	Construction site	Observation and documentation	LDC management costs
		Observation of water accumulations resulting from dewatering (if encountered)	LDC HSE	Daily During construction. Monthly 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
Local traffic and accessibility	Reduction of traffic flow and accessibility to local community	Comments and notifications from Traffic Department	LDC HSE	Monthly during construction.	Construction site	Documentation in environmental monthly reports Complaints log	No cost
Underground utilities	Damages to underground utilities and infrastructure	Official coordination reports with relevant authorities	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs



Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
		Accidents documentation					
Local community	Damage to the streets	1. Streets quality after finishing digging 2. Number of complaints due to street damage	LDC, EGAS	Four times per year, each three months	Site and Desk work	Checklists and complaints log	No cost
Local community	Threat to Safety of users and houses (due to limited level of awareness and misconceptions)	1. Number of awareness raising campaigns implemented 2. Number of participants in information dissemination	LDC, EGAS	Quarterly monitoring	Office	Reports Photos Lists of participants	No cost
Labor conditions	Occupational Health and Safety	1. Total number of complaints raised by workers 2. Periodic Health report 3. Periodic safety inspection report	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost
Labor conditions	Child labor	1. Attendees lists with workers IDs 2. Complaints and accidents reports	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost

5.5 Environmental and Social Management Matrix during OPERATION

Table 4: Environmental and Social Management Matrix during OPERATION

Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost
				Mitigation	Supervision		
Integrity of natural gas piping	Network integrity	<ul style="list-style-type: none"> Detailed review of the geotechnical and geological history of the project area Random inspections and awareness campaigns to ensure that NG piping and components (both inside the household and outside) are not be altered, violated, or intruded upon in any way without written approval from, or implementation of the alteration by, the LDC. Availability of 24-7 hotline service (129) to all beneficiaries and the public for reporting possible leaks, damages or emergencies evacuation of the affected area Repair or replacement of failed component 	Minor	LDC	LDC HSE.	<ul style="list-style-type: none"> Map and local geotechnical report review Site inspections Awareness actions Periodical trainings and drills 	LDC management costs
Economically disadvantaged Community members	Financial burden on economically disadvantaged due to the installments	<ul style="list-style-type: none"> Petro Trade should collect the installment immediately after the installation of NG The installments should be collected on monthly basis in order not to add burden to the poor, as it will be easier for them to pay on monthly basis The installment should not be high 	Minor	Petro trade (Company responsible for collecting the consumption fees and the installments)	EGAS	<ul style="list-style-type: none"> Banks loans log Complaints raised by poor people due to the frequency of collecting the installments 	LDC management costs



Receptor	Impact	Mitigation measures	Residual Impact	Responsibility		Means of supervision	Estimated Cost
				Mitigation	Supervision		
Community health and safety	Possibility of Gas leakage	<ul style="list-style-type: none"> Information should be provided to people in order to be fully aware about safety procedures The hotline should be operating appropriately People should be informed of the Emergency Numbers People should be also informed about GRM telephone numbers (please see Annex 6) The Egyptian Emergency Response Procedure (in English and Arabic) has been included in the report as annex (8A and 8B). In addition, reference to the ERP is made in different sections of the report such as: 2.4.3, Table 7.1, Table 7.4. 	Minor	LDC	LDC	<ul style="list-style-type: none"> Complaints raised due to Gas leakage 	LDC management costs
Labor conditions	Occupational Health and Safety	<ul style="list-style-type: none"> Total number of complaints raised by workers Periodic Health report Periodic safety inspection report 	Irrelevant	LDC HSE	LDC	<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 1. -Reports about the workers and complaints 	LDC management costs

5.6 Environmental and Social Monitoring Matrix during OPERATION

Table 5: Environmental and Social Monitoring Matrix during OPERATION

Impact	Monitoring indicators	Responsibility of monitoring	Monitoring Frequency	Location of monitoring	Methods of monitoring	Monitoring Estimated Cost
Network integrity	<ul style="list-style-type: none"> Earthquakes or geotechnical settlements Emergency response time and corrective actions during emergency drills Reports of alteration or tampering with ANY gas components 	LDC HSE	Bi-annual inspections and annual emergency response drills	Along the network and inside and outside households	<ul style="list-style-type: none"> Inspection, leakage detection, running the drills 	LDC management costs
Financial burden on economically disadvantaged due to the installments	<ul style="list-style-type: none"> Number of economically disadvantaged people who complained Number of those who can't pay the installment 	LDC and Petro Trade, EGAS	Quarterly	Desk work	<ul style="list-style-type: none"> Complaints log Bank reports Petro trade reports 	No cost
Economic disturbance to the LPG distributors	<ul style="list-style-type: none"> Grievance received from the informal LPG distributors Information shared with them 	EGAS, LDC	Quarterly	Desk work	<ul style="list-style-type: none"> Complaints log 	No cost
Possibility of Gas leakage	<ul style="list-style-type: none"> Complaints raised by the community people Number of leakage accidents reported/raised 	LDC	Four times per year, each three months	Site and Desk work	Complaints log LDC	No cost



6 Stakeholder Engagement and Public Consultation

The public consultation chapter aims to highlight the key consultation and community engagement activities that took place as part of the preparation of the ESIA and their outcomes. Following are the main groups consulted during the ESIAF and the SSESIA and the engagement tools used.

Table 6-1: Summary of Consultation Activities in Qena Governorate

Participants		Number		Methods	Date
		Male	Female		
During the ESIA framework preparation					
Potential beneficiaries and governmental bodies		22	10	FGD	November and December 2013
Potential beneficiaries		75	67	Structured questionnaire	
Potential beneficiaries, government officials, NGO representatives,		96	57	Public consultation	
Total		193	134		
During the site specific phase I					
Government officials		5	1	In-depth	September and October 2015
NGOs		2	1	In-depth	
Community people		52	27	FGD	
Community people		475	168	Structured questionnaire	
Potential beneficiaries, government officials, NGO representatives,		68	42	Public consultation	7 th of February 2016
Total		602	239		
During Phase II (Qeft, Farshout, Naqada, el-Waqf)					
Potential beneficiaries	El-Waqf	7	11	FGD	End of February – First week of March 2017
	Farshout	7	12		
	Qeft	8	5		
	Naqada	8	8		
Government/public officials NGOs/CDAs representatives	El-Waqf	7	0	In-depth interview	End of February – First week of March 2017
	Farshout	5	1		
	Qeft	5	0		
	Naqada	4	0		
Total		51	37		



Table 6-2: Key comments and concerns raised during the different public consultation activities, and the way they were addressed during in the ESMP study

Subject	Questions and comments	Responses	Addressed in the ESMP Study
Safety of NG	-How safe is NG?	The NG networks and PRS adhere to the maximum safety measures. The safety requirements are related to the prerequisites needed to install the NG. The odorization of NG to detect any leakage, Monitoring and controlled inspections, enabling hotline to report on any leakage. There is multi-levels of safety measures. The above mentioned ones are just examples	It has been addressed in both project description and the community health and safety
Requirements for connecting NG to households	-What are the prerequisites that any buildings must have in order to be eligible for NG connections?	In order to install NG to an area, there has to be basic public utilities installed beforehand (water, sewage and electricity). The buildings must be built with concrete and red bricks. The total number of beneficiaries is economically accepted The new area should be close to the national gas grid	They were illustrated in the project description



Subject	Questions and comments	Responses	Addressed in the ESMP Study
Cost of installing NG to households and options for payments	<p>-How much is the installation fees?</p> <p>Is there a system of monthly installments to settle the installation fee?</p> <p>-Do we bear the cost of the pipes?</p>	<p>The cost of the installation fees ranges between (2300-3000 EGP). And there is a monthly installment system that extends to a period of 7 years to settle the installation fee.</p>	<p>Stakeholder section number 8 and cost payment in installment alternative</p>
NG connections to villages and hamlets	<p>-Is the NG connection project only limited urbanized areas? Will it include the villages and hamlets of Qena governorate, as well?</p>	<p>Connection to villages and hamlets is dependent on the availability of other public utilities (water, sewage, and electricity) Additionally, the village should be close to the national NG grid.</p> <p>If the village is big this will fulfill the requirements of economic aspect</p> <p>The hamlets are not targeted due to their limited population and the high cost</p>	<p>Stakeholder section number 8 and project description chapter</p>
Street rehabilitation	<p>-Who would carry out street rehabilitations after constructions?</p>	<p>The Local Governmental Units (LGUs) in el-Waqf, Naqada, Farshout, and Qeft are the ones in charge for fixing the streets and any other damages resulting from construction works.</p>	<p>section number 7.2.9 mitigation of street deterioration</p>



Subject	Questions and comments	Responses	Addressed in the ESMP Study
Information sharing about NG	-What is the average cost per month? -Are there options for setting up the meters?	-NGOs and CDAs in the four areas expressed their willingness to carry out awareness campaigns to share information with the local communities. The representative of the LGUs' Information Centers expressed the same willingness to carry out awareness campaigns.	Stakeholder section number 8
Water pressure	-if water pressure is low, the NG water heaters would not work. Is there a solution for that?	It is one of important prerequisite to install the NG is to have proper water supply. In case the water supply is weak, there is no solution and water heater will not be connected to the NG	Stakeholder section number 8 and in the project description. Prerequisites required to install the NG.
Compatibility with home appliances	-some of the household still use old appliances that might not be compatible with NG connection valves. Do we have to replace these old appliances?	It is important to have proper appliances that are compatible with the NG. Old stoves and water heater can't be connected to the NG. For Baladi ovens using for baking bread inside the houses, their valve is not compatible with the NG. Some negotiations took place with Industrial Factories but no agreement was reached to date	Stakeholder section number 8 and in the project description. Prerequisites required to install the NG.

6.1 Summary of consultation outcomes

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



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

The main concerns raised about street rehabilitation and the necessity to develop paying in installment schemes that is required to install the NG. Additionally, there was a high demand to share information with the local community about NG related issues i.e. safety measures and methods of payment.

6.2 ESMP disclosure

As soon as the site-specific ESMPs gets clearance from the World Bank and approval from EEAA, a final report, in English and Arabic, will be published on the WB, EGAS and ReGas websites. A copy of the ESMP 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 ESMP study.
