

Tetra Tech International Development

# Economic Resilience Initiative - Infrastructure Technical Assistance TA2017141 R0 ERI

## 03-MSK-EGY-TRA Environmental and Social Audit and Assessment for Cairo Metro Line 2 Rehabilitation:

## Phase III **Non-Technical Summary**

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# Glossary of Terms and Abbreviations

<b>CAA</b>	Competent Administrative Authority
<b>CBI</b>	Computer Based Interlocking
<b>CBTC</b>	Computer Based Train Control
<b>CCP</b>	Central Control Panel
<b>CCP</b>	Central Control Panel
<b>CCS</b>	Centralized Control System or Control Centre System
<b>CCTV</b>	Closed-Circuit Television
<b>CHS</b>	Community Health and Safety
<b>CML2</b>	Cairo Metro Line 2
<b>CML2</b>	Cairo Metro Line 2
<b>E&amp;S</b>	Environmental and Social
<b>EBRD</b>	European Bank for Reconstruction and Development
<b>EC</b>	European Commission
<b>ECM</b>	Egyptian Company for Metro
<b>EEAA</b>	Egyptian Environmental Affairs Agency
<b>EGP</b>	Egyptian Pound
<b>EHS</b>	Environmental Health and Safety
<b>EHSS</b>	Environment and Health, Safety, and Security
<b>EIA</b>	Environmental Impact Assessment
<b>EIB</b>	European Investment Bank
<b>EM</b>	Environmental management
<b>EMU</b>	Environmental management Unit
<b>EPRP</b>	Emergency Preparedness and Response Plan
<b>ER</b>	Executive Regulation
<b>ERMC</b>	Egyptian Railways Medical Center
<b>ESAA</b>	Environmental and Social Audit and Assessment
<b>ESAP</b>	Environmental and Social Action Plan
<b>ESHS</b>	Environmental, Social, Health, and Safety
<b>ESMP</b>	Environmental and Social Management Plan
<b>ESMS</b>	Environmental and Social Management System
<b>ESP</b>	Environmental and Social Policy
<b>ESS</b>	Environmental and Social Standards
<b>EU</b>	European Union
<b>HR</b>	Human Resources
<b>HS</b>	Health and Safety
<b>HSSE</b>	Health, Safety, Security, and Environment

<b>HVAC</b>	Heating Ventilation Air Conditioning
<b>MoT</b>	Ministry of Transportation
<b>NAT</b>	National Authority for Tunnels
<b>NFPA</b>	National Fire Protection Association
<b>PPHPD</b>	Passengers per hour in peak direction
<b>SEP</b>	Stakeholder Engagement Plan
<b>TA</b>	Technical Assistance

# 1. Project Overview

## 1.1 Project Description Summary

Under the Ministry of Transport (MoT), the National Authority for Tunnels (NAT) is expected to receive financial support from the European Investment Bank (EIB) and the European Bank for Reconstruction and Development (EBRD) for the planned upgrade of the CML2. In order to improve the comfort, capacity, and safety of CML2 to its existing and prospective passengers, the rehabilitation project will involve improvement to a range of elements, including; the power supply, third rail, rolling stock systems, telecommunications, signalling, control systems, electromechanical components (controls and alarms), workshop and stabling area, and track works.

The overall purpose of the project is to provide Technical Assistance (TA) to The National Authority for Tunnels (NAT), which is considered to be the official authority with ownership of the Cairo Metro Systems. This Technical Assistance includes developing a set of studies that can support NAT with its rehabilitation and enhancement plan for Line 2 of the Cairo Metro System. The Ministry of Transport (MoT) initially set out the Master project for Line 2. NAT was set out as the responsible authority for planning the project, in coordination with the Egyptian Company for Metro (ECM) as they are the current operator of Line 2.

Some of the primary reasons for the rehabilitation, as set out in the Technical Assistance sub-assignment Terms of Reference, include:

- The line 2 systems have been in operation for 23 years and have become old. Many of the current infrastructure are **obsolete**, and there is a constant struggle to repair and replace parts.
- The consistent growth in population along line 2, mixed with the need to extend the line to more areas while adding several new stations, will require the line 2 system to improve its **passenger capacity** intake.
- The **safety measures** applied for the CML2 are outdated and do not meet the current global standard for Metro safety, especially for tunnels and underground stations
- The government has the desire to provide more comfort in the metro systems, with additions such as **Advanced Information Systems**.

Accordingly, NAT set out the following two new requirements that the new rehabilitated Line 2 system must have:

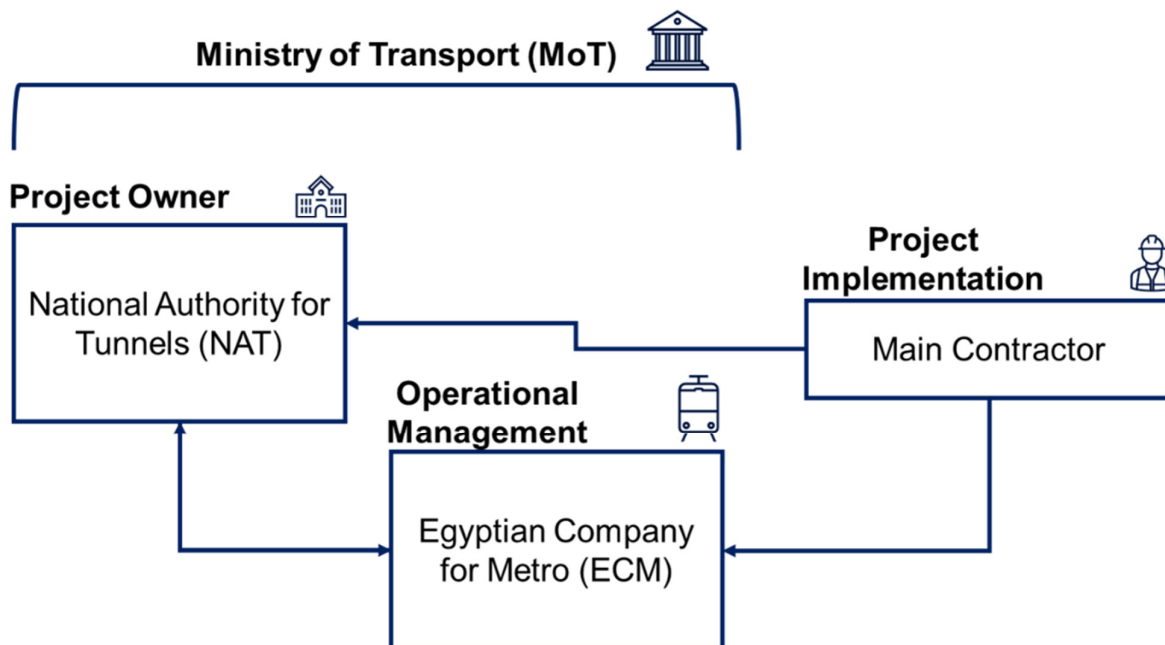
1. Design headway of 90 seconds and operational headway of 105 seconds
2. Passenger safety according to current international safety standards

To achieve the abovementioned requirements, and to upgrade the obsolete systems found in Cairo Metro Line 2, the project will include (but not limited to) the following rehabilitation, replacement, and adjustment activities:

- **Power Supply** – Replacement and Enhancement works for Rectifier Stations, Lighting Power Stations and Power Stations
- **Telecommunications** – Integration of new passenger information mechanisms such as screens and replacing obsolete fire safety and communication tools with more state-of-the-art technology
- **Signaling** – Rehabilitation of existing Track Circuit System and replacement of obsolete Signaling infrastructure across the CML2 track.
- **Rolling Stock** – Upgrade existing Rolling Stock to integrate communication systems.
- **Electromechanical** – Rehabilitation to Fire Safety Pumps and Systems, in addition to Replacement of obsolete shafts and Remote-control monitoring of HVAC.
- **Track** – replacement of track sleepers in specific sections, integration of new feeder 3<sup>rd</sup> rail accompanied with a large replacement intervention for third rail across CML2 with new high conductive third rail.
- **Management System** – Integrate a new Asset management system and upgrade computer software, hardware, and services.

All the works mentioned will be rehabilitated or constructed by a contractor that will be assigned by NAT and will work closely with ECM to achieve the rehabilitation goals without largely disturbing the day-to-day operations of ECM. NAT is the primary entity responsible for planning and construction under the Ministry of Transport in Egypt and was established in 1983 with the purpose of executing metro infrastructure in Egypt. Since they were established, NAT has overseen the introduction and construction of metros and other transport infrastructure projects in Egypt. For the Cairo Metro Line 2 project, NAT is considered to be the project owner that has the responsibility of assigning the main contractor and monitoring them to ensure adequate environmental and social measures are in place in compliance with requirements stated out in the Environmental and Social Action Plan (ESAP).

ECM is a joint stock company established in 1997 with the purpose of management, operation, and maintenance of Metro lines in Cairo, including its buildings, rolling stock assets, and associated equipment and machines or related workshops, central controlling stations as well as power stations. They currently operate Cairo Metro Line 2 and will continue to operate it after the rehabilitation works. The summary of primary entities responsible for delivering the project is shown in the following figure.



*Figure 1. Main Project Beneficiaries*



## 1.2 Project Justification

Among the Greater Cairo Metro Network, CML2 has been in operation since 1996 and one of the three metro lines that provides important affordable mobility to commuters and is one of the most highly utilized metros in the world with around 2.2 million passengers using the current 3 lines every day. CML2 extends from Shubra El Kheima to El Mounib with a total length of 21.5 km including 20 stations (12 underground, 6 surfaces and 2 elevated stations), this line was implemented in five successive phases:

**Phase 1:** “Shubra El Keima Metro Station - Mubarak Metro Station” with a total length of 8 km and this phase was inaugurated in October 1996.

**Phase 2:** “Mubarak Metro Station- Sadat Metro Station” with a total length of 3 km and this phase was inaugurated in September 1997.

**Phase 3:** “Sadat Metro Station - Cairo University Metro Station” with a total length of 5 km and this phase was inaugurated in April 1999.

**Phase 4:** “Cairo University Metro Station – Omm El Misryeen Metro Station” with a total length of 2.7 km and this phase was inaugurated in October 2000.

**Phase 5:** “Omm El Misryeen Metro Station - Mounib Metro Station” with a total length of 2.6 km and this phase was inaugurated in January 2005.

The metro has 12 underground stations in both Cairo and Giza, 6 stations at grade in Giza and 2 stations as viaducts in Shubra el Kheima. The current CML2 is reaching its maximum capacity for passengers, and the strain on ECM has only grown with time as there has been a consistent increase of obsolete segments in CML2 making it difficult to maintain operations for a number of infrastructural aspects. Thus, this project proposes to replace and rehabilitate obsolete infrastructure in the CML2 system and supports the increase in passenger capacity by improving the metro headway and upgrading systems to support more rolling stock.



**Figure 2. Cairo Metro System**

In spite of the rehabilitation activities of Metro Line 1, continued construction of Line 3 and Line 4, and urban development along CML2, Line 2 is expected to see a rise in passenger demand in the upcoming years. Therefore it is essential to upgrade the systems and provide a safer environment for passengers and equipping trains with better

communication systems, and more strict safety precautions in mass transit systems, specifically for tunnels and underground stations. Thus, the proposed works which are summarized in section 1.1, will be crucial to support the ongoing growth in transportation services demand in Greater Cairo. The project is expected to run over a period of 3 years, with certain segments of the work requiring the metro operations to shutdown earlier in the night and occasionally full closure during weekends.

## 2. Project E&S aspects

### 2.1 Environmental, Health and Safety, and Social Review

EcoConServ Environmental Solution was appointed as an Environmental and Social Consultant for the **Environmental and Social Audit and Assessment (ESAA)** of Cairo Metro Line 2 (CML2) for its proposed Renewal and Upgrade Project. The ESAA was conducted from the period of January 2021 until May 2021, which included the follow primary steps:

- Assessment of the E&S impacts of the current system operated by ECM
  - This was done through a comprehensive documentation review that was provided by ECM through NAT
  - A large number of interviews were conducted with ECM management and operation personnel
  - Walkthroughs and site visits to key project locations such as intermodal stations, the depot and the operational control system in Ramsis were conducted
  - A systematic compliance review of the current Metro Line 2 management and operations was conducted against the EBRD PRs and EIB ESS to assess the environmental and social performance of Metro Line 2 operations in order to provide recommendations in the Environmental and Social Action Plan (ESAP) later on in the ESAA.
- Assessing the E&S impacts of the proposed rehabilitated system, and the impacts of implementation for the different interventions
  - This included a thorough review of the proposed feasibility study provided by the Technical Assistance Consultant, in addition to the obsolescence survey.
- Preparation of a Stakeholder Engagement Plan (SEP), and Environmental and Social Action Plan (ESAP) based on the ESAA findings.
  - Based on findings from the first two steps, impacts and benefits were evaluated and an action plan was drafted for NAT and one for the contractor to ensure all EHS aspects are sufficiently addressed and managed during the project implementation.
  - The ESAP drafted ensures that the project is in compliance with National requirements, EBRD Performance Requirements (Category B project) and EIB requirements (Category B project), namely the ESS standards.

### 2.2 Key Project Benefits and Impacts

The CML2 rehabilitation will bring a wide range of positive impacts to the operations of the line, the surrounding communities, and to the users of the metro infrastructure. These include:

- Increased **capacity of CML2** due to the improved headway which would increase capacity from 39, 420 PPHPD to 60,000 PPHPD
- Increased **safety in the stations** as there are proposed upgrades to the fire safety systems in the tunnels as part of the electromechanical works and Tunnel/Passenger Safety works. The TA's proposed interventions, where possible, to meet the NFPA 130 2020 standards would massively improve the overall Tunnel Safety profile.
- Increased **safety of the Rolling Stock**, considering the unpredictable state of the current Signalling system, which due to obsolete spare parts, experiences frequent faults that could cause serious operational problems.

- Increased **efficiency of operations**, especially in the CCP, with newer state of the art technology that involves higher levels of automation
- Improved **ventilation in the stations** as part of the electromechanical works
- Increased **energy efficiency**, since newer equipment will integrate better energy usage especially in the Workshop area.

However, the project also includes a number of activities and interventions that will result in **EHS risks** that can affect the day to day operations of the metro line or affect the communities/passengers. The key project impacts include:

- **Operational Impacts** due to rehabilitation works:
  - If partial closures are to be adopted for certain works, stations may not be able to meet the passenger flow and may not have the capacity to safely transfer passengers in intermodal stations.
  - The complexity of maintaining the consistent flow of passengers by ECM operational staff will increase during replacement/rehabilitation works, which will increase the strain of maintaining service quality and safety.
  - During the rehabilitation works, there will be an increased risk of security voids which can cause theft
- Since the increase in metro capacity is not met with increased capacity for the metro stations, especially the intermodal stations, this can cause future **excessive crowding** in stations
- Construction and Rehabilitation works are expected to generate **air, noise, and vibration emissions** which will largely disturb the passengers, nearby community and ECM workers.
- There are a number of **serious OHS risks** that the contractor's workers will be exposed to due to the conditions and the type of works required for the CML2 rehabilitation.
- **Chronic climate change impacts** on project infrastructure that required design considerations to increase the lifetime of the proposed Metro Line 2

## 2.3 Project E&S Actions

To address those impacts, and other project identified impacts, the Environmental and Social Action Plan (ESAP) was developed to align with EBRD and EIB standards for Environmental, Health and Safety, and Social requirements inclusive of Egyptian National Standards. The ESAP includes concise actions to be undertaken by NAT, and also actions that must be undertaken by the contractor under the supervision of NAT. ECM is expected to provide support, but monitoring of the E&S mitigation measures implementation is a responsibility that will fall on NAT. The primary actions can be summarized below:

- ECM with the support of NAT to continue to upgrade its HSSE systems and integrate the ESMS for CML2 once developed by the TA to ensure the project appropriately manages E&S aspects during operation
- The Contractor is required to prepare a standalone COVID-19 and communicable diseases Management Plan
- The Contractor is required to develop Environmental Management Plans including Air Quality Management Plan, Noise and Vibrations Management Plan, Waste Management Plan etc. that must be implemented under the supervision of NAT. NAT will be required to carry out measurements and regular review of documentation to ensure minimal environmental impacts result from project activities.
- The Contractor is also required to develop an OHS management plan, accompanied by a robust risk assessment for all project activities, with a clear incident log and incident response/investigation process. Additionally, a site security management plan, traffic management plan and Emergency Preparedness and Response Plan must be prepared (scenarios based on the contractor's work plan and work locations).
- The project must ensure a well-advertised and easily accessible grievance mechanism is available for all stakeholders, and communication channels must be well established

## 3. Project Stakeholders and Grievance

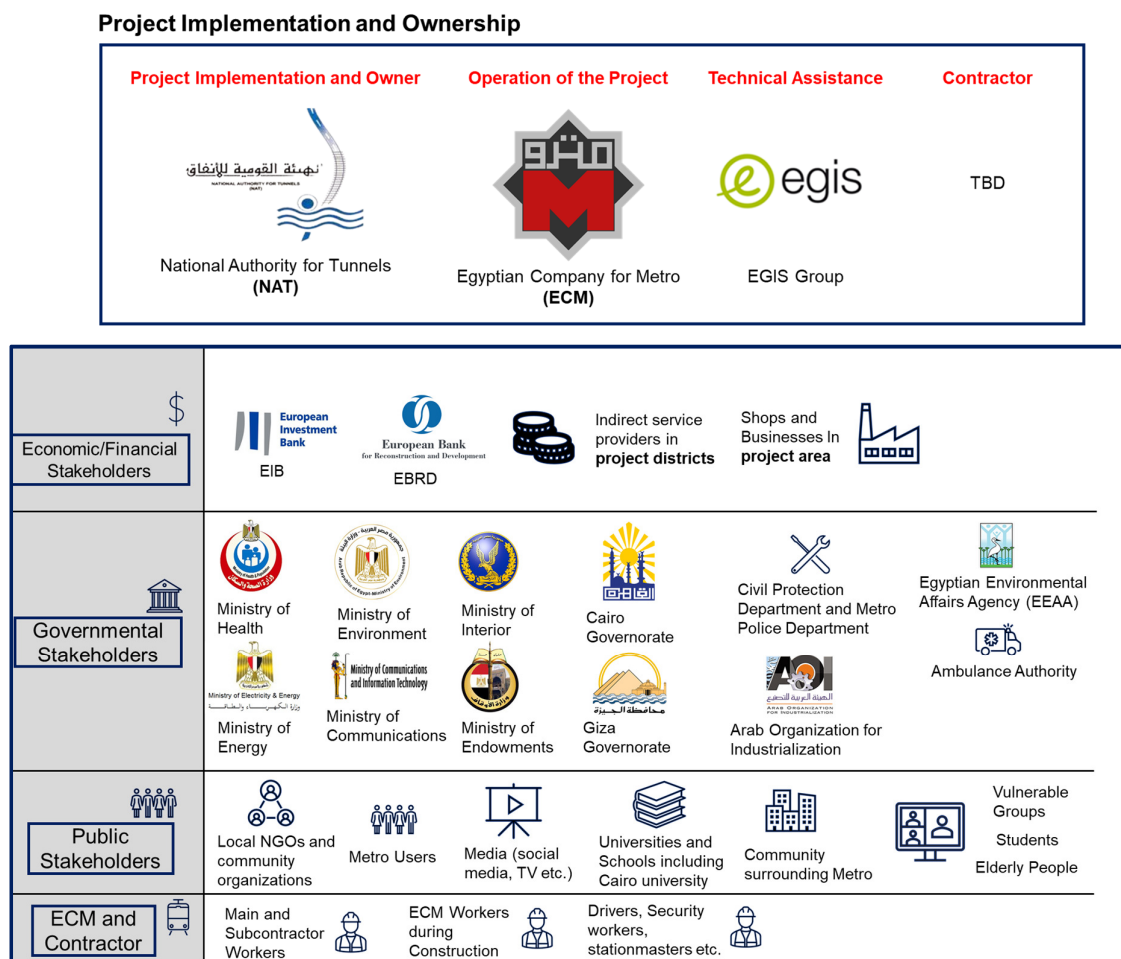
### 3.1 Stakeholders

A stakeholder Engagement Plan (SEP) was developed as part of the ESAA assignment which includes an identification of all project stakeholders at different levels and phases of the project life cycle. The plan was aligned with EIB's ESS 10 and EBRD's PR 10, and is considered to be a live document that is consistently referred to and updated across the project life cycle. The stakeholder engagement plan includes a project overview, identification project issues and impacts, a comprehensive identification of project stakeholders, summary of previous stakeholder engagement activities conducted by NAT, methods of future engagement activities, project disclosure information and the grievance mechanism adopted by the project. The SEP developed highlighted all the tools available to NAT to ensure consistent and sufficient stakeholder engagement.

Stakeholders are considered any person, groups of people, or entities that;

- Might be directly or indirectly, positively or negatively affected by the project in any phase of the project's construction and implementation.
- Might have an environmental or social interest taking place as a consequence of the project, or might impact project-related decisions and implementation in a way or another.

The following figure presents the summary of key project stakeholders:

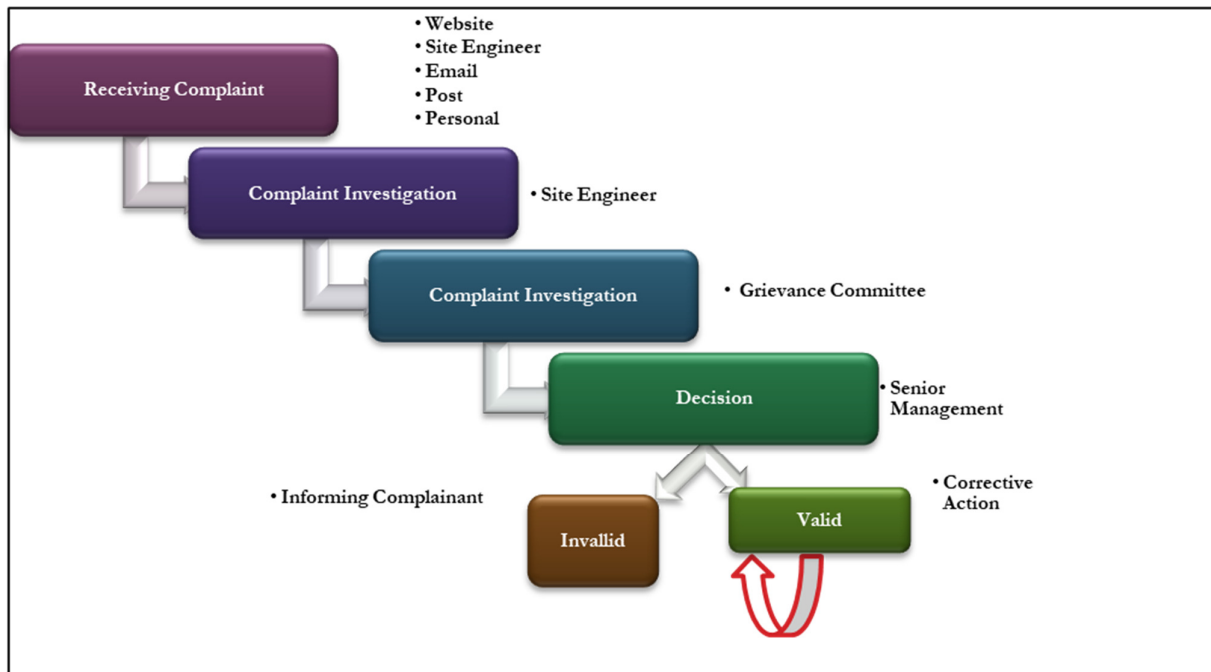


**Figure 3. CML2 Project Stakeholders**

All key project stakeholders will be engaged throughout the project, as covered in the project SEP. This dynamic and live process that will be Led by NAT is covered in the SEP which includes information on the methodology and approach for stakeholder engagement adopted, location/information of stakeholder engagement activities to date, a summary of all concerns raised up to date, and how NAT or any relevant authority has dealt with the concerns of the stakeholders.

### 3.2 Grievance Mechanism

NAT currently has a public grievance mechanism designed to address any concerns or issues faced by the public regarding active projects being implemented or even regarding project operations with regards to Metro services. The grievance process currently adopted by NAT is highlighted in the following figure:



**Figure 4. NAT Grievance Process Cycle**

For any grievance related to the project the following are the primary project contact points, where project information can also be found.

- Engineering representative on-site: It has not been identified yet
- NAT Website: [Contact Us](#)
- Direct mail to the Chairman of NAT: [chairman@nat.org.eg](mailto:chairman@nat.org.eg)
- Planning Department: [pld@nat.org.eg](mailto:pld@nat.org.eg)
- Telephone calls (Landline): +20225743070
- Hotline: (16528) There is no hotline except for general Government Complaints
- Address: Cairo, Ramses Square – NAT building - ZIP: 11794 p. B 466
- The Government Complaints/ Portal: [www.shakwa.eg](http://www.shakwa.eg)
-