











1.5 Million Natural Gas Connections Project in 11 Governorates

Environmental and Social Management Plan

Shintina Al Hajar & Um Saleh Tilbant Abshish, Salaka villages/ Monofeya, Governorate

Final Report

December 2017

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)
BUTAGASCO	The Egyptian Company for LPG distribution
CAPMAS	Central Agency for Public Mobilization and Statistics
CDA	Community Development Association
CRN	Customer Reference Number
CULTNAT	Center for Documentation Of Cultural and Natural Heritage
EEAA	Egyptian Environmental Affairs Agency
EGAS	Egyptian Natural Gas Holding Company
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
GIS	Global Information Systems
GPS	Global Positioning System
HH	Households
HSE	Health Safety and Environment
IDSC	Information and Decision Support Center
IFC	International Finance Corporation
IGE/SR	Institute of Gas Engineers/Safety Recommendations
LDC	Local Distribution Companies
LPG	Liquefied Petroleum Gas
STP	Sewage Treatment Plant
mBar	milliBar
NG	Natural Gas
NGO	Non-Governmental Organizations
P&A	Property and Appliance Survey
PAP	Project Affected Persons
PE	Poly Ethylene
PPM	Parts Per Million
PRS	Pressure Reduction Station
RAP	Resettlement Action Plan
RPF	Resettlement Policy Framework
SDO	Social Development Officer
SIA	Social Impact Assessment
SSIAF	Supplementary Social Impact Assessment
SYB	Statistical Year Book
Town Gas	The Egyptian Company for Natural Gas Distribution for Cities
WB	The World Bank
WHO	World Health Organization
$	United States Dollars
€	Euros

Exchange Rate: US$ = 18.15 EGP. as of April 2017

Exchange Rate: € = 19.26 EGP as of April 2017

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1. Introduction

1.1 Project Objectives

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:**

- Describing project components in Shintina Al Hajar & Um Saleh (Berket El Sabaa Markaz), Tilbant Abshish (El-Bagour Markaz), Salaka (Shebin El kom Markaz) villages 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.

This ESMP follows national and World Bank requirements regarding scope and detail of assessment and procedure, and gives particular emphasis to public information and stakeholder participation. It will identify and assess significant impacts the proposed project is likely to have on the local population and on human health; on land, soil, water, air and climate; on landscape; on biodiversity; and on cultural heritage. It will identify risks and will suggest mitigation measures where appropriate. The areas and the total number of households which will be covered in this ESMP are illustrated in table 1-1:

Table 1-1: Number of Areas and Potential clients

Governorate	Local Distribution Company	Areas	Potential clients
Monofeya	Egypt Gas	Shintina Al Hajar	6400
		Um Saleh	5000
		Tilbant Abshish	1200
		Salaka	5600
TOTAL:		4	18200

The studied areas contain existing pressure reduction stations (PRS) and no ESIA is required for these areas. No major environmental or social risks can be foreseen which would prevent the project from reaching the targeted customers over the proposed 2-year timeframe. The extensive experience gained, by EGAS and affiliates; through implementation of the previous WB and GoE funded Natural Gas Connection project in Greater Cairo (and all over Egypt) plays a critical role in minimizing environmental and social risks and maximizing public ownership and acceptance.

1.2 Contributors

The ESMP 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 ESMP study listed in **Annex 1** of this report.

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:

(The red box below denotes project activities covered by this ESMP)

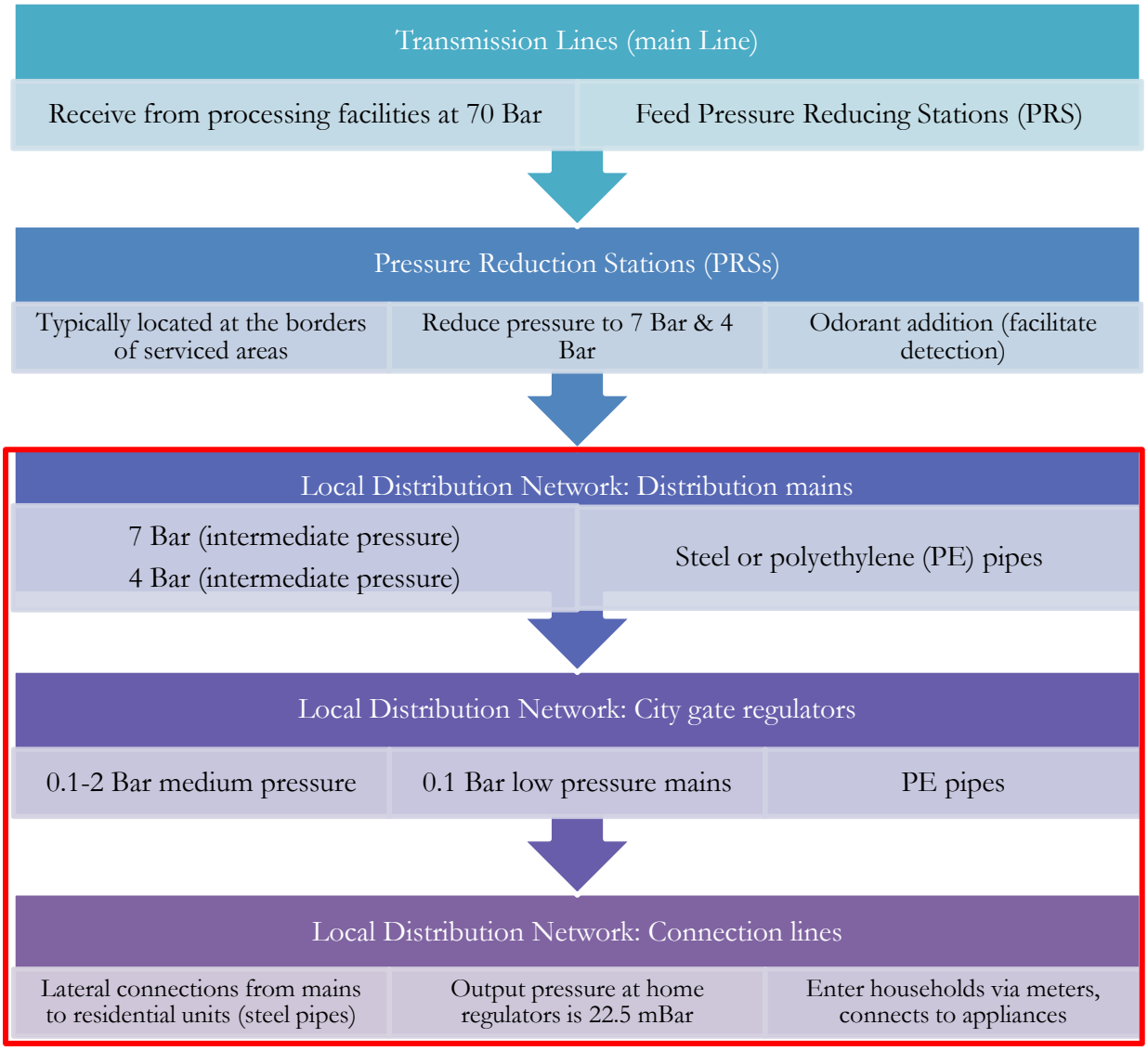


Figure 2-1: General components of Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka distribution network (Surrounded by red frame)

2.2 Project Work Packages

According to the agreement between Egypt Gas Company and the Egyptian Natural Gas Holding Company "EGAS" signed for supplying natural gas to more than 18200 domestic in **Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka districts, Monofeya Governorate**. Egypt Gas Company will start the necessary installations needed to feed natural gas for the customers in this region. The project scope within Monofeya Governorate's said districts will be as follows: -

2.2.1 Intermediate Pressure Network-Main feeding line (7 bar system) for Shintina Al Hajar & Um Saleh areas:

Shintina Al Hajar & Um Saleh areas belong to Berket El Sabaa, they are adjacent to each other; and thus, will be connected by the same polyethylene intermediate pressure feeding pipeline of about 4 km length.

Route

The proposed pipeline route will start from the intake point on an existing Intermediate Pressure gas pipeline which is located at the intersection of Berket El Sabaa – Shibin Al Kawm road with Abou Kafan road (Lat. 30° 37' 56.1" N, long. 31° 04' 48.20" E). The existing pipeline is extended from Kafr Elim pressure reduction station (PRS) (Lat. 30° 38' 28.21" N, long. 31° 06' 46.53" E) which is the feeding source for Markaz Berket El Sabaa.

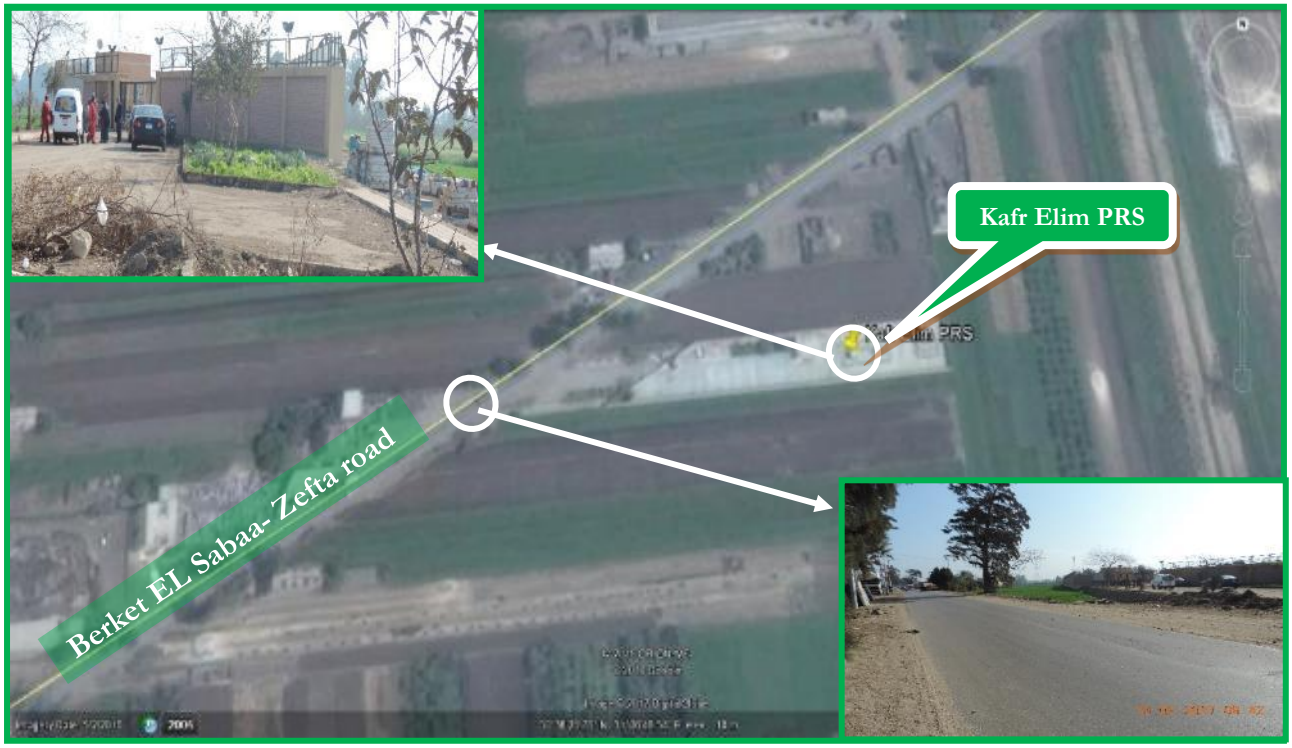


Figure 2-2: The Location of Kafr Elim PRS

The proposed pipeline route then extends to the east direction, parallel to Abou Kafan road for about 650 meter. Then turns north parallel to Al Halfaya road for about 722 meter till meet Shintina Al Hajar road, then going East for about 572 meter within Shintina Al Hajar road and finally extend for 1046 meter in "Route-41" road to reach the proposed pipeline endpoint location.

Figure 2-3: Satellite Map showing the proposed pipeline route feeding Shintina Al Hajar & Um Saleh areas

Figure 2-4: Pictures showing the proposed pipeline route feeding Shintina Al Hajar & Um Saleh areas

2.2.2 Low-pressure Distribution-Network for Shintina Al Hajar & Um Saleh areas:

Low-pressure gas exiting city regulators 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 for 10 sectors within Shintina Al Hajar and 8 sectors for Um Saleh as shown in figure 2-6 below.

Figure 2-5**: Satellite map showing the proposed Distribution - Network feeding Shintina Al Hajar & Um Saleh**

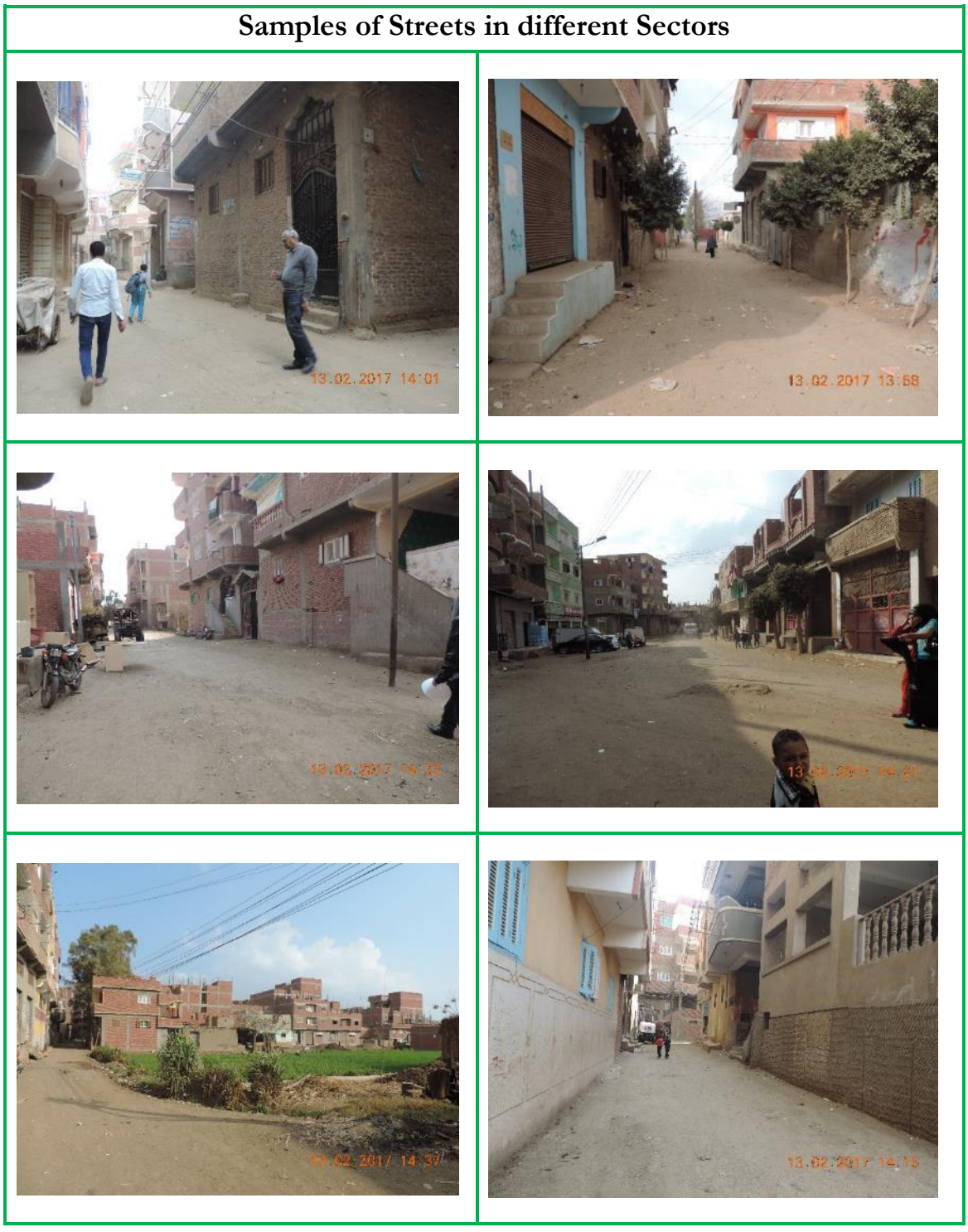


Figure 2-6: Pictures showing Samples of Streets in Sectors of Shintina Al Hajar & Um Saleh areas.

2.2.3 Intermediate Pressure Network-Main feeding line (7 bar system) for Tilbant Abshish area:

Tilbant Abshish belongs to El-Bagour Markaz, it will be connected with a polyethylene intermediate pressure feeding pipeline of about 4.6 km length.

Route

The proposed pipeline route will start from the intake Point on an existing Intermediate Pressure gas pipeline which is located at the intersection of Quesna – Shibin Al Kawm road with Gessr El Nile road (Lat. 31° 05' 35.32" N, long. 30° 25' 14.35" E).

The existing pipeline is extended from Quesna pressure reduction station (PRS) (Lat. 30° 32' 9.02" N, long. 31° 8' 55.93" E) which is the feeding source for Quesna Markaz.

Figure 2-7: The Location of Quesna PRS

The proposed pipeline route then extends to the north-west direction, parallel to Quesna–Shibin Al Kawm road for about 2580 meter. Then turn east parallel to El-Bagour – Banha road for about 2086 meter to reach the proposed pipeline endpoint location at entrance of Tilbant Abshish village (Lat. 30° 27' 24.34" N, long. 31° 5' 40.26" E).

Figure 2-8: Satellite Map showing the proposed distribution - network feeding Tilbant Abshish area

Figure 2-9: Pictures showing the proposed pipeline route feeding Tilbant Abshish area

2.2.4 Low-pressure Distribution-Network for Tilbant Abshish area:

Low-pressure gas exiting city regulators 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 installed horizontally underground for five sectors within Tilbant Absish as shown in figure 2-13 below.

Figure 2-10: Satellite map showing the proposed distribution - network feeding Tilbant Abshish area

Samples of Streets in Tilbant Abshish Sectors

Figure 2-11: Pictures showing Samples of Streets in Sectors of Tilbant Abshish area.

2.2.5 Intermediate Pressure Network-Main feeding line (7 bar system) for Salaka area:

Salaka belong to Shibin Al Kawm Markaz, it will be connected with a polyethylene intermediate pressure feeding pipeline of about 1 km length.

Route

The proposed pipeline route will start from the intake Point on an existing Intermediate Pressure gas pipeline which is located on the intersection of Quesna– Shibin Al Kawm road with Salaka road (Lat. 31° 03' 00.87" N, long. 30° 33' 00.61" E).

The existing pipeline is extended from Quesna pressure reduction station (PRS) (Lat.30° 32' 9.02" N, long. 31° 8' 55.93" E) which is the feeding source for Quesna Markaz (figure 2-9).

The proposed pipeline route then extends to the northeast direction, parallel to Salaka road for about 1000 meter to reach the proposed pipeline endpoint location at intersection of entrance of Sidi-Abu El-Hassan road with Salaka road (Lat. 30° 27' 24.34" N, long. 31° 5' 40.26" E).as shown in figure 2-14

Figure 2-12: Satellite Map showing the proposed distribution - network feeding Salaka area

Figure 2-13: Pictures showing the proposed pipeline route feeding Salaka area

2.2.6 Low-pressure Distribution-Network Network for Salaka area:

Low-pressure gas exiting city regulators 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 installed horizontally underground for 13 sectors within Salaka as shown in figure 2-16 below.

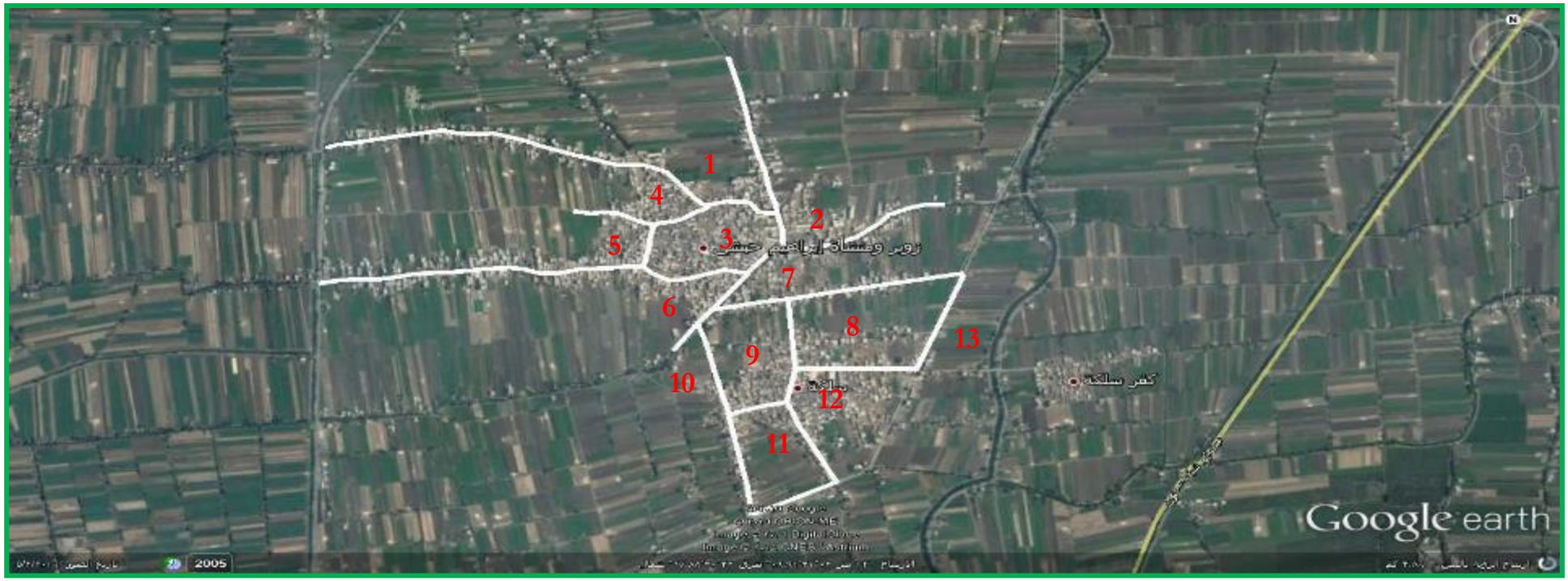


Figure 2-14**: Satellite map showing the proposed distribution - network feeding Salaka area**

Samples of Sectors

Figure 2-15: Pictures showing Samples of Sectors of Salaka area.

2.3 Project Execution Methodology

2.3.1 Project area selection criteria

Preliminary project planning has applied social, economic, safety, and technical criteria to identify sub-areas eligible for connecting customers (households). The project shall introduce the service in new areas and shall further extend the network in areas which are partially covered.

A preliminary estimate was generated through a general survey, followed by a Property & Appliance (P&A) survey. **The general survey covered the following:**

- 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 gas networks.

While the Property & Appliance (P&A) survey covered the following:

- Obtain the latest aerial maps of the project areas from the Egyptian Survey Authority
- Identifying Global Positioning System (GPS) coordinates of the sites
- Data is entered into a central database and G.I.S system for review by a design team
- Design team finalizes pipe sizing, capacity & locations and routing. Based on the surveys described above, potential connections in Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka are presented below: (Also see Figures 2-6, 2-11 & 2-16)

Table 2-1: Number of Areas, sectors and Potential clients

Governorate	Local Distribution Company	Areas	Number of Sectors	Connection Priorities[1]	Potential clients
Monofeya	Egypt Gas	Shintina Al Hajar	10	5►6►8►16►15►3►4►17►18►7	6400
		Um Saleh	8	9►10►2►13►14►12►11►1	5000
		Tilbant Abshish	5	4►2►3►5►1	1200
		Salaka	13	10►8►9►5►6►7►1►2►3►4►11►12►13	5600
TOTAL:		4	36		18200

[1] 5►6►8 : Connection start from 5th sector then 6th sector then 8th sector

2.4 Construction works of Main feeding line/network "7 bar system- low pressure Network 100 mmbar"

The construction activities of the network lines will involve drilling, pipeline placement, pipeline connection welding, and then surfacing. The construction activities will be located within the allocated site. The following activities will take place during the construction of network:

- Clearing and grading activities and Pipe transportation and storage
- Excavation and pipe laying
- Site preparation and excavation
- Pipe laying
- Backfill and road repair
- Leakage testing
- Construction works of household installation
- Commissioning
- The construction will be mainly in urban roads and local roads.
- No construction activities will take place in main roads.

2.4.1 Clearing and grading activities and Pipe transportation and storage

The first step of construction includes flagging the locations of approved access route of pipeline, temporary workshop for the crew, install fences surrounding the area of work, clean the land from any rubbish and /or remove weeds. Grading is conducted where necessary to provide a reasonably level work surface. Additionally, equipment and piping will be transported to the site (temporary storage area). 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.

2.4.2 Repairs in households

Before any excavation activities, the Egypt gas company 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, they will carefully excavate a trial pit.

2.4.3 Excavation

The most commonly used excavation technique is the Open cut technique. Alternatively, borings may be excavated using hydraulic drive, and finally Horizontal Directional Drilling (HDD) technique. HDD is only utilized in the case of railway crossings and major streets where traffic cannot be interrupted. In the case of HDD under railway crossings steel, a reinforced concrete sleeves will be installed to further protect the piping from fatigue. **It should be noted that there are no intersections with waterways of the Nile or its major branches in the studied areas.**

HDD is anticipated in **Tilbant Abshish** as it is required to cross a railway to reach it (Mit EL-Wasta railway crossing) as shown in figure 2-16:

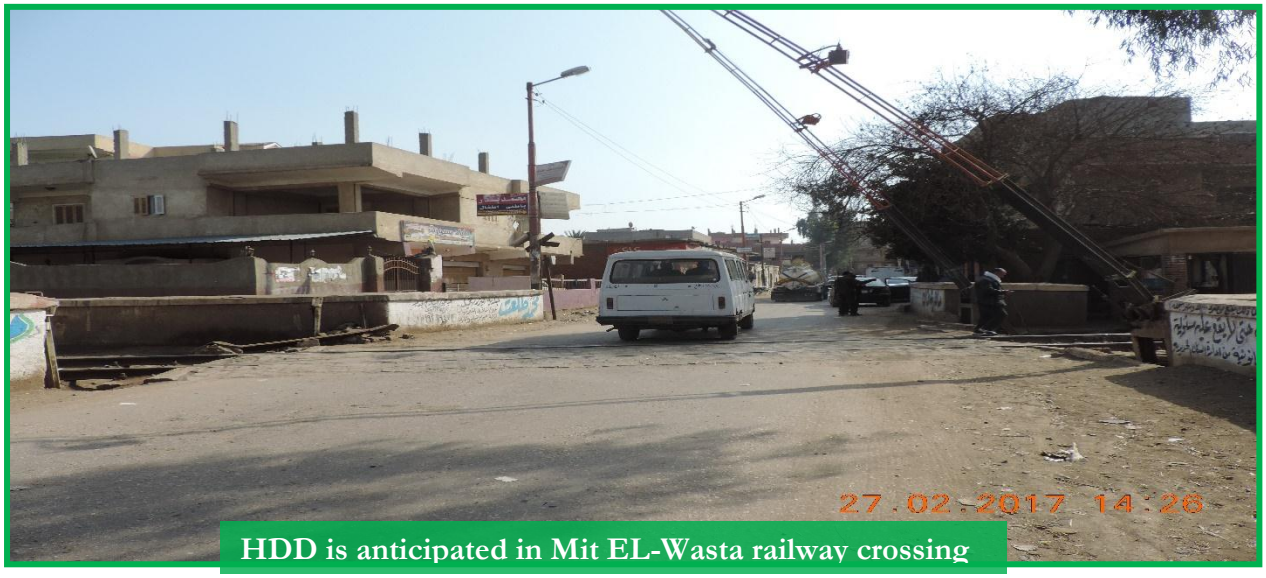


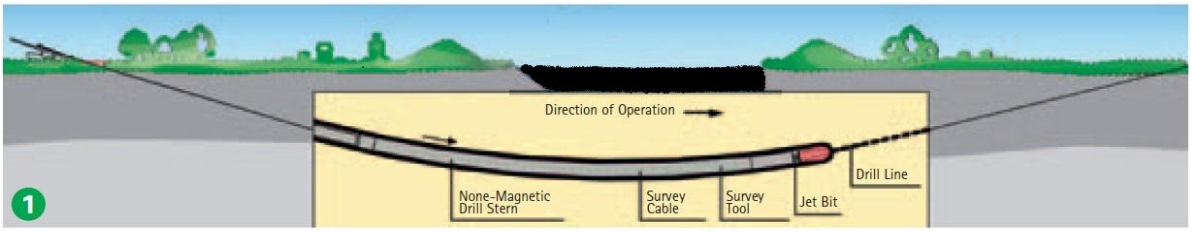
Figure 2-16: Pictures showing the proposed location HDD crossing in Mit EL-Wasta railway crossing

HDD is a trenchless methodology that use high excavation depths (about 30-40 meters) and can be used for high pipeline length. HDD provides a number of benefits compared to the other traditional technologies. Auger boring drilling is used in one of the urban road crossing. The horizontal auger boring trenchless technique involves equipment like auger boring machine, auger, and cutting head. This technique also requires the excavation of a drilling pit and a receiving pit. The process starts by lowering the auger boring machine into the drilling pit, and then the augers installed inside the casing pipe are lowered into the pit and connected to the auger boring machine. The boring operation then starts by rotating the augers and the cutting head, and pushing the casing pipe gradually forward. This process continues till the casing pipe emerges from the receiving pit side.

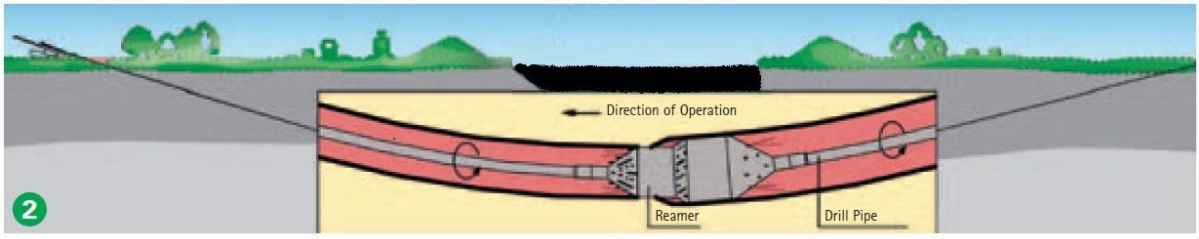
The boring process results in cuttings (spoil) which is carried through the augers and extracted from the entry side of the boring machine as shown in figure 2-17:.

Horizontal Directional Drilling (HDD) Technique

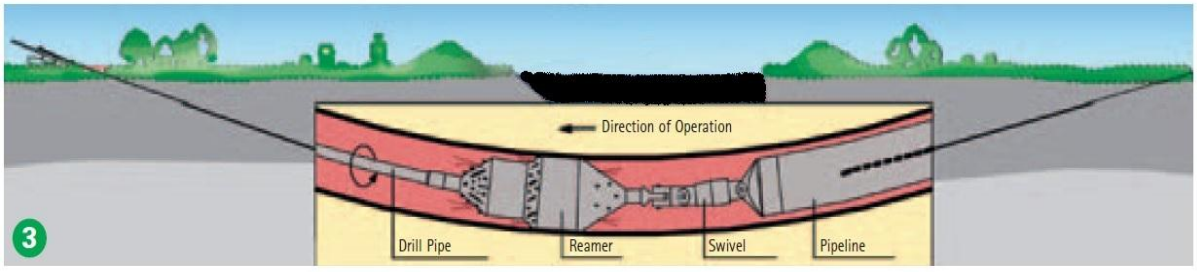
As simple as it is convincing. In the HDD method, pipelines are laid in three stages.



First, a pilot drill is carried out from the entry point. In this process step, a computer-controlled surveying system located behind the drilling bit steers the drill string along the planned route to the exit point on the other side of the obstacle to be crossed. The surveying system, the steering and the drilling tools can be adapted to any soil conditions, thus ensures the success of a project.



In the second stage, reaming the pilot drill, the drilling diameter is successively enlarged. To achieve this, the drill bit is replaced by a reamer. The reamer is equipped with jets and cutting tools, enabling it to remove the soil both hydraulically and mechanically. Depending on the soil conditions, a mixture of water and bentonite or other additives can be used for hydraulic excavation. This both supports the bore hole and reduces frictional forces, while allowing the excavated material to be transported to a separation plant on the surface.



Finally, the prefabricated pipeline or pipe bundle is **pulled-back** from the exit point into the enlarged and cleaned bore hole. To do this, the pipeline is connected to the pipe string and pulled back to the entry point. When the pipeline appears at the entry point, it has reached its final and safe position and the pipeline installation is complete.

Figure 2-17: Pictures showing Horizontal Directional Drilling (HDD) Technique.

Open-cut excavation works start by removing the asphalt layer and the base stone layer using either a mechanical excavator (used in urban roads) or an air compressor jackhammer for dusty roads (used in local roads). In case the jack hammer is used, road layers are removed by excavator. The trench is excavated to a depth that provides sufficient cover over the pipeline after backfilling.

The road base soil, underneath asphalt and stones, is then excavated either by a backhoe excavator or by manual excavation. The advantage of manual excavation is that it reduces the risks of breaking water, sewerage, electric or telecommunication lines which are unmapped.

At locations with irregular ground elevations, additional excavation may be applied to avoid undue bending of the pipe. In addition, and in case of having crossing with other underground infrastructure lines/cables, the trench shall be deepened so that the pipeline be installed below or above the existing lines/cables.

Typically, the trench (for PE100 7 bar network are orange pipes with diameter of 0.09 m to 0.25 m and for PE80 10 mmbar are yellow with diameter 0.25 m-0.03 m) is 0.4 - 0.6-meter-wide, and about 1.2-1.5-meter-deep, depending on pipe diameter.

The excavation products are placed on the sides of the trench by distance of 61 cm so it doesn't fall down inside the trench. The followed safety procedures are presented in **Annex 5**

Figure 2-18: Pictures showing sample of Typical trench for PE pipes by Egypt Gas

2.4.4 Types and Number of Equipment Used

The following table shows the types and numbers of equipment used:

Table 2-2: Types and Numbers of Equipment used

Serial	Equipment	
	Types	Numbers
1	Heavy Truck	1
2	Medium Truck	7
3	Light Truck	2
4	Pickup Truck	1
5	Mini Van	2
6	Compressors	4
7	Excavator	4
8	110 V Generator	7
9	220 V Generator	21
10	Welding machine	3
11	Cold cut machine	9
12	Hilti drill machine	32
13	Test Pump	18

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 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.
  - 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 Monofeya 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 Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka. The Pipelines network will not cross agricultural land in Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka and accordingly no compensation will be applied.

3.2.1 World Bank Group General Environmental, Health, and Safety Guidelines & WB 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 – HSE Guideline (provided in **Annex-2** from the report) 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 Information[2] will be followed by the Project.

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

3.3 Permits Required

- Railway Authority permit for crossing railways
- Constructions permit to be obtained from the Local Governmental Unit.
- Road and Bridges Directorate permission for digging of main roads in accordance to 84 of year 1968 pertaining to the public roads
- 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.

4. Environmental and Social Baseline

4.1 Description of the Environment

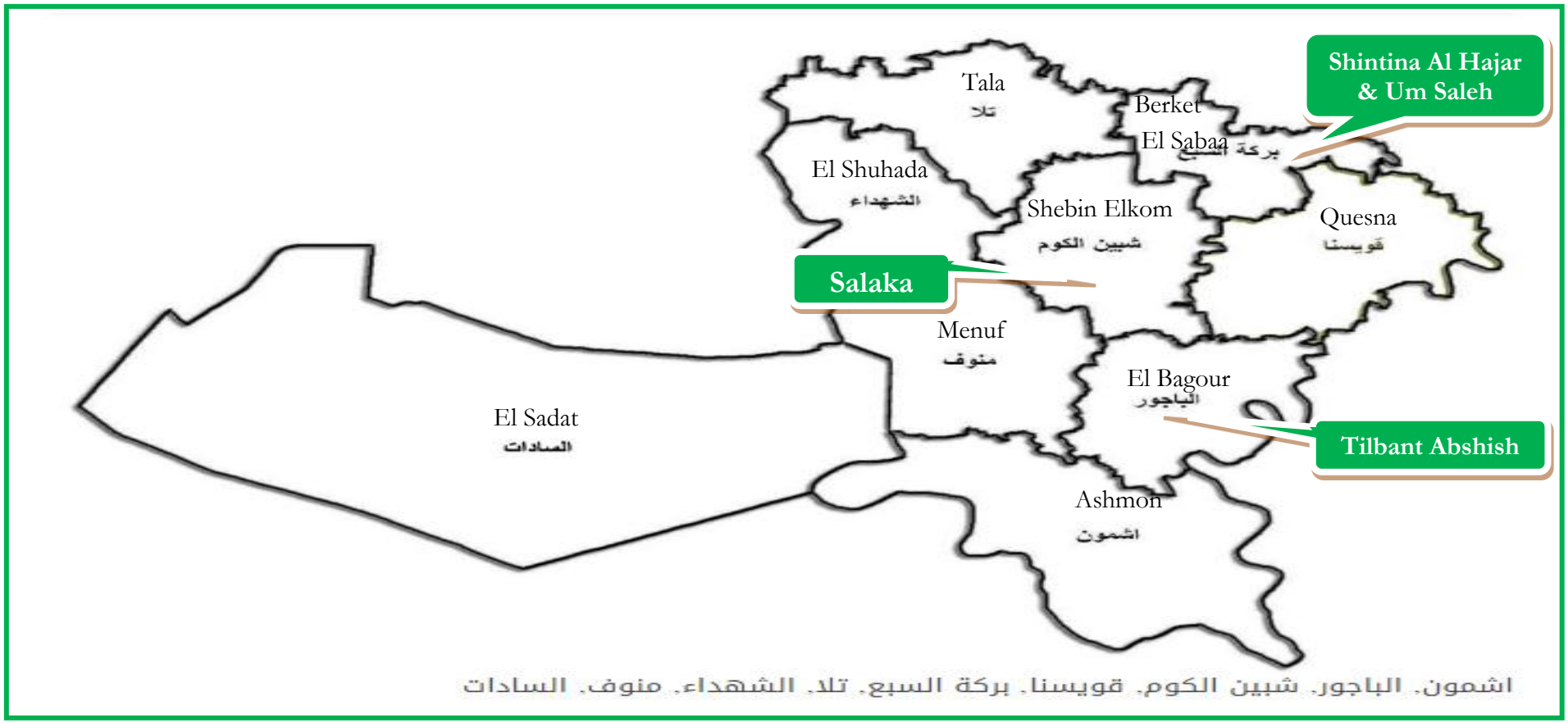


Figure 4-1: Distribution of cities in Monofeya governorate and proposed gas connections districts location

The proposed project aiming to construct a natural gas network feeding some districts of Monofeya governorate as per the following:

- **Shintina Al Hajar**

  Shintina Al Hajar village is located in Berket El Sabaa Markaz about 75 km from Cairo, bordered from north by Abdel Galel Ezbet and Berket El Sabaa-Tala Road and from south by Melieg village and from East by Berket El Sabaa and El agafary road and from west by Manshet el Refay village. (Figure 4-2)

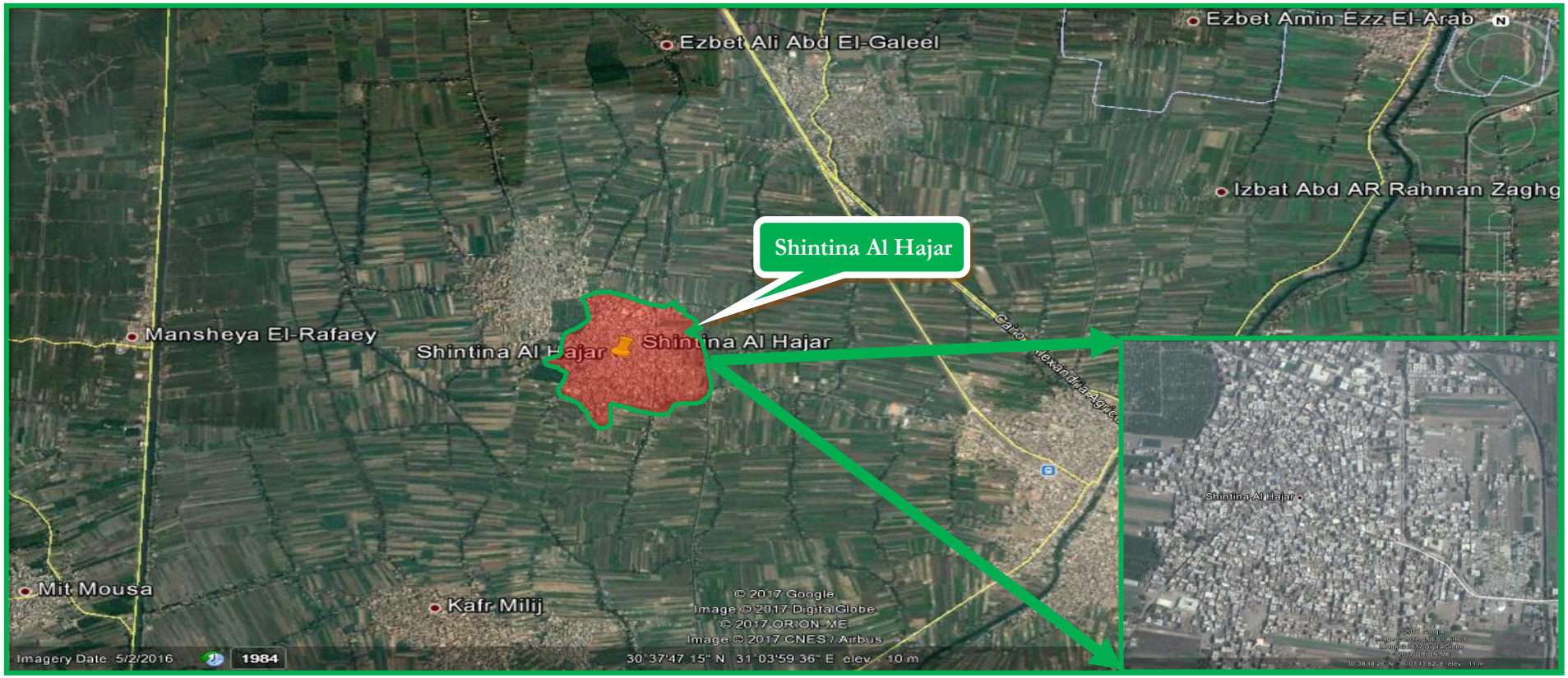


Figure 4-2: Satellite map showing Shintina Al Hajar village and surrounding communities

- **Um Saleh**

  Um Saleh village is located in Berket El Sabaa Markaz about 77 km from Cairo, bordered from north by Ganzour village and from south by Melieg Kafr and from east by Mostafa Kamel road and Cairo -Alexanderia road and from west by manshet El refay village and Tanta-El Bagour road. (Figure 4-3)

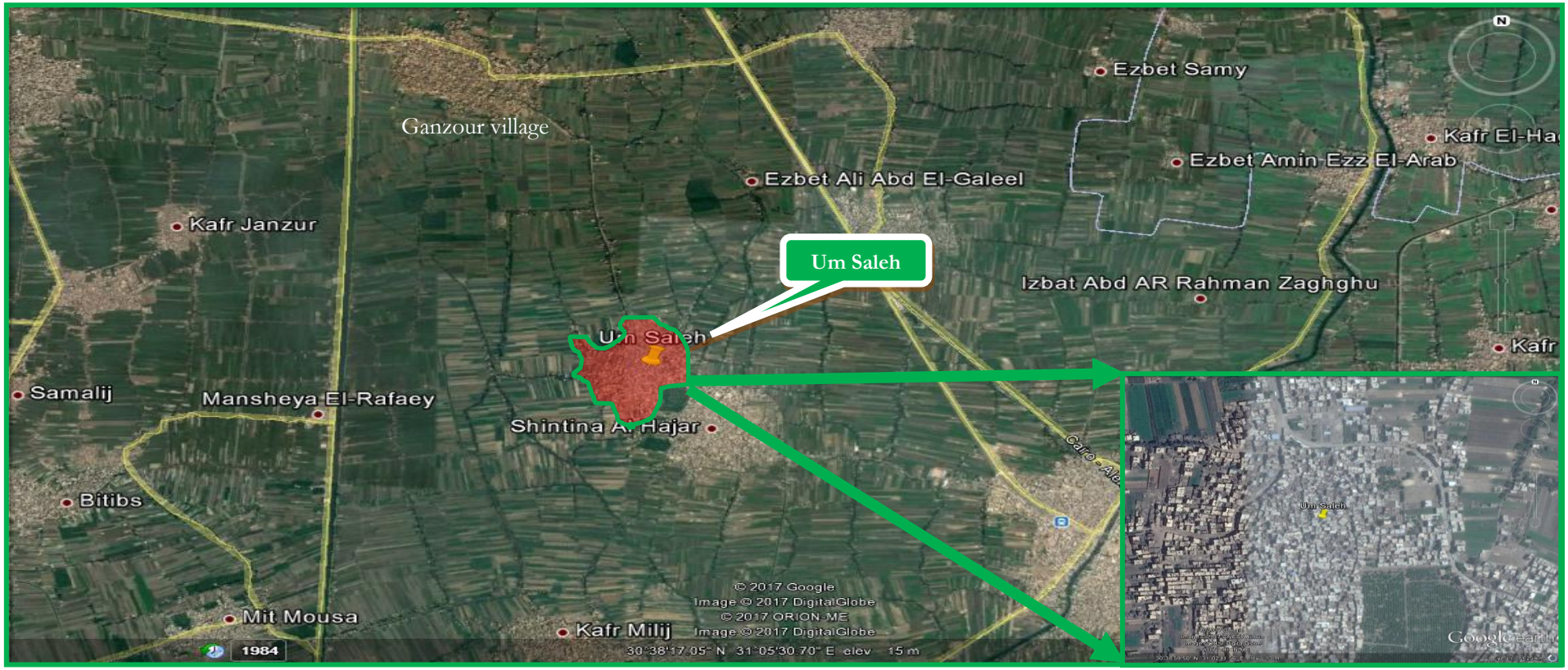


Figure 4-3: Satellite map showing Um Saleh village and surrounding communities

- **Tilbant Abshish**

  Tilbant Abshish village is located in El-Bagour Markaz about 55 km from Cairo, bordered from north by manshet um khenan village and from south by masharef village and from east by benha and from west by El Merghany village. (Figure 4-4)

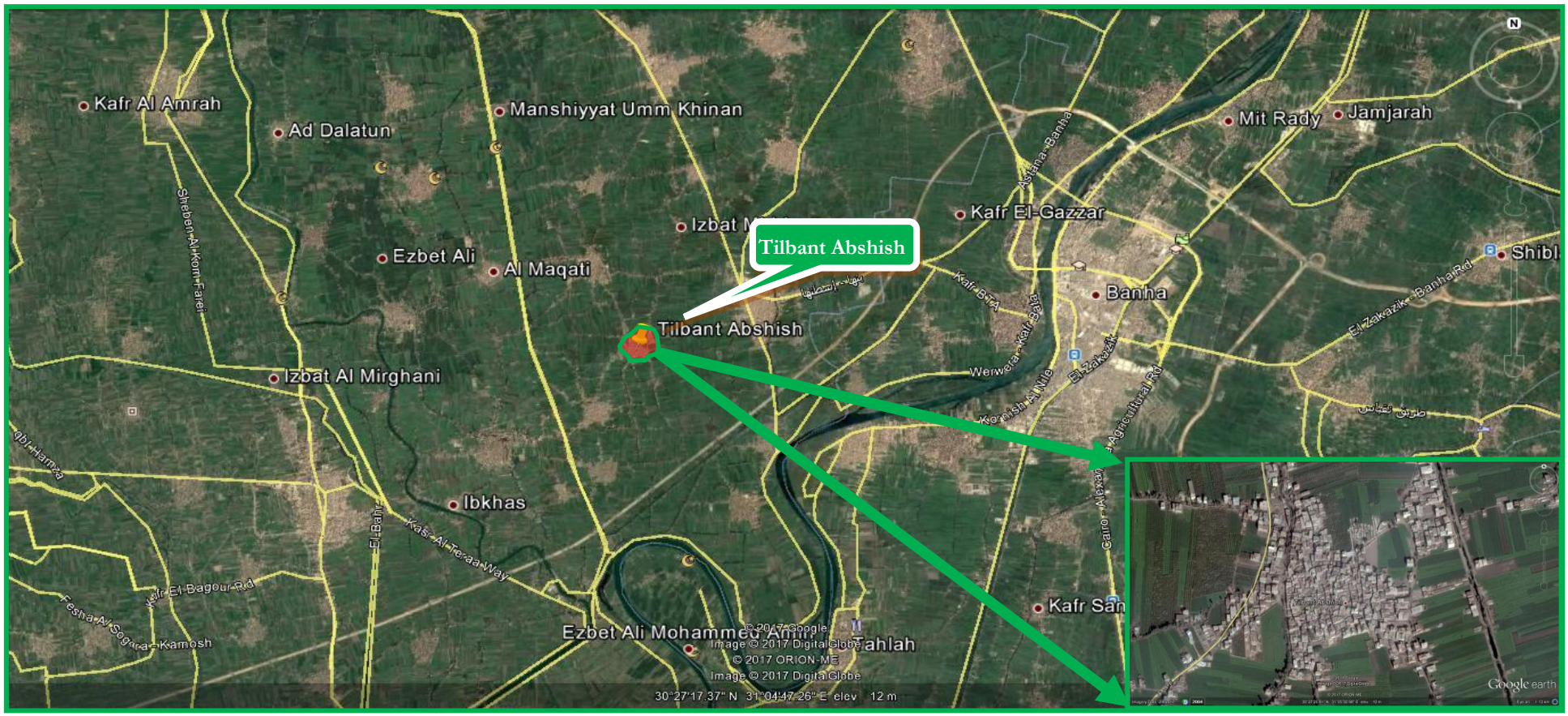


Figure 4-4: Satellite map showing Tilbant Abshish village and surrounding communities

- **Salaka**

  Salaka village is located in Shebin El kom Markaz about 70 km from Cairo, bordered from north by zeouir village and from south by Quesna-Shebin El Kom road and from east by Quesna and from west Meet Halfa village. (figure 4-5)

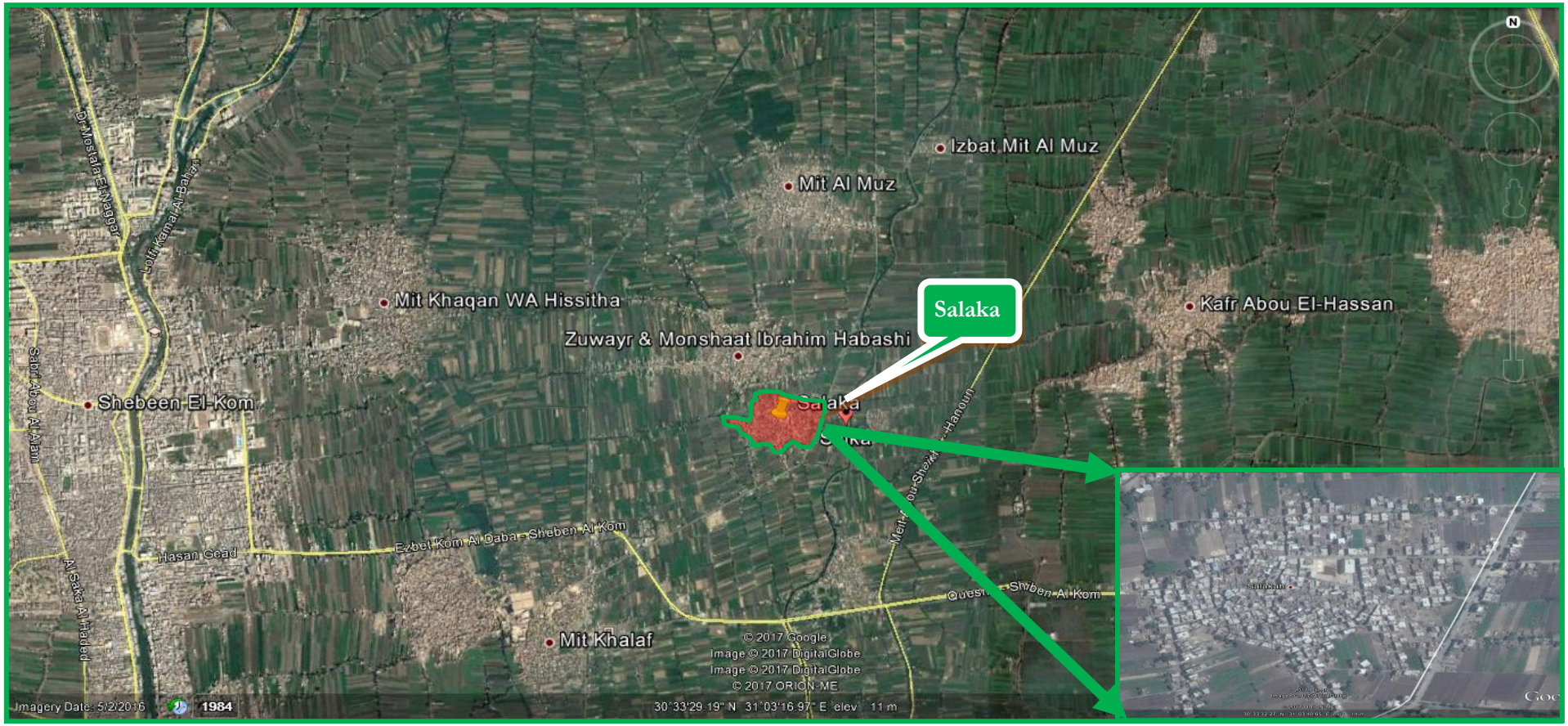


Figure 4-5: Satellite map showing for Salaka village and surrounding communities

4.1.1 Air Quality

Site Specific Ambient Air Quality:

The selection of the active air measurement location is based on the nature of the surrounding activities, the location of the nearest sensitive receptors 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 school and near a residential area beside a main road and close to the pipeline route. The GPS coordinates of the selected Ambient Air monitoring locations are shown in the table below.

One-hour average results for 8 hours continuous measurements were conducted for pollutants of primary concerns, namely, carbon monoxide (CO), nitrogen oxides (NO2), sulfur dioxide (SO2), Total Suspended Particulates (T.S.P) and particulate matter (PM10).

Table 4-1: Location of Air and Noise measurements

Area	Latitude	Longitude
Shintina El Hajar school/Residential area	30°38'.616"N	31°3'.360"E
Um Saleh school, Berket El Sabaa,	30°39'.272"N	31° 2.811"E
Tilbant Abshish primary school	30°28'14.01"N	31° 5' 28.28"E
Sadat primary school, Salka, Shebin El Koom	30°33'34.63"N	31° 3' 43.70"E

Methodology, instrumentation, and results of Air Quality measurements are detailed in Annex 3.

Results of ambient air quality measurements:

The concentrations of measured air pollutants in the studied areas are below national and WB guidelines (Table 4.2). Construction engines are certified, i.e., exhaust is below permissible levels. Ambient concentrations of gaseous pollutants, NOx, SOx 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. As the excavation and construction are done on the same workday, therefore, 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 chapters 7.

Table 4-2: Shintina Al Hajar, Um Saleh, Tilbant Abshish and Salaka average air Quality Measurements

Area	NO (µg/m3)	NO2 (µg/m3)	NOx (µg/m3)	SO2 (µg/m3)	CO (mg/m3)	PM10 (µg/m3)	T.S.P (µg/m3)
Shintina Al Hajar	18.3	26.88	46.4	13.74	3.63	79	109
Um Saleh	16	23.15	39.16	15.84	5.7	93	117
Tilbant Abshish	14.84	26.91	41.75	14.43	2.91	122.6	161.22
Salaka	15.99	21.68	37.66	13.05	2.98	101	137
Limits	150	200	150	350	30	150	230

4.1.2 Noise

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 as shown in Table 4-3.

Table 4-3: Shintina Al Hajar, Um Saleh, Tilbant Abshish and Salaka Noise Measurements

Area	LAeq	National Limits	International Limits
Shintina Al Hajar	57.31	60	70
Um Saleh	53.34		
Tilbant Abshish	55.16		
Salaka	52.76		

Methodology, instrumentation, and results of Noise measurements are detailed in Annex 3.

Results of noise measurements

The noise measurements in the studied areas are below national and WB guidelines.

The excavation and construction activities may cause noise levels to further surpass permissible levels at the site. As the excavation and construction are done on the same workday, therefore, the duration of permissible levels being surpassed will be intermittent for the duration of the work day i.e., 8-10 hours Management and mitigation plans for noise levels beyond permissible levels are further addressed in chapter 7.

4.1.3 Climate

Temperature

Table 4-4: Shintina Al Hajar, Um Saleh, Tilbant Abshish and Salaka Air Temperature[3]

Area	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Shintina Al Hajar & Um Saleh	Temp. (°C)	12.7	13.4	15.4	19.4	22.8	25.8	26.6	26.5	25	22.5	18.1	14.3
Tilbant Abshish		13.1	14.2	16.4	20.3	23.7	26.6	27.3	27.2	25.7	23.2	18.7	14.7
Salaka		13	13	16	20	24	27	28	28	26	23	20	15

Rainfall

Table 4-5: Shintina Al Hajar, Um Saleh, Tilbant Abshish and Salaka Rainfall[4]

Area	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Shintina Al Hajar& Um Saleh	mm	13	7.2	5.7	3	1.9	0.2	0	0	0	1.7	5.9	11.2
Tilbant Abshish		7.8	4.6	4.1	1.8	1.3	0.1	0	0	0	1	5	6.3
Salaka		0	0	0	0	10	0	0	0	0	0	0	10

Relative humidity

Table 4-6: Shintina Al Hajar, Um Saleh, Tilbant Abshish and Salaka Relative Humidity[5]

Area	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Shintina Al Hajar& Um Saleh	RH%	70.5	67.7	66.1	59.6	56.7	58.5	66.1	70.1	68.1	67	70.6	70.7
Tilbant Abshish		66.5	62.7	60.3	53.9	51.1	53.6	62	65.7	63.7	63.1	67.4	67.1
Salaka		62	54	51	50	48	49	55	55	62	58	64	65

[3] *Source: www.weatherbase.com*
[4] *Source: www.weatherbase.com*
[5] *Source: www.weatherbase.com*

Wind

Table 4-7: Shintina Al Hajar, Um Saleh, Tilbant Abshish and Salaka Relative Humidity[6]

Area	Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Shintina Al Hajar& Um Saleh	Km/hr	9.7	10.8	11.9	11.5	11.5	10.8	9.4	8.6	9	9.4	8.6	9
Tilbant Abshish		11.2	12.2	13.3	13.3	13.3	13	11.5	10.4	10.8	11.2	10.1	10.4

4.1.4 Terrestrial Biological Environment:

The projected work is planned along existing roads; no pipelines will be passing through any of the natural habitats. The gas route will be located in mixed agricultural and urban areas.

The proposed gas pipeline route and the connections of pipelines to households are planned in areas where flora and fauna of significance do not occur

Flora

There had not been flora recorded in the studied areas Except some non- significant exotic species such as ***Arundopliniiat*** at Shintina Al Hajar, Um Saleh, Tilbant abshish and Salka.

***Arundo plinii* and *palms* at Tilbant Abshish**

Figure 4-6: Shows flora at Tilbant Abshish

Fauna

In conclusion, the project area is essentially free from any endangered or vulnerable species.

[6] ***Source:*** ***www.weatherbase.com***

Bubulcus ibis at Salak	Bubulcus ibis at Shintina Al Hajar & Um Saleh
	

Canis lupus Species in the Study Area (Tilbant Abshish)

Raven Black at Salak	Raven Black at Shintina Al Hajar & Um Saleh
	

Domestic Animals exists at Tilbant Ibshish	Domestic Animals exists at Salka
	
Felis catus Species in the Study Area (Tilbant Abshish)	**Felis catus Species in the Study Area (Salaka)**
	

Figure 4-7: Shows fauna at study area

4.1.5 Waste Management:

Solid Waste:

The responsibility of service planning, delivery and monitoring in Al Monofeya Governorate is delegated to Cleansing and Beatification Agency managed by villages local units.

In most cases, the proportion of waste collected in the capital cities of the selected Governorates exceed 70 - 80%, However, in other cities at the Marakez, the figure is likely to be lower; - Few collection bins existed in the districts of AL-Monofeya Governorate, then will be transferred by local units Trucks to the dumpsite (Berket EL-Sabaa Dumpsite for Shintina Al Hajar & Um Saleh, Shebin El Kom Dumpsite for Salaka and Sadate Dumpsite for Tilbant Abshish as follows:

Shintina Al Hajar & Um Saleh (Berket El Sabaa Dumpsite)	
Salaka (Shebin El Kom Dumpsite)	

Figure 4-8: Shows dumping area at Shintina Al Hajar, Um Saleh and Salaka

Liquid Waste:

No liquid wastes are expected during the construction phase. However, if the sub-surface table is shallow, the trench should be dewatered (portable trash pumps are commonly used in construction projects) and discharge the water into a drain or sewer manhole, according to the arrangements with local authorities. Project activities in the studied areas will take place in the villages, where project workers will have access to public sanitary facilities. Therefore, no extra sanitary waste is anticipated.

Shintina Al Hajar & Um Saleh (STP)	
Tilbant Abshish (STP)	

Figure 4-9: Shows sewage treatment plants at Shintina Al Hajar, Um Saleh and Tilbant Abshish

4.1.6 Potential Sensitive areas:

No sensitive receptors have been identified along route of the main feed line and network extension. During the gas distribution network execution within the residential areas, the safety procedures of construction can be followed as following:

- Precaution signs,
- Security personnel.

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 areas. There has been substantial data gathering on socioeconomic conditions in the area. A number of visits to the project sites were conducted during February 2017. SIA tools were employed during the field trip including observation and interviews with local officials, community leaders, local administrative units, LPG warehouse, local health units, and NGOs.

This section will highlight the following socioeconomic characteristics of the project areas including: administrative division, urbanization trends, demographic characteristics, human development profile, access to basic services, roads and transport, poverty index, Income and expenditure, Fuel currently used in households, Problems faced with the current household fuel, Perception towards the project, gender dimension of the current type of fuel, and physical cultural resources.

Project Area

Monofeya is one of the oldest Governorates of Egypt. It is located in the northern part of the country in the Nile Delta, to the south of Gharbia governorate and to the north of Cairo. The governorate is named after Menuf, an ancient city which was the capital of the governorate until 1826. The main economic activity in Monofeya is agriculture. Monofeya is one of the Governorates of the central Nile delta, where it is situated amid the delta between the two branches of the Nile (Rosetta and Damietta). Monofeya borders shape a triangle; its head in the south and the base in the north, stretching to the west of Rashid branch of Sadat City. Given the location of Shebin outstanding that is mediating throughout the Governorate it has taken the capital of Monofeya. Shibin al Kawm city is the main city in the governorate, where there the main governmental departments and the main campus of the University of Monofeya. The project will be implemented in four villages of Monofeya governorate; Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka. The following table illustrates the project areas.

Table 4-8 Project Areas[7]

Governorate	District (Markaz)	Village
Monofeya	Berket El Sabaa	Shintina Al Hajar
	Berket El Sabaa	Um Saleh
	El Bagour	Tilbant Abshish
	Shibin Al Kawm	Salaka

[7] ***Source: CAPMAS***

4.2.1 Administrative affiliation

The total area of Monofeya Governorate of 2499 km^2 covers the rural sector (1773 m^2) which represents 70% of the total area. The populated areas represent 57.4% of the total area, while the desert lands represent 42.6% of the total area. Monofeya's capital is the city of Shibin Al Kawm (Monofeya Environmental Profile 2006). Menofeya Governorate is divided into (9) administrative districts (Markaz) and (10) cities (70) rural local units including (315) village and (1024) and Ezbet/Kafr. The nine districts (Markaz) are El Sadat, Shibin El Kom, Menouf, Ashmoun, Tala, El Bagour, El Shohada, Quesna, and Birket El Sabaa.

4.2.2 Urbanization Trends

Based on the observations during the site visits, the four villages can be classified as semi-urbanized areas. The four villages are typical small rural settlements, surrounded by intensively cultivated fields. There are high percentage of houses overlooking agricultural land. Typical features of the villages are mosques, schools, service buildings belonging to the government i.e. health unit, youth center, local administration unit, and a few local shops. Most of the people in the villages engage in agriculture. On the level of each village:

Table 4-9 Urbanization indicators for the project villages[8]

Governorate	Village	Urbanization Indicators	Buildings Density
Monofeya	Shintina Al Hajar	Percentage of agriculture lands are the highest in the project sites. Mixed nature; residential and commercial zones.	**Low**
	Um Saleh	Very small village, close to Shintina Al Hajar. Mixed nature; residential and commercial zones.	**Low**
	Tilbant Abshish	More urbanized than other villages in the project, roads are in a better shape, percentage of asphalted roads is higher as an indicator for urbanization. Commercial activities (restaurants, groceries, local cafes. Mixed nature; small industries, small workshops, residential	**Low**
	Salaka	Small semi-urbanized area, residential areas, small commercial activities (restaurants, groceries, local cafes), no factories or industrial zones.	**Low**

[8] ***Source: field visits observations***

Shintina Al Hajar & Um Saleh villages	
Masjid El-Nour	**Saint Mary Church**
	
Tilbant Abshish village	
Masjid El-Arab	**Tilbant Abshish Preparatory School**
	
Salaka village	
Masjid El-Shoura	**Saint Mary Church**
	

Figure 4-10: Pictures showing some of Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka villages Landmarks.

Dwelling Characteristics:

Monofeya Governorate is a rural governorate where around 80% of the total population lives in rural areas. New and most houses in the project areas are built using red brick. White stone is also used. The houses are joined to one another in a continuous row. Concrete is used more in the construction of ceilings of houses, particularly in new houses. Other materials, such as wood, are used. There are very few old houses; usually one or two stories high which are built using mud bricks plastered with mud and straw. Only the suitable houses (according to the best gas connections codes and standards) will be connected.

Table 4-10 Dwelling indicators[9]

Governorate	Village	Urbanization Indicators
Monofeya	Shintina Al Hajar	More urbanized village. Housing density is medium. Buildings area 4-6 floors and more like cities.
	Um Saleh	small village, close to Shintina Al Hajar. Mixed nature; residential and commercial zones.
	Tilbant Abshish	Housing density is moderate. Most buildings are 2-3 floors.
	Salaka	Housing density is low. Most buildings are 2-4 floors.

Three floors building in Salaka, red bricks	Tilbant Abshish Buildings and Agriculture Lands
	

Figure 4-11: Pictures showing some Dwelling indicators.

[9] ***Source: field visits observations***

4.2.3 Road distribution network and traffic

The four villages are connected to other areas by asphalt roads. Local streets consist mainly of narrow, dirt and winding footpaths. The width of the main streets within the four villages varies between 5-9 meters, while the width of the sub-streets varies between 3-5 meters. The following table provide more details on streets status.

Table 4-11 Streets status and traffic in the project areas

Governorate	Village	Streets status	Traffic density
Monofeya	Shintina Al Hajar	<u>Local streets consist of:</u> • Main wide asphalted streets as Dayer El Nahya street, Um Helal street, Route-41 street, Shintina Al Hajar – Um Saleh road. • Side narrow, dirt and winding footpaths.	High traffic density.
	Um Saleh	Main street is Shintina Al Hajar – Um Saleh road, Local sub-streets consist mainly of narrow, dirt and winding footpaths.	Medium traffic density.
	Tilbant Abshish	Local streets are in a good shape consist mainly of narrow, dirt and winding footpaths.	Low traffic density
	Salaka	The village is reached by Salaka asphalted road. Then enter the village through Sedi Abu El Hassan street which is medium dirt street, the other sub-streets as the church street (sharia el kenisa) consist mainly of narrow, dirt and winding footpaths.	Low traffic density.

The streets in Shintina Al Hajar and Um Saleh are congested with pickup trucks, cars, TukTuks, carriages pulled by donkeys, bicycles, motorcycles, tricycles and pedestrians. While in Salaka and Tilbant Abshish Tractor, motorcyles and TukTuks are the most means of transportation.

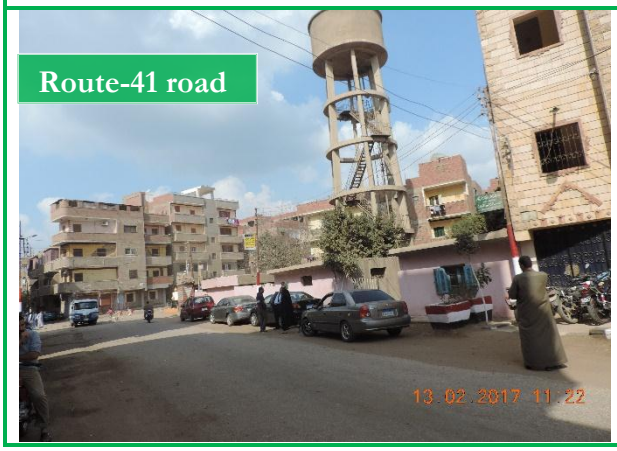
Asphalt main street in Shintina Al Hajar	Asphalt main street in Um Saleh
	

Figure 4-12: main streets in Shinitna Al Hajar and Um Saleh.

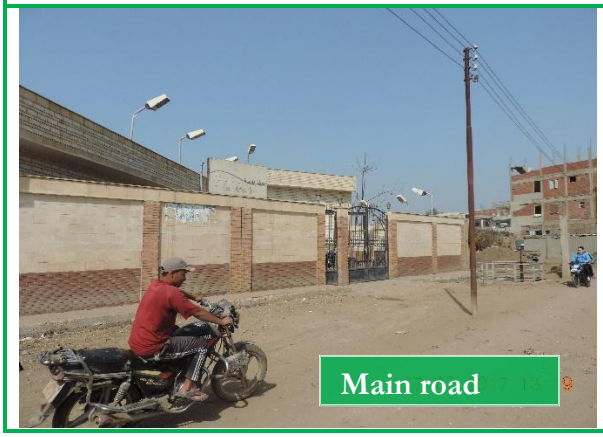
Main street in Tilbant Abshish	Main street in Salaka
	

Figure 4-13: main streets in Tilbant Abshish and Salaka.

4.2.4 Demographic Characteristics

Total population:

Total population and number of households, within the four villages presented in the table below:

Table 4-12 Distribution of population in project areas[10]

Governorate	Village	Population	Potential clients
Monofeya	Shintina Al Hajar	19278	5000
	Um Saleh	11612	4000
	Tilbant Abshish	6717	2000
	Salaka	9500	2500
Total		47107	13500

Rate of natural increase:

The birth rate in Monofeya is 29.8 per 1000 of population, the death rate is 6.2 and the rate of natural increase is 23.7 (CAPMAS Statistical Year Book 2016). The annual population growth rate is in Monofeya has decreased from 2.1% in 1996 to 1.7% in 2008 (Egypt HDR 2010) where the current annual growth rate in project sites is 2.55%.(Egypt HDR 2010)

[10] ***Source: villages local units, CAPMAS, Gas Misr***

4.2.5 Household size

A household is defined as "Family (and non-family) members who share residence and livelihood, and operate as one social and economic unit". The average family size in Monofeya governorate is about 5.01 persons. The following table illustrates the average family size in the project areas.

Table 4-13 Average family size[11]

Governorate	Village	Family size
Monofeya	Shintina Al Hajar	5.0
	Um Saleh	5.02
	Tilbant Abshish	6.1
	Salaka	5.6

4.2.6 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 areas and the focus group discussions, the four villages found to have access to basic services, such as; electricity, sanitation, and potable water. Thus, it will be possible to install the NG to the four villages.

The following table contains the percentage of individuals who have access to basic services in the project areas.

Table 4-14 Access to basic services[12]

Governorate	Village	Percentage of persons having access to portable water	Percentage of persons using electricity for lighting	Percentage of persons having public sanitation network
Monofeya	Shintina Al Hajar	84%	97%	92%
	Um Saleh	84%	99%	95%
	Tilbant Abshish	91%	95%	90%
	Salaka	98%	97%	90%

[11] ***Source: villages local units, CAPMAS***

[12] ***Source: villages local units***

4.2.7 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 target areas (Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka)

Education:

Monofeya is one of the most highly educated governorates with a high proportion of educated people out of the total population. Perhaps the reason for this is due to the high population density, making the citizens of Monofeya enroll their children in different education levels to enhance their chances in the future job market. The adult literacy rate (+15) is 72.6 where the national rate is 70.4 and combined basic and secondary enrollment rate is as high as 95.6% where the national rate is 77.6%. There are 22 students per each teacher (Egypt average is 23).[13]

Table 4-15 Education status in the project areas[14]

Governorate	Village	Education status
Monofeya	Shintina Al Hajar	Unlike most of the Egypt's countryside that facing a serious shortage in the education facilities, Shintina Al Hajar has reasonable number of educational authorities: 3 primary schools, 2 prep schools, 1 experimental school, 1 private school, 1 secondary school, 1 institute of Al-Azhar
	Um Saleh	Mit Om Saleh has reasonable number of educational institutions: 2 primary schools, 1 prep schools, and certainly the educational facilities at the adjacent village Shintinaa Al Hajar will be available for Mit Om Saleh residents
	Tilbant Abshish	There are 236 schools in El-Bagour (out of 2173 schools in Monofeya) whereas in Tilbant Abshish, the average density in classrooms is 42 students. There is one elementary school, one preparatory school 1 and one Azhar Islamic Institute in Tilbant Abshish.
	Salaka	There are 316 schools in Shibin el Kom (out of 2173 schools in Monofeya) whereas in Salaka, the average density in classrooms is 41 students. There is one elementary school in Salaka (El Sadat Elementary) with capacity of 10 classrooms and one preparatory school with 4 classrooms.

[13] *Egypt Human Development Report 2010*

[14] *Source: field visits observations*

Unemployment and work status

Labour force (15+) is 35% of total population at the governorate level according to the UN Human Development Report 2010 counting to about 1,058,969 persons. The total number of the employed is 903.734 people. The total unemployed 155.235 with an unemployment rate of about 14%. Observations from field visits and social assessment show that the majority of population resides in project villages are farmers, workers, teachers, craftsmen, and employees. In Tilbant Abshish and Shintina Al Hajar there are more skilled workers i.e. carpenters, drivers, and workers. There are no manufacturing projects, very few skills workers and craftsmen. Thus, the Gas Connection company, should consider the current skills profile during local hiring. Observations and discussions indicates that the households can afford to pay NG installation costs where the availability of reasonable installment plan is highly desired.

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

4.2.8 Poverty index

Although the prevalence of poverty (poverty rate) is higher in rural areas and highest in rural Upper Egypt, poverty grew the most in urban areas in Egypt during 2009-2011 (by 39.1 percent in urban governorates, by 41.1 percent in urban Lower Egypt and by 38 percent in urban Upper Egypt) where considerable pockets of poverty exist. Around 20% of people in Monofeya are considered poor (CAPMAS 2013). This makes the governorate in relatively positive position in terms of poverty ranking. Poverty percentage is estimated to be higher in Salaka and Um Saleh since they are small rural areas where poverty rates are usually higher due to lack of industrial, commercial activities, income sources and job opportunities. During the social assessment, the

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

majority of households in the project areas expressed their willingness to be connected to the NG and that they can afford to pay NG installation costs either in cash or in installments.

4.2.9 Income and expenditure

GDP refers to the total value of services produced using internal and external resources where the economic situation is one of the main pillars of human development. Monofeya is low ranking among the governorates of Egypt for per capita GDP. Per capita GDP is around $202 where Port Said the highest is about $580[16]. The level of income is relatively low in Salaka and Um Saleh and a bit higher in Tilbant Abshish and Shintina Al Hajar. Main sources of income are agriculture, governmental occupation and transfers from workers in Gulf countries. Most of salaries are relatively low, compared to Cairo and large cities. Social Assessment field visits estimates refers to the average income for adults in Salaka and Um Saleh is between $82.6-$137.7 per month; Tilbant Abshish and Shintina Al Hajar $110-$165.2 per month.

4.2.10 Fuel currently used in households

The total annual consumption of LPG cylinders for household use in Monofeya in 2012 is 24,652,709 cylinders where the urban consumption represents 11%, and rural consumption 89% of total Monofeya consumption[17]. The highest proportion of consumption is in the rural areas[18]. The majority of the samples surveyed in the project areas reported that, the main type of fuel used for cooking is the LPG cylinders. The source of aforementioned type is mainly the LPG vendors (sareha). The second source is the LPG outlets. Field survey stated that, the average cost of LPG cylinders per household in Salaka is $1.65-2.47 per month /$19.8-29.7 per year. This cost is relatively high cost comparing to local people income.

Table 4-16 LPG cylinder outlet and consumption[19]

Governorate	Village	LPG cylinder outlet	Average consumption of LPG cylinders per household
Monofeya	Shintina Al Hajar	There is one LPG cylinder outlet in Shintina Al Hajar village, 3 outlets at the local unit. The annual allocation of the LPG cylinder for the outlet of Shintina Al Hajar village is 93,600 per year	20 LPG cylinder per year.

[16] source: Human Development Report 2010

[17] ***Monofeya Information Center Newsletter 2014***

[18] ***Monofeya Information Center Newsletter 2014***

[19] ***Source: Field visits observation, Monofeya Information Center newsletter 2014***

Governorate	Village	LPG cylinder outlet	Average consumption of LPG cylinders per household
	Um Saleh	No LPG cylinder outlet exists in Om Saleh village, but 3 outlets are existing within the local unit that consists of 5 villages, the nearest outlet will be the one of Shintina village.	12 LPG cylinder per year.
	Tilbant Abshish	There is no LPG cylinder outlet in Tilbant Abshish. The nearest outlet is around 3 km far	20 LPG cylinder per year.
	Salaka	There is no LPG cylinder outlet in Salaka. The nearest outlet is around 12 km far	11 LPG cylinder per year

The average consumption of LPG cylinders for cooking per household ranges between 1 to 2 cylinders monthly. While during winter, each household consumes between 2 to 4 cylinders monthly. With regards to the fuel used for water heating, the majorities of the samples surveyed in the project areas rely upon LPG cylinders, while very few percentages of the samples surveyed rely upon electricity.

4.2.11 Problems faced with the current household fuel

The study aimed at highlighting problems associated with the LPG cylinders in order to verify the willingness of community people to convert to the natural gas. The majority of the samples surveyed in the four villages reported the problems related to LPG cylinders

- High cost of LPG and price fluctuations especially during winter
- The tedious process to obtain LPG cylinders
- LPG cylinders are not available all the time
- LPG cylinder is a bomb in the house; it might explode in any minute.
- The LPG is not completely full. It is half filled
- Sometimes it might leak
- It is difficult to bring the LPG upstairs

With regards to the electricity heater, high electricity bill was the first major problems. The second problem is having weak water flow that does not enable heater working properly. The third major problem is the power cut. Therefore, the majority of samples surveyed in the project areas expressed their willingness to be connected to the NG.

4.2.12 Perception towards the project

During the social assessment field work, the team recorded notable and tremendous public acceptance 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 areas (Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka) have positive perceptions about NG connections project. They reported that NG has many benefits:

- NG will save community people's efforts and money
- It is reliable, safe, and available
- It will limit the quarrels and fights that occur to obtain an LPG
- It will also limit vulnerability to LPG shortages
- It will save electricity that is used in electricity heaters and reduce the cost of electricity bills

4.2.13 Gender dimension of the current type of fuel

Females are the main player when it comes to the domestic labor related to handling LPG. According to the interviews and the focus group discussions:

- Women in the project village are responsible for travelling to other villages in many cases to bring LPG cylinders. They are also responsible for carrying the LPG cylinders from the outlets and installing them to their stoves or water heaters, as the LPG outlets are located outside the village, which adds more pressure on women in terms of time, effort and money.
- In Shintina Al Hajar, there is LPG outlet and LPG vendors spread in the village; however, women are also in charge of waiting the vendors in order to change the cylinders.

4.2.14 Willingness and affordability to pay

For the planned NG connection project, the contracting fee for each client is estimated to be $119. This includes the cost for up to two devices (cooker / heater). There is an option for a payment plan through an agreement with El-Ahly bank, as a facilitation for the clients. From the social assessment and the field visits discussion, it has been found that most people at the project villages are highly willing to convert to the NG. This is due to the high cost, difficulties of

securing LPG cylinders and the associated risks issues. Community people are much in favor to host the project. However, it is crucial for the NG company to provide clear information about the project in order to guarantee community support to the project. The majority of the samples cannot pay NG installation costs in one installment, they strongly recommended to have payment plan and All NGOs interviewed expressed their willingness to act as communication channels with poor but no one of them will provide financial aid to the poor. However, the AFD in cooperation with the European Union will provide the poor with a kind of grant to be able to install the NG. This initiative has been approved and will be applied to all project areas.

4.2.15 Physical culture resources

Low pressure Natural Gas installation pipework shall only take place in the semi-urbanized areas in Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka These areas have already been excavated beforehand, in order to install other public utilities such as water, sanitary, sewage and electricity networks. It is least likely to find any artifacts or antiquities where low pressure NG installation pipework is going to take place. There are no identified archeological sites or sites with cultural or historical value located within those semi-urban areas that would be affected by the NG pipework. IN case of any unanticipated archeological discoveries within the project areas; the **Annex 2** section, entitled 'Chance Find Procedure,' details the set of measures and procedures to be followed in such case.

5. Environmental and Social Impacts

The environmental and social impact assessment 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 positive ones. The evaluation of the potential impacts on various receptors is based on a significance ranking process described in the following subsection. Details are presented in **Annex 4**.

5.1 Impact Assessment Methodology

The impact assessment methodology adopted for this ESIA is a semi-quantitative "cause-effect" matrix modified from Leopold and Buroz´s Relevant Integrated Criteria. The Leopold matrix is two-dimensional, where the stages of the project (activities) are assessed in relation to the existing environmental characteristics and conditions that may be affected during the execution of those actions. The impact of each activity on each receptor was assessed according to magnitude on a scale of -10 to 10, where negative values indicate a negative influence on the receptor, and importance on a scale of 0 to 10, which encompasses the probability of occurrence, frequency of the impact etc. The numbering system is used as a relative measure, where more negative numbers correspond to impacts having a higher negative magnitude. Susceptible receptors and corresponding activity are deduced if magnitude and importance are of minor severity. Then the importance of each impact by activity is determined based on the Buroz relevant integrated criteria. The importance of each impact by activity is assessed by assigning a score for intensity (IN), extension (EX), momentum (MO), persistence (PE), reversibility (RV), recoverability (MC), synergy(SI), accumulation (AC), effect (EF) and frequency (PR) of the impact. The importance, I, is determined according to **I = ± (3IN + 2EX + MO + PE + RV + SI + AC + EF + PR + MC).** For both methods, the severity of the impact is defined as either irrelevant, minor, medium, or major. Results from both methods are summarized and presented according to the following scheme:

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);	
51-75	**Medium** severity (larger scale impacts:	

Importance of Impact	Impact Rating	Color Code
	local or regional; appropriate mitigation measures readily available);	
76-300	**Major** severity (Severe/long-term local/regional/global impacts; for negative impacts mitigation, significant).	

Detailed impact assessments results are presented in two tables in **Annex 4**.

5.2 Impacts during Construction phase

5.2.1 Positive impacts

The project may result in the creation of job opportunities, both directly and indirectly.

- **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 - 60 drilling worker, two engineers and 20 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.

- **Indirect benefits**

  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 Shebeen el kawm to the project districts 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 in Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka; those receptors include Subsurface water, Ecological (fauna or flora), vulnerable structures, cultural vulnerable sites and land use. The receptors which might be affected during the construction phase will be as follows:

5.2.2.1 Air Emissions

Environmental impacts

Construction of the network pipeline will include several activities such as excavation, land clearing, 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. Table (4-2) showing that the concentrations of measured air pollutants in the studied areas are below national and WB guidelines. As a result, we can conclude that ambient concentrations of gaseous pollutants, NOx, SOx and CO are unlikely to surpass permissible levels due to operation of construction equipment. Also, construction activities will be conducted for a short period. The following air pollutants are foreseeable for most of the construction activities:

- Particulate matter and suspended solids from excavation/backfilling operations
- Possible dispersion from stockpiles of waste or sand used for filling trenches.
- Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SOx, NOx, CO, VOCs, etc.
- Fugitive dust emissions (PM10, PM2.5)
- Traffic congestions resulting from road closure or slowing down of traffic due to excavation works.

Dust

The impact of dust generation (particulate matter) will be limited to the working hours as excavation and backfilling are carried out within the same day. Excavation on dusty or rocky roads such as local roads and some urban roads are likely to generate more dust compared to asphalted streets due to the dusty status of those roads.

Gaseous pollutants emissions

Machinery used during construction such as excavators, generators, boring machines, etc. are 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 WB permissible levels.

On urban roads, traffic congestion may lead to increased exhaust emissions. Traffic management with local authority will reduce the impact of works on road congestion and associated emissions. The emissions will be mostly limited to the construction phase and therefore are temporary.

Socioeconomic Impacts

Air impacts related to excavation works will differ from one village to another according to the population, time of excavation work, the nearby of excavation place to the places crowded with people such as: schools, markets, and microbus and TukTuk stations.

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

5.2.2.2 Noise

Environmental impacts

Table (4-3) showing that noise levels in the studied areas are below national and WB guidelines. As a result, we can conclude that Noise levels unlikely to surpass permissible levels due to operation of construction equipment. However, the activities will be temporary and for short time.

Traffic interruption due to excavation can cause congestions, which can result in increased ambient average noise intensity levels.

Socioeconomic Impacts

Noise impacts related to excavation works will differ from one village to another according to the population, time of excavation work, the nearby of excavation place to the places crowded with people such as: schools, markets, and microbus and TukTuk stations.

Noise impacts are expected to be temporary, local and of **minor severity**

5.2.2.3 Soil

The excavation activities will result in disturbance of the soil and geological characteristics. This will be more pronounced in the trench's area (around 0.2 to 2-meter depth) where excavation, pipeline laying, and soil compaction as a result of heavy equipment take place. Soil disturbance at higher depths will also take place in case of applying HDD technologies in crossing the railway. In addition, potential soil contamination may take place as a result of spillage or leaks

The impact on soil considered **medium severity.**

5.2.2.4 Water

Surface water

Surface waters consisting of canal branches may be susceptible to pollution resulting from uncontrolled dumping of wastes generated during construction.

The impact on surface water pollution is of **minor severity**

5.2.2.5 Waste generation

Environmental Impact

Normal construction non-hazardous solid wastes including scrap concrete, steel, bricks, packaging waste, used drums, wood, scrap metal, and building rubble will be generated.

Human or domestic wastes generated by construction labor, including sewage and garbage collected from the labor camp location. Disposal of sewage and garbage generated from construction labor, if not transported to adequate sites, will be a continuation of the existing sanitation situation and contribute, although to a relatively low extent, to environmental deterioration. This kind of wastes has to be transported outside the site.

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

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

Socioeconomic impacts

Waste and recycling/disposal sites will benefit from waste disposal contracts. If waste is not managed properly, it will result in health problems to the surrounding communities.

Therefore, impact considered **medium severity**

5.2.2.6 Traffic Flow (disruption of local and regional traffic)

Traffic flow is not expected to be disturbed by the workers due to the limited expected number of workers. However, it will be affected by the excavation works of the project which does not exceed one day or two days at most. It may result in some adverse impacts:

- Traffic congestion and loss of access due to the excavation and installation works will vary from village to another according to the population and the services within each village.
    - In Tilbant Abshish and Shintina Al Hajar villages, the traffic density is higher than other project sites but it is usually limited in the sub streets. However, some of the main streets have high traffic density. As well as, the sensitive receptors i.e. the main commercial areas, local markets, transportation stations and service areas. Therefore, there is a high traffic density at peak times.
    - In Salaka and Um Saleh villages, the traffic density is limited
- Traffic congestion may affect the drivers and vehicles in case of non-rehabilitation of streets after the project implementation. There should be clear traffic diversion plan for pedestrians, cars, Tuk Tuk and microbus drivers.
- Reduction of Traffic Flow Mobilization of heavy machinery, asphalt breaking, excavation, placement of piping, and backfill activities are bound to limit traffic and accessibility

during construction. This may entail narrowing major roads by longitudinal and/or lateral excavation or totally blocking narrow or side roads.

- In addition to reducing the lanes/space available for traffic, impacts may also entail limiting or prohibition of parking along the length of the works. Access to buildings and shop entrances may be limited or constricted in cases where excavations form obstacles for persons and cargo.
- Negative effects on the business of neighboring shopkeepers due to excavation close to such shops. The excavation activities could affect access to shops.

Traffic and access limitation effects are temporary, local, **Medium severity**

5.2.2.7 Occupational health and safety

General risks associated with construction sites are anticipated including slips and falls; moving Lorries and machinery; exposure to chemicals and other hazardous materials; exposure to electric shock and burns; exposure to high noise intensity levels.

Noise

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

Vibrations

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

Electrical shocks and Working at heights

- Faulty equipment or exposed cables can cause risks of electrocution.
- Working at heights
- Household installations will require working at heights, which can result in falls and pose a safety hazard.

Occupational health and safety considered **medium severity**

5.2.2.8 Risk on Infrastructure and underground utilities

Environmental Impacts

Prior to excavation the LDC (Egypt gas) performs exploratory drills to investigate the presence of underground utilities that may have been installed without accurate documentation and maps for its routes and depths. The risk of damage to such utilities during excavations for natural gas pipeline installation is possible, but minimal. In the event that an underground utility is fractured, the most significant potential environmental impact will arise in case a sewerage pipe is broken and wastewater potentially accumulating in the trench. There is also the possibility of overflowing to the streets causing nuisance to the surrounding environment.

Socioeconomic impacts

Breaking a water supply pipe may result in cutting the supply to a number of residential units, which may lead residents to use other sources of water which may be either expensive or unsafe.

Damaging sanitary pipes, electricity underground cables and water pipelines result in severe disturbance to community people. The time needed to resolve problems with damaged utilities is relatively short (no more than 4-8 calendar days). Additionally, the contractor will be responsible of compensating for damaged pipes

Impacts on underground utilities are expected to be temporary, local, and of minor severity

5.2.2.9 Community health and safety

The excavation works within the project areas will affect the community health and safety:

- **Waste accumulation** illegal dumping and potential burning of construction waste, which will consist mainly of excavated soil and leftover PE pipes can pose health and safety threats to local community. Accumulation of waste in the construction areas might become a hub for insects and unfavorable smells which will negatively affect the surrounding communities. This is one of the potential unfavorable impacts.
- **Project infrastructure** excavation works will result in the presence of open trenches in areas accessible to local community (e.g., in front of building and shops.) The presence of open trenches can pose risks of accidental falls and injuries. Trenches are expected to be open during the work day, and no trenches will be left open after working hours. There was a fear that negligent workers may cause accidents harmful to themselves or to the community members, particularly children, especially close to the excavation sites. Therefore, awareness-raising sessions should be provided to workers and community

members to promote safety and health while safety supervisors are hired to oversee excavation sites. These supervisors can be chosen from among community members by NGOs and will be largely responsible for children and their safety around the construction site. Concerning workers, they should be trained on the occupational health and safety measures and they should be strictly monitored. The measures in the environmental management framework should be followed by the contractors.

Community health and safety is temporary, local, **medium severity** for community health & safety

5.2.2.10 Temporary Labour Influx

The implementing companies rely on using a number of workers and technicians during the drilling and installation works. The number of workers varies according to the size of the work in each area; consequently, the impact differs and varies according to each area. The temporary workers labor may have impacts on the project areas in terms of:

- **Risk of social conflict:** There are no potential effects of temporary labor influx on the culture of the society in the project areas; this is due to the focus of the implementing companies on the labor, whom are often from areas adjacent to the project areas. This helps in the reduction of the hours of their presence in the project areas, as well as their limitation to the working hours only; as such labors are not permanently resident during the project duration. Moreover, the temporary labor influx shares the same culture and values as those in the study areas. The implementation companies may depend on NGOs and mayors in training the workers on how dealing with the community people in order to avoid social conflict. Increased risk of illicit behavior and crime: the implementation companies and the contractors should revise the criminal records of the workers, in order to avoid the risk of illicit behavior and crime in the project areas.
- **Increased risk of communicable diseases and burden on local health services:** the implementation companies should take care of the workers' health in order to avoid the spread of the communicable diseases.
- **Influx of additional population, Increased pressure on accommodation and rents:** The number of temporary labor influx are limited, in addition, they present during the working hours only and does not reside in the project areas during the project construction period, which will lead to the absence of potential impacts for high prices or rental values of homes in the project areas.
- **Local inflation of prices:** The prices of some food commodities and services may increase

- **Overconsumption of community resources:** The temporary labor influx may affect the public facilities available in the project areas, which are the ones attached to the places of worship, cafes and restaurants. This may cause some problems; therefore, the implementing companies must commit to provide mobile premises attached to the workplaces for workers to change their clothes and eliminating their needs.

Temporary Labor Influx limitation effects are **temporary, local, minor**

5.2.2.11 Child Labour:

As mentioned in the baseline, child labor is a common practice in Egypt at large. Children below 18 are favorable labor as they receive low salaries and they are less demanding. There is a risk that this common practice is used in the project. This risk should be carefully handled in the ESMP and restrict obligations and monitoring should be applied in the contractor obligations.

The impact of construction activities pertaining to child labor is of **low-medium severity.**

5.2.2.12 Street condition deterioration

Environmental Impact

Streets rehabilitation or restoration following pipeline network installation: is referred to by an Egyptian legal/institutional expression that signifies the responsibility to "restore to original condition". In the context of the project, it applies to the responsibility of the implementing company to provide the necessary resources to re-pave roads and streets to the original state after natural gas excavation and installation works. The current arrangement is that the implementing entity performs the backfilling of the excavated trenches and agrees on a restoration fee with the local government unit (district) to cover the balance of the restoration and pavement cost. The local unit uses the fee to include the restoration and re-pavement of the streets in its "pavements plan".

Socioeconomic impacts

Delays in street restoration may lead to varying degrees of damage to vehicles, loss of access and business, traffic congestions with associated delays and emissions, and a potentially significant public discontentment.

Although the restoration impact may be temporary, localized, and of **minor severity**, it is perceived by the public as **major inconvenience**.

5.2.2.13 Land

Land needed

The network will pass through the main urban roads/streets and side roads without causing any damage to private assets or lands. No land acquisition or resettlement activities are anticipated.

The implementation companies will rent site storage areas in order to store the equipment and excavation tools, in addition, temporary equipment for workers' services. As well as, the companies will coordinate with the district in order to provision sanitation and potable water services.

Land acquisition is not expected. No impact

5.2.2.14 Visual resources and landscaping

Project activities will entail piling of sands and moving of vehicles in various construction sites. Moreover, the temporary storage areas will be used to store pipes, painting materials and safety equipment. That may have impact on visual resources and landscaping.

Impact related to visual resources and landscaping is temporary, local and minor

5.3 Impacts during Operation

5.3.1 Positive impacts

- As indicated in the Baseline Chapter, women are key players in the current domestic activities related to handling LPG and managing its shortage. Being the arty 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 the price of consumption fees. 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.
- The NG connection will achieve the safety factor, as the LPG vendors will not enter the households in order to change the LPG
- Constantly available and reliable fuel for home use
- Reduced expenditure on LPG importation and subsidies. The NG will reduce the consumption of LPG by 215,500 cylinders per year at the project four areas. Recent estimates refer to the fact that the governmental subsidy for each LPG cylinder is $4.95. Consequently, this phase of the Monofeya NG project is

expected to reduce the subsidies of LPG for the project area by $1,068,595 per year. (calculations based on number of potential NG project clients multiply annual LPG use per each area multiply subsidy for each LPG cylinder $4.95).

- Significantly lower leakage and fire risk compared to LPG
- Improved safety due to low pressure (20mBar) compared to cylinders
- Beneficiaries to benefit from good customer service and emergency response by qualified personnel/technicians **as per the Emergency Response Plan presented in Annex 6**
- Elimination of insects and dirt typically associated with LPG cylinders
- Limiting the LPG cylinder "black market" due to lower demand
- Eliminate the hardships that special groups like physically challenged, women, and the elderly had to face in handling LPG
- Limiting possible child labor in LPG cylinder distribution

5.3.2 Negative impacts

The process of environmental impact assessment during the operation phase indicate that some receptors have irrelevant impacts in Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka; those receptors include waste management, noise, air emission, soil and Ecological (Fauna and flora). The receptors which might be affected during the operation phase will be as follows:

5.3.2.1 Community health and safety

In addition to a full array of safety and emergency precautions taken by EGAS and the implementing entities (Local Distribution Companies: Egypt Gas), user safety is prioritized by stating emergency precautions on the household gas meter and by setting up emergency response centers. Impacts on user health and safety may occur through improper handling of piping and valves by the user. This may be due to a lack of awareness, illiteracy, or failures in piping or sealants. Low probability to affect the aesthetic appeal of the buildings, this is due to the installing of the pipelines on the walls of the building.

Concerns of the community people regarding the pipelines safety. The project should increase the community awareness about the emergency place and number.

Considering the low probability of occurrence and the lower density of natural gas (compared with current practice of LPG), impacts on community health and safety due to gas leaks is of **minor severity.**

5.3.2.2 Integrity of natural gas piping

Environmental impacts

- Low-probability events may impact the integrity and safety of the NG network and components during the years of the operation phase.
- Geological and geotechnical events: earthquakes may result in geotechnical instabilities that lead to network breakage or leakage in multiple locations simultaneously. The geological and geotechnical history of the area may also lead to possible events.
- Sabotage: pipelines and other components may be targeted for sabotage.

Socioeconomic impacts

Adverse impact is expected due to the possibility of disrupting the Gas supply to households.

Leak impacts may be permanent and highly severe; however, considering the extremely low probability of occurrence, the impact is of **minor severity.**

5.3.2.3 Economic disturbance

- For those who will pay in installments, this may be an added financial burden on the poor families.
- There could be a Minor negative economic impact on LPG cylinders distributors. (Governmental sector- private sector who have license to distribute LPG cylinders- non-official distributors). The LPG distributors will lose their income. However, their ability to move to other areas or change their business is high. Various previous NG projects have not influenced the informal LPG vendors. Based on the meetings conducted with the LPG cylinder distributors, they reported that the NG will not cover all areas. Inside the same areas covered by the NG not all of the units are technically eligible to be connected to the NG. Therefore, they will continue working in the same areas and in the uncovered areas.
- The surveyed LPG distributors have their vehicle in transporting the LPG cylinders. They reported that this vehicle might be used in transporting other goods. Such activity is also lucrative for them in case of not being able to distribute the LPG cylinders and such approach was adopted during the shortage of LPG cylinders occurred two years ago.

The probability of such impact is **minor** as LPG distributors manage to perform alternative job.

5.3.2.4 Child labor

The LDC have never employed any children during the operation of the networks as they adhere to labor law. Additionally, maintenance and operation activities need highly professional technicians who graduated from secondary schools. They all are above 18 years old.

Child labor risk is assessed as irrelevant

Table 5-2 Impact Assessment

Detailed impact assessments results are presented in two tables in **Annex 4**.

Impact	Description	Type	Significance
During Construction			
Air emissions	Air emissions (gases and particulates) during construction can exceed permissible limits and shall arise from: - Particulate matter and suspended solids from excavation/backfilling operations - Possible dispersion from stockpiles of waste or sand used for filling trenches. - Exhaust from excavation equipment and heavy machinery (excavators, trenchers, loaders, trucks) containing SOx, NOx, CO, VOCs, etc. - Traffic congestions resulting from road closure or slowing down of traffic due to excavation works. Dust The impact of dust generation (particulate matter) will be limited to the working hours as excavation and backfilling are carried out within the same day. Excavation on dusty or rocky roads such as local roads and some urban roads are likely to generate more dust compared to asphalted streets due to the dusty status of those roads.	Negative	Medium
	<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 WB permissible levels. On urban roads, traffic congestion may lead to increased exhaust emissions. Traffic management with local authority will reduce the impact of works on road congestion and associated emissions.	Negative	Medium
Noise	Construction activities of the gas distribution network will likely increase noise levels due to excavation and heavy machinery but not exceeding the WB/IFC guidelines and Law 4/1994-9/2009 standards for noise intensity. However, the activities will be temporary and for short time. Traffic interruption due to excavation can cause congestions, which can result in increased ambient average noise intensity levels.	Negative	Minor
Soil	Degradation of soil quality, Excavation and movement of heavy machinery on unpaved surface soils during site preparation and foundation-laying could cause a physical breakdown of soil particles potentially causing destabilization of the soil structure.	Negative	Medium
Water	Surface Water: Uncontrolled dumping of waste in canals can result in water pollution	Negative	Minor
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. These wastes should be disposed in licensed sites by the local authority, which minimizes any aesthetic effects of such waste. Poor handling of Hazardous and non-hazardous materials may result in poor containment of induced leaks.	Negative	Medium

Impact	Description	Type	Significance
Traffic & Accessibility	- Traffic congestion and loss of access due to the excavation and installation works will be vary from village to another according to the population and the services within each village. - Affect the drivers and vehicles in case of non-rehabilitation of streets after the project implementation - Congestion and traffic disturbance for both pedestrians, cars as well as the livelihoods of taxi, Tuk Tuk and microbus drivers, Thus, clear traffic diversion plan should be settled. - Reduction of Traffic Flow Mobilization of heavy machinery, asphalt breaking, excavation, placement of piping, and backfill activities are bound to limit traffic and accessibility during construction. This may entail narrowing major roads by longitudinal and/or lateral excavation or totally blocking narrow or side roads. - In addition to reducing the lanes/space available for traffic, impacts May also entail limiting or prohibition of parking along the length of the works. - Access to buildings and shop entrances may be limited or constricted in cases where excavations form obstacles for persons and cargo. - Negative effects on the business of neighboring shopkeepers due to excavation close to such shops. The excavation activities affect having access to the shops.	Negative	Medium
Occupational health and safety	- General risks associated with construction sites and anticipated include slips and falls; moving lorries and machinery; exposure to chemicals and other hazardous materials; exposure to electric shock and burns, exposure to high noise intensity levels. - 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. Traffic congestions, which could be caused by excavation works, may increase ambient average noise intensity levels.	Negative	Medium
Risk on Infrastructure and underground utilities	- Underground utilities and infrastructure pipelines (such as water, sewerage and telecommunication) have been installed years ago without accurate documentation and maps for its routes and depths. Therefore, the risk of damage to such utilities during excavations for natural gas pipeline installation is possible. - The most significant potential environmental impact will arise in case a sewerage pipe is broken and wastewater potentially accumulating in the trench. There is also the possibility of overflowing to the streets causing nuisance to the surrounding environment. - Breaking a water supply pipe may result in cutting the supply to a number of residential units, which may lead residents to use other sources of water which may be either expensive or unsafe. - Damaging sanitary pipelines, electricity and water supply result in severe disturbance to community people. Yet such problem takes short time (no more than 4-8 calendar days). Additionally, the contractor will be responsible of compensating for damaged pipes.	Negative	Minor

Impact	Description	Type	Significance
Community health and safety	The excavation works within the project areas will affect the community health and safety by the following means: - Waste accumulation illegal dumping and potential burning of construction waste, which will consist mainly of excavated soil and leftover PE and carbon steel pipes can pose health and safety threats to local community. - Project infrastructure excavation works will result in the presence of open trenches in areas accessible to local community (e.g., in front of building and shops.) The presence of open trenches can pose risks of accidental falls and injuries. Trenches are expected to be open during the work day, with no trenches being left open after working hours. There was a fear that negligent workers may cause accidents harmful to themselves or to the community members, particularly children, especially close to the excavation sites. - Child labor and school dropout	Negative	Medium
Temporary Labor Influx	Possible social adverse impacts from Temporary Labor Influx - Risk of social conflict - Increased risk of illicit behavior and crime - Increased risk of communicable diseases and burden on local health services - Influx of additional population - Increase in traffic and related accidents - Increased pressure on accommodation and rents - Local inflation of prices - Overconsumption of community resource	Negative	Minor
Child labor	As mentioned in the baseline, child labor is a common practice in Egypt at large. This could be also an applicable risk in the project areas in Shintina Al Hajar & Um Saleh, Tilbant Abshish, Salaka. Children below 18 are favorable labor as they receive low salaries and they are less demanding. There is a risk that this common practice is used in the project. This risk should be carefully handled in the ESMP and restricting obligations and continuous monitoring should be applied in the contractor obligations.	Negative	Medium
Street condition deterioration	Street condition deterioration Streets rehabilitation or restoration following pipeline network installation: is referred to by an Egyptian legal/institutional expression (رد الشيء لأصلة) that signifies the responsibility to "restore to original condition". In the context of the project, it applies to the responsibility of the implementing company to provide the necessary resources to re-pave roads and streets to the original state after natural gas excavation and installation works. The current arrangement is that the implementing entity performs the backfilling of the excavated trenches and agrees a restoration fee with the local government unit (district) to cover the balance of the restoration and pavement cost. The local unit uses the fee to include the restoration and re-pavement of the streets in its "pavements plan".	Negative	Minor

Impact	Description	Type	Significance
Street condition deterioration	Delays in street restoration may lead to varying degrees of damage to vehicles, loss of access and business, traffic congestions with associated delays and emissions, and a potentially significant public discontentment.	Negative	Minor
Land	Land needed Regard to the land needed, there will no land needed for the project, as there is PRS already existed in each project area. The implementation companies will be temporary storage area which maybe small plots of land usually are rented land or rented shops that are rent for few days in order to store the equipment and excavation tools, in addition, temporary equipment for workers' services.	None	None
Visual resources and landscaping	Project activities will entail piling of sands and moving of vehicles in various construction sites. Moreover, the temporary storage areas will be used to store pipes, painting materials and safety equipment. That may have impact on visual resources and landscaping.	Negative	Minor
Operation			
Community health and safety	In addition to a full array of safety and emergency precautions taken by EGAS and Egypt Gas, user safety is prioritized by stating emergency precautions on the household gas meter and by setting up emergency response centers. Impacts on user health and safety may occur through improper handling of piping and valves by the user, which can result from lack of awareness, illiteracy, or failures in piping or sealants.	Negative	Minor
Integrity of natural gas piping	- Low-probability events may impact the integrity and safety of the NG network and components during the years of the operation phase - Geological and geotechnical events: earthquakes may result in geotechnical instabilities that lead to network breakage or leakage in multiple locations simultaneously. - Sabotage: pipelines and other components may be targeted for sabotage. Adverse impact is expected in raising the fear of disruption of Gas supply	Negative	Minor
Economic disturbance	- For those who will pay in installments, this may be an added financial burden on the poor families. There could be a Minor negative economic impact on LPG cylinders distributors. (Governmental sector- private sector who have license to distribute LPG cylinders- non-official distributors). The LPG distributors will lose their income. However, their ability to move to other areas or change their business is high. Various previous NG projects have not influenced the informal LPG vendors. Based on the meetings conducted with the LPG cylinder distributors, they reported that the NG will not cover all areas. Inside the same areas covered by the NG not all of the units are technically eligible to be connected to the NG. Therefore, they will continue working in the same areas and in the uncovered areas. - The surveyed LPG distributors have their vehicle in transporting the LPG cylinders. They reported that this vehicle might be used in transporting other goods. Such activity is also lucrative for them in case of not being able to distribute the LPG cylinders and such approach was adopted during the shortage of LPG cylinders occurred two years ago.	Negative	Minor

6. Analysis of Alternatives

This Natural Gas Connections to Households Project is expected to yield many economic and social benefits in terms of providing a more stable, energy source, achieve savings in LPG consumption and enhance 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.

6.1 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.

6.1.1 Trenchless Technologies

HDD[20] 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.

[20] **See figure number 2-22**

On the other hand, HDD suffers from 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.

6.1.2 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

6.2 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.

6.3 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
- More safe

6.4 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. Such market should be avoided if possible. 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.

6.5 Installation Costs

The average natural gas connection installation cost is about $858.9 and consumers contribute a part of it because the balance is subsidized by the Government. The government of Egypt is negotiating with the project's financing organizations in order to secure additional subsidy to poor and marginalized groups. Currently, they offer flexible payment schemes for the installation cost.

7. Environmental and Social Management & Monitoring Plan

7.1 Objectives of the ESM&MP

The objective of the Environmental and Social Management and Monitoring Plan (ESMMP), is to outline actions for minimizing or eliminating potential negative impacts and for monitoring the application and performance of mitigation measures. The ESMMP identifies roles and responsibilities for different stakeholders for implementation and monitoring of mitigations. This section also presents an assessment of the institutional capacity and institutional responsibilities for implementing the ESMMP. Wherever applicable, the ESMMP is designed to accommodate alternative context-specific mitigations and monitoring measures.

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

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 Mitigation Measures During Construction Phase

During construction activities, 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 **as per the Emergency Response Plan presented in Annex 6**.

This includes possible damage to other underground utility lines (water, wastewater, electricity, phone, Internet) and to buildings and physical structures or cultural sites during excavation/construction activities. It also includes reporting issues resulting from construction activities such as excessive/prolonged noise, vibration, waste, traffic, accessibility, visual, and other community health and safety impacts.

7.2.1 Air Emissions

Air emissions of excavation machinery and diesel-powered electrical units should be within allowable legal limits. Because dust emissions from construction works include non-point sources such as excavation, direct emission levels cannot be measured. On the other hand, monitoring ambient total suspended particles or PM10 could be misleading because of the interference of other sources. Therefore, monitoring activities should ensure point sources, i.e., exhaust of excavation machinery, are within the standards stipulated by the Law. Mitigation measures must be documented. Documentation should consist of standard operating procedures and monitoring reports for emission tests and complaints.

7.2.2 Noise

Mitigation measures proposed to minimize Noise impact are detailed in the ESMP matrix below. Documentation should consist of standard operating procedures and monitoring reports for noise measurement tests and complaints.

7.2.3 Soil

Mitigation measures proposed to minimize Soil impact are detailed in the ESMP matrix below.

7.2.4 Mitigation measures of surface water

Mitigation measures proposed to minimize Surface water impact are detailed in the ESMP matrix below.

7.2.5 Waste

The local unit is responsible for the pick-up and disposal of solid waste. Construction waste such as soil waste is disposed of. Domestic waste is collected from domiciles and collection sites and disposed. Solid wastes generated during the construction phase are classified as either non-hazardous (which includes inert wastes) and hazardous wastes. It is worth mentioning Construction wastes will be generated only during a relatively short period.

Monitoring activities shall depend mainly upon observation of waste stockpiles of soil and construction waste to ensure the frequency of removal from site, and whether they contain hazardous components. Medical or healthcare wastes containing pathologic, contagious, or radioactive constituents as per the definitions of Ministry of Health decree 192 for the year 2001 should be collected, stored and transported separately from any other wastes. Several certified incinerators are available across Egyptian governorates in designated healthcare facilities. In the unlikely case of medical waste, arrangements should be made immediately with the local office of the ministry of health for safe handling and disposal.

7.2.6 Management of Traffic Impacts

Mitigation measures proposed to minimize traffic disruptions are detailed in the ESMP matrix below. Coordination between Egypt Gas/EGAS and the local traffic authority is imperative as the above-mentioned mitigation measures will be implemented by, or in coordination with, the local Traffic Department. Monitoring will be carried out by the local Traffic Department to make sure that flow reduction is within acceptable levels. Coordination should be established between the Traffic Department and the HSE Departments of the implementing gas companies (Local Distribution Companies- LDCs) to ensure compliance and adequate implementation of the identified mitigation measures. LDC HSE should record any comments by the Traffic Department regarding violation of excavation permits by the contractor.

7.2.7 Management of occupational health and safety (OH&S)

A comprehensive and practical occupational health and safety management system must be enforced. The OH&S measures are to comply with all relevant national legal requirements well as international Best Practice such as the IFC EHS General Guidelines. Practical and administrative measures should be taken by EGAS and the LDC to ensure adherence of site crews to OH&S procedures and measures. **Annex 5, Annex 6** presents OH&S for Egypt Gas. Avoiding unacceptable, and illegal, noise levels include:

7.2.8 Management of Community health and safety

In addition to all the environmental and social management and monitoring measures in this section which aim for health and safety, awareness-raising actions and signs should be provided to workers and community members to promote safety and health, safety supervisors should be hired by the LDCs to oversee work sites and they will be largely responsible for children and their safety around the construction site. Egypt Gas and LDC should share with the community the timeline of the project especially when the LDC will be entering their street Mitigation measures proposed for minimizing community H&S impacts detailed in the ESMP matrix below.

7.2.9 Management of Temporary Labor influx

Mitigation measures proposed for minimizing temporary labor influx impacts detailed in the ESMP matrix below.

7.2.10 Management of Street Restoration after asphalt breaking

As mentioned in the impacts section of the study, restoration and re-pavement of streets post-construction and excavation is one of the impacts, which are highly perceived by the public. The implementing entity 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.

Mitigation measures proposed for restoration of excavated streets are detailed in the ESMP matrix below.

7.2.11 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.

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 available 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 4 studied areas
2-On the level of LDC headquarter
3-On the level of EGAS

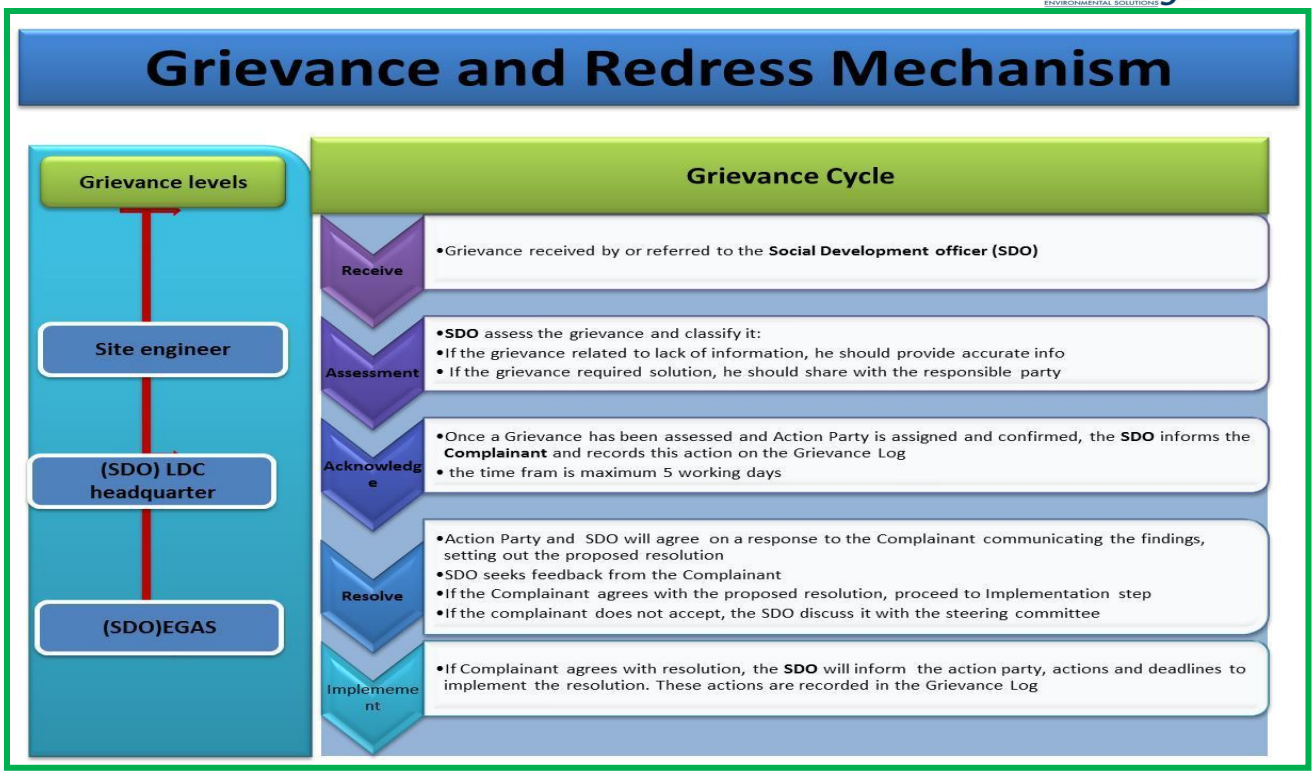


Figure 7-1 Proposed Grievance and Redress Mechanism

7.2.11.1 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 to gather the grievances (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 calendar days and the complainant should know that he/she should receive response by then.

The grievances should be presented to the following:

- The foreman working on the ground in the 4 studied areas,
- The project manager in the 4 studied areas,

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

7.2.11.2 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. Complaint form is attached in **Annex 5**. SDO where they should provide resolution within 15 calendar 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 15 calendar days.

7.2.11.3 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 15 calendar 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 15 calendar days.
- The SDO should update the complainant on the outcome of his/her complaint.

7.2.11.4 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
- 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.

7.2.11.5 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.

Table 7-1 Means of verification and indicators

Monitoring dimensions	Means of verification and indicators
GRM is fully operational	○ 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	○ 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	○ Dissemination activities undertaken ○ Total number of brochures distributed (if any) ○ Total number of awareness meetings conducted (if any)

7.2.11.6 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:

7.2.11.7 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

7.3 Environmental and Social Management Matrix during CONSTRUCTION

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

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Local traffic and accessibility	**Traffic congestion** (and associated noise/air emissions)	Excavation during off-peak periods Time limited excavation permits granted by local unit & traffic department	Excavation contractors	– LDC + – Traffic department	Contractor has valid conditional permit + Field supervision	Contractor costs LDC management costs
		Announcements + Signage indicating location/duration of works prior to commencement of work	– LDC – Excavation contractors	– LDC HSE – Local Unit – Traffic department	Ensure inclusion in contract + Field supervision	
		Apply Horizontal Directional Drilling under critical intersections whenever possible to avoid heavy traffic delays	Contractor	LDC HSE	Field supervision	
		Traffic detours and diversion	Traffic Department	Traffic Department	Field supervision for detouring efficiency Complaints received from traffic department	Additional budget not required
		Road restructuring and closing of lanes			Fluidity of traffic flow	
Ambient air quality	**Increased emissions of dust and**	Controlled wetting and compaction of excavation/backfilling surrounding area	Excavation Contractor	LDC HSE	Contractual clauses + Field supervision	– Contractor costs – LDC management costs

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
	gaseous pollutants	Isolation, covering, transportation in equipped vehicles and disposal of stockpiles			Contractual clauses + Field supervision	
		Compliance to legal limits of air emissions from all relevant equipment			Measure & document emissions of machinery by regular audits request emission measurements	
		_ Availability of 24-7 hotline service (129) to all beneficiaries and the public for reporting possible leaks, damages or emergencies _ Quick response to gas leaks by evacuation of the affected area _ Repair or replacement of failed component	LDC	LDC HSE	Field Supervision	
Ambient noise levels Local community Workers	**Increased noise levels beyond WB/National permissible levels**	Ear muffs, ear plugs, certified noise PPE for workers	_ LDC _ Excavation Contractor	LDC HSE	Contractual clauses + Field supervision (audits)	_ Contractor costs _ LDC management costs
		Avoid noisy works at night whenever possible			Field supervision Complaints receipt from local administration	

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Ground utilities' integrity Local community	**Damage to underground utilities resulting in water/wastewater leaks, telecommunication and electricity interruptions**	Coordination with departments of potable water, wastewater, electricity, and telecom authorities to obtain maps/ data on underground utilities, whenever available	Excavation Contractor	LDC HSE	Official coordination proceedings signed by representatives of utility authorities – Examination of site-specific reports and records – Field supervision	– Contractor management costs – LDC management costs
		If maps/data are unavailable: Perform limited trial pits or boreholes to explore and identify underground utility lines using non-intrusive equipment		LDC HSE Supervisor	– Contractual clauses + Field supervision	
		Preparation and analysis of accidental damage reports		LDC HSE	– Review periodic HSE reports	
		Repair and rehabilitation of damaged components		LDC HSE Local Government Unit Local Police	– Contractual clauses + Field supervision	

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Streets (physical status) local community and workers (health and safety)	**Hazardous waste accumulation**	– Temporary storage in areas with impervious floor – Safe handling using PPE and safety precautions – Transfer to LDC depots for temporary storage – Disposal at licensed Alexandria hazardous waste facilities (Nasreya or UNICO) – Hand-over selected oils and lubricants and their containers to Petrotrade for recycling	– LDC – Excavation Contractor	LDC HSE	Field supervision and review of certified waste handling, transportation, and disposal chain of custody	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
		– Adequate management of asbestos and any possible hazardous waste	Water Authority + contractor		Field supervision + review of Water Authority manifests	– Contractor costs – LDC management

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
		– Minimize fueling, lubricating and any activity onsite that would entail production of hazardous materials empty containers – Pre-Plan the anticipated amounts of hazardous liquid materials (such as paint, oils, lubricants, fuel) to be used in the various activities in order to minimize leftovers and residuals. – 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: o avoid inhalation and sources of ignition o cover and mix with sufficient amounts of sand using PPE o collect contaminated sand in clearly marked secure containers/bags – Add sand to inventory of hazardous waste	– LDC – Excavation Contractor		Field supervision	costs

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Local community	**Non-hazardous waste accumulation**	1. Designate adequate areas on-site for temporary storage of backfill and non-hazardous waste 2. Segregate waste streams to the extent possible to facilitate re-use/recycling, if applicable 3. Reuse non-hazardous waste to the extent possible 4. Estimate size of fleet required to transport wastes. **5.** Transfer waste to disposal facility East of the project area	– LDC – Excavation Contractor	LDC HSE	– Contractual clauses – Monitoring of waste management plan – Field supervision	– Contractor costs – LDC management costs
Local community	**Destruction of streets and pavement**	– Arrange Restoration and re-pavement (رد الشئ لأصله) with local unit – Communication with local community on excavation and restoration schedules.	– LDC	EGAS	Field supervision Coordination with LGU as needed	Included in re-pavement budget agreed by LDC with local units or Roads and Bridges Directorate

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Occupational health and safety	**Health and safety**	1. 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. 2. Standard protection by placing clear project signs. 3. Time management for vehicles movement; especially avoiding the peak hours 4. Standard protection for the workers especially working at elevated heights or trench. 5. Regular inspection to compelling worker to used their PPE 6. Training and licensing industrial vehicle operators of specialized vehicles. 7. The contractor also should keep attendance worksheet and laborers ID in order to verify the age of workers 8. Health insurance should be applicable to the contractor workers and workers contracted by a sub-contractor 9. Full compliance to EGAS and LDC HSE requirements, manuals, and actions as per detailed manuals developed by Egypt Gas 10. Ensure the provision of the appropriate personal protective Equipment and other equipment needed to ensure compliance to HSE manuals	Excavation Contractor	LDC HSE	Field supervision	– Contractor costs – LDC management costs

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Labor conditions	**Child labor**	• 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 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 below 18 years old	LDC Excavation Contractor/ subcontractor	LDC HSE	Field supervision and review of HSE report+ Field supervision (audits)	_ Contractor costs _ LDC management costs

Receptor	Impact	Mitigation measures	Responsibility		Means of supervision	Estimated Cost of mitigation / supervision
			Mitigation	Supervision		
Local communities and businesses	**Lack of accessibility to businesses due to delay in street rehabilitation**	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 • Ensure transparent information sharing • The telephone numbers of the social development officer responsible for grievances should be shared with the community people	• LDC • Excavation Contractor	EGAS (SDO) LDC	_ Ensure the implementation of GRM _ Supervision on Contractors performance	No cost
Local community Health and safety	**Threat to Safety of users and houses (due to limited level of awareness and misconceptions)**	Prepare Citizen engagement and stakeholder plan Awareness raising campaigns should be tailored in cooperation with the community-based organizations	During the construction LDC	EGAS (SDO) LDC	_ List of awareness activities applied _ Lists of participants _ Documentation with photos _ Awareness reports	_ 2250 $ per awareness raising campaign _ 2250 $ for brochure and leaflets to be distributed (material available by EGAS-$ spent)

7.4 Environmental and Social Monitoring Matrix during CONSTRUCTION

Table 7-3: 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
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 HSE monthly reports Complaints log	LDC management costs
Ambient air quality	Increased air emissions	HC, CO% ,opacity, TSP, PM10 and PM 2.5	LDC HSE	Once before construction + once every six months for each vehicle	Construction site	Measurements and reporting of dust and 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	weekly during site inspections	Construction site (residential area or near sensitive receptors such as hospitals)	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

Receptor	Impact	Monitoring indicators	Responsibility of monitoring	Frequency of monitoring	Location of monitoring	Methods of monitoring	Estimated Cost of monitoring
Underground utilities	Damages to underground utilities and infrastructure	Official coordination reports with relevant authorities Accidents documentation	LDC HSE	Monthly during construction.	Construction site	Documentation in HSE monthly reports	LDC management costs
Physical state of street	Waste generation	Observation of accumulated waste piles	LDC HSE	During construction.	Construction site	Documentation in HSE monthly reports	LDC management costs
		Observation of water accumulations resulting from dewatering (if encountered)	LDC HSE	During construction. Monthly reports	Around construction site	HSE monthly reports	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 community	Damaging to the streets	– Streets quality after finishing digging – 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
	Threat to Safety of users and houses (due to limited level of awareness and misconceptions)	– Observation of water accumulations resulting from dewatering (if encountered)	LDC, EGAS	Quarterly monitoring	Office	Reports Photos Lists of participants	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	Total number of complaints raised by workers Periodic Health report – Periodic safety inspection report	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost
Labor conditions	Child labor	Attendees lists with workers IDs – Complaints and accidents reports	LDC HSE	Biannual	Construction site	Documentation in H&S monthly reports Complaints log	No cost

7.5 Mitigation Measures During Operation Phase

7.5.1 Hotline

As mentioned previously, odorant is added to odorless natural gas to facilitate leakage detection by smell/odor. 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. In addition, an Emergency Response Plan has been prepared to address different emergency situations (**Annex 6)**.

7.5.2 Community health and safety

Several measures are suggested to overcome obstacles to full understanding and adoption of safety measures by the clients in the social management plan. Examples include using drawings instead of written instructions to improve communication with illiterate customers, coordinating with women of local NGOs who are interested in cooperating with the project to explain safety precautions to women in the households to be connected, and constantly monitoring the performance of emergency response units.

The LDC must communicate clear instructions to clients in order 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.

7.5.3 Management of network integrity

Rare events may threaten the integrity of the network and cause multiple failures/leaks/fires/explosions simultaneously should be addressed, despite their low occurrence probability. Such events may include the unlikely impacts from earthquakes, unexpected geotechnical settlements, and pipeline sabotage. Mitigation should involve review of geological/geotechnical history and vulnerabilities. Other measures include an emergency action plan and training drills to deal with such events with minimal damage and risk to the public.

7.5.4 Emergency Response

In case of emergencies, the proper action will be taken according to Egypt Emergency Response Procedure. The procedure includes the key personnel responsibilities and communication methods, as well as the emergency classes. Reports will be prepared after the necessary actions are taken to document the cause of the emergency and the remedial actions taken **as per the Emergency Plan presented in Annex 6**.

7.5.5 Management of financial disturbance

Residential gas connection installation costs are around 385$. Customers pay 119 $ of that cost in cash. The balance is subsidized by the government of Egypt. The 119 $ can be made either upfront or in installments over a period of time. Typically, households opt for flexible monthly payment plans facilitated by the LDCs and local banks. All NGOs interviewed expressed their willingness to act as communication channels with poor but no one of them will provide financial aid to the poor. However, the AFD in cooperation with the European Union will provide the poor with a kind of grant to be able to install the NG. This initiative has been approved and currently is applied to all project areas in all Egyptian Governorates.

7.6 Environmental and Social Management Matrix during OPERATION

Table 7-4: 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		
Integrity of natural gas piping	**Network integrity**	_ Detailed review of the geotechnical 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	LDC	LDC	LDC HSE.	- Map and local geotechnical report review - Site inspections - Awareness actions - Periodical drills	LDC management costs

Receptor	Impact	Mitigation measures	Residual impact	Institutional Responsibility for Implementation		Means of supervision	Estimated Cost of mitigation / supervision
				Mitigation	Supervision		
Economically disadvantaged Community members	**Financial burden on economically disadvantaged due to the installments**	- 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 - LPG distributors should be informed about the NG potential areas in order to enable them to find alternative areas - They should be informed about the GRM in order to enable them to voice any hardship	Minor	Petrotrade (Company responsible for collecting the consumption fees and the installments	EGAS	Banks loans log Complaints raised by poor people due to the frequency of collecting the installments	No cost

7.7 Environmental and Social Monitoring Matrix during OPERATION

Table 7-5: 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		LDC HSE	Bi-annual inspections and annual emergency response drills	Along the network and inside and outside households	- Inspection, leakage detection, running the drills	LDC management costs
Financial burden on economically disadvantaged due to the installments	- Number of economically disadvantaged people who complained - Number of those who can't pay the installment	LDC and Petro Trade, EGAS	Quarterly	Desk work	- Complaints log - Bank reports - Petro trade reports	No cost
Impact on the informal LPG distributors	- Grievance received from the informal LPG distributors - Information shared with them	EGAS, LDC	Quarterly	Desk work	- Complaints log	No cost
Possibility of Gas leakage	- Complaints raised by the community people - Number of leakage accidents reported/raised	LDC, EGAS	Quarterly	Site and Desk work	Complaints log LDC	No cost

7.8 Reporting of Mitigation and Monitoring Activities

LDC HSE Departments are to prepare monthly and quarterly reports to be submitted to EGAS Environment Department during the construction phase.

During construction, phase monthly reports should include as a minimum:

- Conditional permits and any comments or recommendations by Traffic Department and Supreme Council for Antiquities
- Number and date of paint cans shipped to company depot or returned to supplier
- Evaluation of LDC and contractor's performance on applying his relevant mitigation measures
- Any accidents or breaking of utility pipes
- The number of complaints received and how they were dealt with
- Monitoring results of excavation machinery exhaust emission, noise and vibrations

During Operation, phase monthly reports should include as a minimum:

- Undertaken treatment and temporary storage and/or disposal activities of empty odorant containers
- Evaluation of the adherence of staff to safety measures
- Pipeline leakage or damage incidents
- The number of complaints received and how they were dealt with

7.9 Institutional Framework for ESM&MP Implementation

7.9.1 Environmental Management Structures

EGAS is the supervisory body. **Egypt Gas** is the implementing body. 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 limited environmental and social background.

Therefore, an upgrade in their environmental and social capacity will be necessary. **EGAS** will be responsible for providing **Egypt Gas** staff with the needed information.

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.

7.9.2 Required Actions

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

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.

Stakeholder Engagement and Public Consultation

8. Stakeholder Engagement and Public Consultation

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

Public consultation activities have been implemented during the preparation of the framework and the site-specific studies. Following are the public consultation activities that have been implemented:

- Consultation activities (including site visits) were conducted on February 2017
- Public consultation session was conducted on 16 April 2017 in Monofeya city

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:

- WB 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 modified with ministerial decrees no. 710/2012 and no. 964/2015
- While WB 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 (for example through focus group discussions, in-depth meetings, and interviews) were implemented to reach the most vulnerable and 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.

- **In order to achieve that:**
  Community engagement plan has been developed for the different communities through three phases:
  - **Phase I:** Preparation of the framework study in March 2014
  - **Phase II:** The site-specific studies in 2016
  - **Phase III:** The consultation activities in 2017

Based on the identification of stakeholders, various questionnaires and guidelines were prepared in order to engage:

- The residents in the project areas
- Local community representatives
- Governmental Organizations and Authorities
- NGOs
- Educational institutions and universities
- Health departments
- Environmental administrations
- Formal and informal LPG distributors.
- In addition to, Egypt Gas company.

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 ESMP 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. Full list of the stakeholders on the governorate level is included in **Annex 7 & 8.**

For the purpose of this site specific ESMP, 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/CDAs were among the key stakeholders on the local level.

The abovementioned stakeholders were consulted using various tools (i.e. individual interviews, group meetings and public consultation). Most of them have attended the public consultation hearings conducted in 16 April 2017 in Monofeya governorate.

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. Following are the main consultation activities to date:

1- The study team visited the project area in order to define various stakeholders.
2- Community engagement plan has been developed for the different communities through three phases:
   - Phase I: Preparation of the framework study in March 2014
   - Phase II: The site-specific studies in 2016
   - Phase III: The consultation activities in April 2017
3- The study team divided the various engagement activities of the project to:
   - Scoping phase,
   - Data collection phase,
   - Consultation activities and final public consultation.
4- All activities conducted were documented with photos and lists of participants in order to warrantee appropriate level of transparency.

Table 8-1: Summary of Field Consultation Activities in Monofeya Governorate

participants	Location	Number of participants (Male)	Number of participants (Female)	Methods	Date
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		
Community people	Shintina El-Hajar	15	5	FGD Structured questionnaire	February 2017
	Um Saleh	10	8		
	Tilbant Abshish	8	4		
	Salaka	12	6		
TOTAL					
Representatives from Egypt Gas		5	2	in–depth	January and February 2017

8.5 Consultation processes

Following are the community participation and the consultation processes that were conducted in Monofeya Governorate throughout the following phases in order to prepare the study:

- Phase I: Preparation of the framework study 2013
- Phase II: Consultation activities and Final public consultation 2017

The results of the phases will be presented as follows:

Summary of phase I: Preparation of the framework study 2013 (see Annex 7)

The consultation session was conducted on December 2013

- Consultants (EcoConServ environmental and social) attended session
- Representatives of EGAS and Egypt Gas
- Representatives of EEAA accompanied the teams
- NGOs
- Media related expert was recruited to invite media people
- Community people

Summary of Phase II: Final public consultation 2017 (see Annex 8)

- The Consultation session was conducted in Monofeya governorate on 16 April 2017
  - Consultants (Petrosafe environmental and social) attended meeting
  - Representatives of EGAS and Egypt Gas
  - Representatives of EEAA accompanied the teams
  - Administrative managers
  - Media related expert was recruited to invite media people
  - Community people
- Key comments and concerns raised during the Final Public Consultations

Table 8-2: Consultation session 2017

Subject	Questions and comments	Responses	Addressed in the ESMP study
NG coverage	**Areas that have not been connected to the NG**	**There are certain specifications to install the NG to any area. In case the area is suitable, the Government of Egypt tries to allocate financial resources to install the NG. Given the limited resources Egypt face, the installation plan might take some time**	**within Section 4.2.2**
LPG problems	The community appreciate having the NG project as the LPG cause many problems: -The LPG cost a lot of money -Sometimes residents can't find it -It is difficult to bring the LPG upstairs especially if the resident is in the upper floors and no elevator is available -Sometimes the LPG is not completely full. It is half filled - LPG cylinder is a bomb in the house; it might explode in any minute.	The government of Egypt has an ambitious plan to connect the NG to 2.4 million households. This will solve LPG problems.	**within Section 4.2.11**
Coordination	**Coordination with the local units in order to get information about the underground utilities**	**All LDCs coordinate with the Local Units, not only to obtain information but also to be able to get permissions for street cuts and crossings.**	**See Section 7.2 Environmental and Social Management Matrix During Construction**

Subject	Questions and comments	Responses	Addressed in the ESMP study
Street restoration	The streets not rehabilitated after the completion of the NG construction	The LDCs disburse the cost of street restoration to the local unit and road authority prior to construction phase. It took them long time to rehabilitate streets so that the streets left without being rehabilitated	See Section 7.2 Environmental and Social Management Matrix During Construction
NG benefits	Members of the community acknowledged the importance of NG and the benefits of having NG connection to their households.	NG is of lower cost than LPG It is reliable, safe, and available It will put limitation to the quarrels and fights occur to obtain 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	within Section 4.2.12
Role of NGOs	NGOs can act as communication channels with poor and women about the various tiers of grievances, particularly, in rural areas explain safety precautions to women in the households to be connected, and constantly monitoring the performance of emergency response units	This will be from the recommendations, but the project will be not obligated to achieve that	within Section 7
Women hardship with LPG	Women suffer from the LPG as they are responsible of bringing it from the LPG outlet and carry it upstairs.	NG connection will save women effort related to changing LPG cylinders	within Section 4.2.13
Impact on LPG vendors	The project might result in unfavorable impacts on the LPG vendors (Sareha).	The NG project will partially affected the vendors, but it will reduce the dangers of LPG cylinders which are considered bombs in houses	See The potential adverse impacts during the operation phase
Information desk	· It is recommended to have an information desk to share info with people about the project people can send their grievances to the information desk · They also can submit a request for the installation of NG · They should have answers to the technical and contracting aspects · Information provided should be in a simple form	The study recommended sharing information about the project not only in the location of contracts or at homes, but also in various public places. It also recommended holding regular meetings to inform the citizens about the natural gas project	See Final public consultation Annex

Subject	Questions and comments	Responses	Addressed in the ESMP study
Role of community people	Community people can mobilize each other to install the NG. Additionally, they can provide guidance to the illiterate groups	The study recommended the participation of the community people in sharing information about NG project with the other people especially the illiterate groups Awareness raising campaigns should be tailored in cooperation with the community- based organizations	See Section 7.2 Environmental and Social Management Matrix During Construction

Figure 8-1: public consultation in Monofeya – April 2017

8.6 Summary of consultation outcomes

The consultation outcomes revealed that:

- The key message from the consultation events carried out for this project is that public and government acceptance for and support to the project are very strong.
- 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:
    - 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.
    - Actual need to provide clear information about the project
    - Actual need to response to grievances in timely manner
- The interviews with the implemented companies revealed that, they are fully aware about security and safety procedures. As well as, the excavation work dates in accordance with the nature of the region, the traffic density and the population. For poor people, the study recommended that the NGOs can act as communication channels with poor. However, the AFD in cooperation with the European Union will provide the poor with a kind of grant to be able to install the NG. This initiative has been approved and will be applied to all project areas. 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)

8.7 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 Egypt Gas 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 ESMP and the website link for the full ESMP study