



**ASIAN INFRASTRUCTURE
INVESTMENT BANK**

December 22, 2022

Project Document
Of the Asian Infrastructure Investment Bank
Sovereign-backed Financing

Arab Republic of Egypt
P000207 Alexandria-Abou Qir Metro Line Project

Currency Equivalents

(As of November 29, 2022)

Currency Unit – Egyptian Pound (EGP)

EGP 1.00 = EUR 0.039

EUR 1.00 = EGP 25.42

Borrower's Fiscal year

July 1 – June 30

Abbreviations

AFD	Agence Française de Développement
AIIB	Asian Infrastructure Investment Bank
APTA	Alexandria Public Transport Authority
CBA	Cost-benefit analysis
CFA	Co-financing Framework Agreement between EBRD and AIIB
EBRD	European Bank for Reconstruction and Development
EETC	Egyptian Electricity Transmission Company
EIB	European Investment Bank
ENR	Egyptian National Railways
EPC	Engineering, Procurement, and Construction
ES	Environment and Social
ESEL	Environmental and Social Exclusion List
ESIA	Environmental and Social Impact Assessment
ESMP	Environment and Social Management Plan
ESP	AIIB's Environmental and Social Policy
FM	Financial Management
GBVH	Gender-based Violence and Harassment
GHG	Greenhouse Gas
GOE	Government of Egypt
GRM	Grievance Redress Mechanism
IMF	International Monetary Fund
IPAM	Independent Project Accountability Mechanism
MOT	Ministry of Transport
NAT	National Authority for Tunnels
PIU	Project Implementing Unit
PP&R	EBRD Procurement Policies and Rules
PPM	AIIB's Policy on the Project-affected People's Mechanism
RAP	Resettlement Action Plan
RF	Resettlement Framework
SDR	Social Discount Rate
SEP	Stakeholder Engagement Plan

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1. Summary Sheet

Project No.	000207
Project Name	Alexandria-Abou Qir Metro Line (formerly, Alexandria-Abou Qir Light Train Project)
AIIB Member	Arab Republic of Egypt
Borrower	Arab Republic of Egypt
Project Implementing Entity	National Authority for Tunnels (NAT)
Sector	Transport
Sub-sector	Urban Transport
Project Objective	The project aims to increase access to efficient, safe, and low carbon public transport in the city of Alexandria by upgrading and electrifying the existing Alexandria-Abou Qir rail line.
Project Description	The project will provide co-financing resources together with EBRD, EIB, and AFD to upgrade and electrify the existing Alexandria-Abou Qir rail line into efficient, safe, and low carbon metro system. Specifically, the project supports the following activities: (1) civil works for the upgrade and electrification of the metro line including a depot and metro systems including signaling, telecommunication, centralized control system, and safety measures; (2) rolling stock to be operated on the metro system; and (3) construction supervision. There will be 20 modern metro stations along the 22 km corridor, 16 km of which will be elevated. The GOE will finance necessary enabling works, land acquisition, compensation to Project Affected People, as well as contingency expenses.
Implementation Period	January 2023 – July 2027
Expected Loan Closing Date	January 2028
Cost and Financing Plan	Project cost: EUR 1,764 million <u>Financing Plan:</u> AIIB loan: EUR 250 million EBRD loan: EUR 250 million EIB loan: EUR 750 million AFD loan: EUR 250 million Govt of Egypt: EUR 264 million Technical Assistant Grant: EUR 1.7 million (EBRD)
Size and Terms of AIIB Loan	EUR 250 million Final maturity of 18.5 years and a grace period of 5 years with AIIB's standard terms for sovereign-backed loans.
Environmental and Social Category	EBRD Category A (equivalent to AIIB's Category A)
Risk (Low/Medium/High)	High
Conditions of Effectiveness	The Subsidiary Loan Agreement, in form and substance acceptable to AIIB, has been executed by the parties thereto, and all conditions precedent to its effectiveness (other than the effectiveness of this Loan Agreement) have been fulfilled;

	and Confirmation that each Co-financing Agreement has been executed and delivered.
Key Covenants	Standard covenants and conditions precedent for Sovereign-Backed financing transactions.
Retroactive Financing (Loan % and dates)	None
Policy Assurance	The Vice President, Policy and Strategy, confirms an overall assurance that the proposed project complies with AIIB's applicable operational policies (Granted on September 26, 2022).

President	Jin Liqun
Vice President	Konstantin Limitovskiy
Director General	Gregory Liu (Acting)
Team Leader	Nat Pinnoi, Infrastructure Sector Senior Economist
Team Members	Gabriel Alfredo Giacobone, Infrastructure Sector Economist (Co-Project Team Leader) Gerardo Pio Parco, Senior Environmental Specialist Sheikh Naveed Ahmed, Social Development Specialist Rizal Rivai, Procurement Consultant Shodi Nazarov, Financial Management Specialist Christopher Damandl, Senior Counsel Marcin Sacin, Senior Economist Bilal Muhammad Khan, Economist Siyang Wang, Project Assistant

2. Project Description

A. Project Overview

1. **Country and Sector Context.** The Arab Republic of Egypt's recent and on-going macroeconomic reforms led to robust economic growth, declined inflation rate, and improved business environment for private sector. However, the global COVID-19 pandemic since early 2020 compounded with global energy and food crisis brought about by the supply disruption due to the war in Ukraine have caused significant adverse impacts on Egypt's fiscal status and overall economic performance and more recently its food security and livelihood due to high inflation arising from rapidly increasing commodity and energy prices. Around 60 percent of Egypt's wheat consumption (the main ingredient of bread, the staple food of Egyptians) is imported and most is from the Black Sea region¹ which ceased to be available after February 2022. The government has put in place effective response measures and prudent macroeconomic policy to weather the global pandemic and economic crisis and is one of the few economies worldwide to maintain positive economic growth (3.6 and 3.3 percent in the calendar year 2020 and 2021), and growth is forecast to rebound to 5.9 and slightly decline to 5.0 percent in 2022 and 2023² due to the impact of the global food and fuel crisis.

2. Egypt was the first country in Africa to invest in a metro system³ to provide fast, safe, and efficient mass public transportation to the rapidly growing urban population in the Cairo metropolitan area which has roughly doubled in the size of population from 10-20 million in during 1987-2020. The Cairo metro system, owned by the National Authority for Tunnels (NAT), a state-owned agency under the control of the Ministry of Transport (MOT), comprises three lines, Lines 1-3, which became operational in 1987, 1996, and 2006, respectively, and carries over 3.5 million daily passengers⁴.

3. Alexandria is Egypt's second largest city with a population of around 5.16 million inhabitants⁵. It is a fast-growing industrial city, which is home to Egypt's largest seaport serving 75 percent of Egypt's imports and exports. Because of the rapid expansion of population, urbanization, and economic activities, Alexandria is facing significant urban challenges including a mismatch between rapidly growing population and quantity and quality of public utility services, deteriorating environmental quality, high unemployment, and constrained mobility due to worsening traffic congestion.

4. Over the last three decades, Alexandria has faced significant challenges to provide its residents with fast, efficient, safe, and convenient public transport infrastructure needed for a large city due to its lack of effective planning and coordination, complex and cumbersome regulations, and severe under-investment in all transport modes. This has increased reliance on petroleum-based modes of transport for urban mobility, including shared taxis and cars, which account for 54 per cent and 39 percent

¹ USDA, 2022, Egypt: Grain and Feed Annual, Report No. EG2022-0009

² IMF, 2022, World Economic Outlook April 2022.

³ Middle east Institute, 2015, Cairo's Rough, Crowded, and Vital Underground Artery, May 27, 2015.

⁴ Railway Technology, 2021, Cairo Metro, January 25, 2021.
<https://www.railway-technology.com/projects/cairo-metro/>

⁵ The Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS), 2021, Egypt in Figures 2021.

of trips respectively with only 7 percent made by public transportation (train, tram, and bus⁶). The predominance of car and shared taxi usage not only increases road congestion and worsens air quality, but also indicates a significant latent demand for quality and energy-efficient public transport modes.

5. The existing 22-km (16 stations), Alexandria-Abou Qir light train line (AAQLTL), operated by the Egyptian National Railways, is the only high-capacity public transport service in the city providing services to 71,000 daily passengers, down from 260,000 daily passengers in 2006⁷. The train is running at grade with the irregular level of services, between 10-30 minutes interval. The total travel time from Abou Qir to Misr stations is around 50 minutes (average speed of 24 km/hour) due mainly to many grade-level crossings (14 official crossing points). The train services are powered by nine diesel locomotives (two trains are on stand-by). Single train fare is EGP 1.0 at station or EGP 1.25 on board) with discount for students and government employees.

6. To address the challenges, the Government of Egypt (GOE) developed the Alexandria Strategic Urban Plan 2032 in 2015 which identified a comprehensive list of urgent investments in the sector. However, due to lack of sufficient funding, no major investment has been mobilized until the recent development of the electrification of the AAQLTL which was identified as one of the short-term high priority projects. The project will substantially improve the quality of public transport to serve Alexandria's growing population, improve air and noise quality and reduce greenhouse gas (GHG) emissions as well as accelerate transition from fossil fuel to lower carbon fuel alternative.

7. The project will be the first modern metro system in the city of Alexandria connecting the City's densely populated north-eastern town Abou Qir to downtown Alexandria. The investment will transform the AAQLTL into a high-capacity electrified metro system, which will generate substantial economic and environmental benefits and support the transition towards an energy efficient, low carbon economy, from modal shift, CO₂ emission reduction benefits and reduced congestion. The project will also improve service availability, significantly reduce the headway from the current 15-20 minutes to a targeted 4 minutes and 20 seconds and increase capacity and level of service necessary to cater for future demand, which is estimated at circa 520,000 daily passengers for the next 30 years⁸.

8. **Project Objective.** The project aims to support the GOE's effort to increase access to efficient, safe, and low carbon public transport in the city of Alexandria by upgrading and electrifying the AAQLTL.

9. **Project Description.** The project will upgrade and electrify the existing AAQLTL into efficient, safe, and low carbon metro system. Specifically, the project supports the following activities: (1) civil works for the upgrade and electrification of the AAQLTL including a depot; (2) rail systems including signaling, telecommunication, centralized control system, and safety measures; (3) rolling stock; and (4) project management and construction supervision. The metro system will comprise 20 modern stations along the

⁶ Systra, 2021, Alexandria Metro Project: Feasibility Study Report.

⁷ Ibid.

⁸ EBRD, 2021, Alexandria Metro Project: Economic Due Diligence Report based on data from the EGIS, 2015, Alexandria Metro Project Feasibility Study.

22 km corridor, 13 stations and 16 km of which will be elevated. AIIB will jointly co-finance the metro with the European Bank for Reconstruction and Development (EBRD), European Investment Bank (EIB), and Agence Française de Développement (AFD).

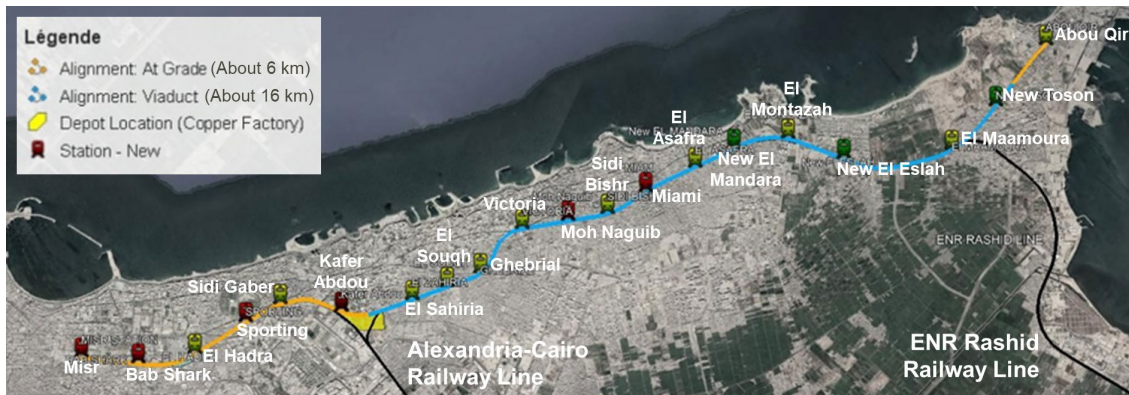


Figure 1: Alexandria – Abou Qir Metro Corridor and Proposed Stations

10. **Expected Results.** The project's expected results include increased ridership, travel time savings by the metro passengers, lowered GHG emissions from replacing diesel-run rail line with the electric metro system and modal shift from high carbon intensive mode of transportation, i.e., automobile system to the low carbon metro system. Specific annual outcome indicators including number of passengers served, average headway, GHG emission reduction. The data will be disaggregated by gender when possible.

11. **Expected Beneficiaries.** The project is expected to provide efficient, safe, and low carbon transit services up to approximately 520,000 daily passengers over the next 30 years on average. The metro system will provide access to a safe mode of mobility for female passengers by integrating video surveillance system in every car with the central security control unit as well as possible utilization of a female-only car. This will facilitate female participation in labor force. Investment in the metro system will also generate complimentary economic activities benefiting various groups of stakeholders along the corridor as well as in the city, during the construction and operation periods.

B. Rationale

12. **Strategic fit for AIIB.** The project aligns well with the Green Infrastructure Thematic Priority of AIIB's Corporate Strategy. Conversion of fossil fuel operated rail line into electric metro system is investing in green and low carbon infrastructure. The metro system also facilitates fast, efficient and safe connectivity and mobility for people and businesses in Alexandria, where the country's most international port is located. The project will also put in place technology-enabled urban metro system through the modernization of the telecommunication, train signaling, and system control as well as the automatic fare collection and management system. Since the project is upgrading the existing infrastructure to a low carbon metro line, it fits well with AIIB's Transport Sector Strategy. Finally, the project is also aligned with the "accessibility" and "efficiency" principles of AIIB's Sustainable Cities Strategy as well as its investment areas by increasing the capacity of the metro by a factor of six over the AAQLTL

13. **Strategy on Financing Operations in Non-Regional Members** Egypt, a non-regional member with territory in the Asian continent, is geographically proximate to and closely economically integrated with Asia and therefore, eligible for financing.

14. **Value addition by AIIB.** Leveraging AIIB's experience in urban rail transport sector such as the Izmir Metro Phase 4 Expansion project, the Chennai Metro Rail Phase 2 – Corridor 4 project and the Bangalore Metro Rail – Line R6, AIIB's participation will enhance the quality of project preparation and implementation by providing additional assessment and advice on technical, environmental (including climate change mitigation and adaptation finance) and social, financial management, economic and financial aspects. Specifically, AIIB's advice to consider climate change adaptation aspects in the project design has been well received and specified in the tender document for main civil works and track systems. AIIB will provide the required financial resources to reach financial close which will enable on time project implementation.

15. **Value addition to AIIB.** This first metro project in Egypt will be an important entry point into the transport sector in Egypt which is rapidly progressing and requiring significant amount of financing. Experience gained from the preparation and implementation of this complex metro would be added to the institutional capacity in the urban mass transit sector which is one of the fastest growing areas of infrastructure investment. Finally, the project will contribute 100 percent of its financing toward the Climate Finance target according to the Joint Methodology for Tracking Climate Change Mitigation Finance under the sub-category 3.4 Vehicle fleet energy efficiency and low carbon fuel (upgrading from diesel to electric train) and the sub-category 7.1 Urban mass transit (metro system).

16. **Lessons learned from previous operations.** Key lessons learned from the Izmir Metro Phase 4 Expansion project, the Chennai Metro Rail Phase 2 – Corridor 4 project and the Bangalore Metro Rail – Line R6 as well as the Cairo Line 3 project partially financed by EIB have been incorporated into the project design, which include timely and inclusive stakeholder engagement during the planning and implementation phases; careful and timely completion of land acquisition and related procedures; effective coordination among contractors of different procurement packages including required enabling works; and efficient coordination between relevant government agencies. Stakeholders have been mapped and analyzed. A detailed stakeholder engagement framework has been prepared emphasizing inclusiveness, completeness and effective communication and coordination among key agencies particularly Alexandria Governorate, Egyptian Environmental Affairs Agency, Egyptian Electricity Holding Company, Egyptian National Railways (ENR), and Alexandria Antiquities Directorate. The number of procurement packages has been optimized to only two main works and goods packages (construction and rolling stock) to reduce the coordination risk among contractors. The most recent lesson learned was that to improve operation efficiency and service quality, NAT awarded the O&M contract of the Cairo Metro Line 3 to an experienced international operator.

C. Components

17. **Component 1.** Upgrading AAQLTL into a Metro System (AIIB: EUR 193 million) This Component will finance the main civil works including:

- a. removal and upgrading of the existing tracks as well as viaduct for the 16 km of elevated rail section;
- b. modernization of existing stations and construction of new stations;
- c. construction of a depot including workshop;
- d. procurement and installation of workshop equipment, power supply, electrical and mechanical equipment, and supplies;
- e. procurement and installation of signaling and telecommunication system, centralized control system, and automated fare collection systems;
- f. public utility diversion, construction of pedestrian over/under passes at stations, fences; and
- g. integration of the rolling stock supplier package.

18. **Component 2.** Low Carbon Electric-Drive Rolling Stock (AIIB: EUR 50 million) This Component will finance the procurement of rolling stock, spare parts, related special equipment, and diagnostic tools. Based on a technical design, a total of 21 electric trains (with the maximum operation speed of 100 km/h) each train having at least 9 cars would be required to maintain the target level of services.

19. **Component 3.** Construction Supervision and Project Management (AIIB: EUR 7 million) The third Component will provide necessary support to NAT to effectively manage the procurement process; supervise the construction; supervise the implementation of environmental and social management plan and resettlement plan; and financial control, monitoring, and reporting.

D. Cost and Financing Plan. The total project cost is estimated at EUR 1,764 million (exclusive of EUR 1.7 million of EBRD Technical Cooperation Fund). The project costs are the allocation by project components and co-financiers are listed in the **Table 1: Project Cost and Financing Plan**.

Table 1: Project Cost and Financing Plan (EUR million)

Component and Activity	Government	EBRD	EIB	AFD	AIIB	All Financiers
Component 1: Upgrading Rail Infrastructure into a Metro System	171	190.5	577	193	193	1,327
Component 2: Low Carbon Electric-Drive Rolling Stock	46	49.5	151	50	49.4	346
Component 3: Construction Supervision and Project Management	7	7.5	22	7	7	50
Sub-total	224	247.5	750	250	249.4	1,723
Enabling Works	15	-	-	-	-	15
Land Acquisition	25	-	-	-	-	25
Total	264	250*	750	250	250**	1,764

Note: * Inclusive of EBRD's front-end fee of EUR 2.5 million

** Inclusive of AIIB's front-end-fee of EUR 0.625 million

E. Implementation Arrangements

20. **Implementation period.** The project implementation period is expected to be from January 2023 to July 2027.

21. **Implementation Management.** The implementing entity is NAT. NAT was established in 1983 by Special Law 113, which authorized it to plan and execute tunnels

and metro projects in Egypt, including managing of the full process of tendering and procuring.

22. In 2018, Law No. 113 was amended. Under the amendments, NAT is responsible for designing and setting up metro projects and electricity-powered rail projects. The authority's budget comes from the allocations set for it in the State general budget, revenues of the projects it will set up, fees given to the authority in return for the consultancies and services it will offer to the others both inside and outside Egypt as well as aid, loans and donations channeled to it. The amendments also allow the authority to set up shareholding companies in cooperation with other partners to operate and maintain metro projects.

23. Since NAT is a service entity, financing is structured such that expenses and investment costs fall under the government's general budget. NAT, therefore, does not produce formal financial statements, but rather prepares an illustrative balance sheet reflecting its financial status. So far, NAT has been able to successfully implement the construction of 83 km of metro lines, some of which were financed by EBRD and EIB, worth over EGP 23 billion (EUR 0.9 billion).

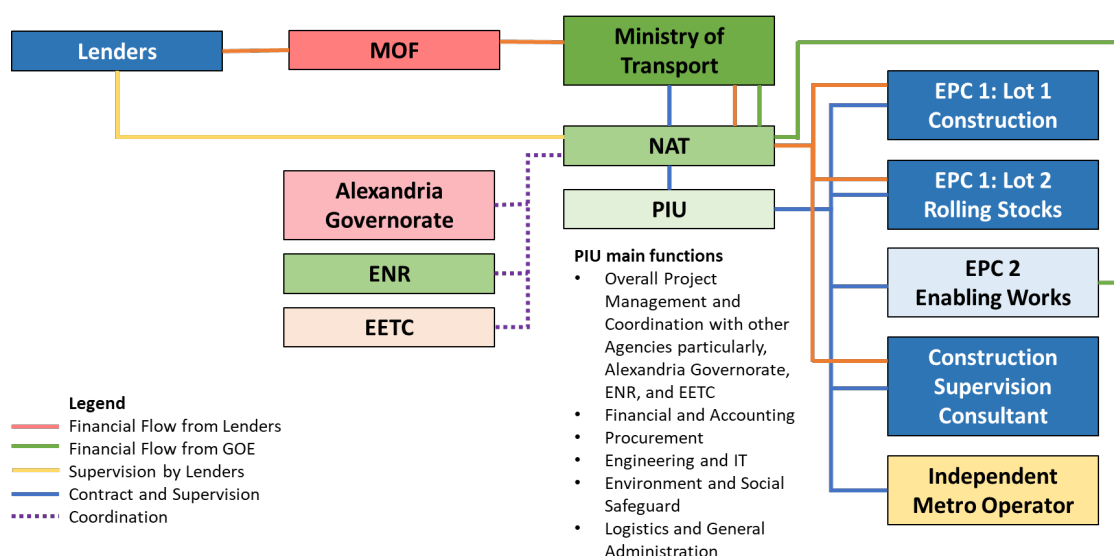
Table 2: NAT Financial Summary

(consolidated) in EUR million	June 2017	June 2018	June 2019	June 2020
Fixed Assets (including Metro)	787	782	854	876
Total Assets	2,949	3,184	3,912	4,767
Projects under execution	1,345	1,667	2,256	3,043
Long Term Liabilities	881	710	868	941
Total equity and liabilities	2,949	3,184	3,912	4,767

Source: NAT

24. The main project activities will be carried out by EPC firms/consortiums for construction and rolling stock provider. To ensure that the project is efficiently and timely implemented from the technical standpoint as well as compliance with lenders' policies, Component 3 of the project will provide construction supervision and project management support to NAT, monitoring, and evaluation in close collaboration with Alexandria Governorate, ENR, and Egyptian Electricity Transmission Company (EETC). Prior to disbursement, a Project Implementation Unit (PIU) will be established within NAT to undertake the following tasks: overall project implementation management and coordination with relevant agencies; financial and accounting, procurement, engineering, information technology, environmental and social safeguard, and logistics management. As the lead co-financier, EBRD has mobilized technical assistance resources to support NAT in carrying out the following tasks: lender supervisory services, preparation and award of an independent operational contract, and Environmental and Social Action Plan implementation support. **Figure 2** shows the diagram of the project implementation arrangement as well as fund flow from the lenders and the GOE. The independent metro operator will be financed by the GOE.

Figure 2: Project Implementation Arrangement



25. **Procurement.** All the components will be jointly co-financed by AIIB, EBRD, EIB and AFD. The EBRD Procurement Policies and Rules (“EBRD’s PP&R”, edition - 1 November 2017) is determined to be consistent with the AIIB Core Procurement Principles and Procurement Standards. Accordingly, in accordance with the provisions of the Co-Financing Framework Agreement (CFA), dated 6 April 2021, between EBRD and AIIB, the following arrangements will be applicable to this Project:

- a. EBRD will be responsible for overseeing the procurement process and the EBRD’s PP&R will apply in lieu of AIIB’s Procurement Policy. AIIB will rely on EBRD’s determination as to compliance with EBRD’s PP&R.
- b. Prior to the commencement of any procurement, EBRD will share the Procurement Plan with AIIB for review and endorsement. Any updates to any such Procurement Plan will also be shared with AIIB for review and endorsement.
- c. Any entity or person listed on AIIB’s Debarment List is ineligible to be awarded and/or participate in contracts for an activity financed by AIIB. Accordingly, EBRD will provide AIIB with the names of entities or persons being proposed for prequalification or for award of the co-financed contract. AIIB will notify EBRD whether the entity or person in the proposal for contract award or prequalification, as applicable, is ineligible pursuant to AIIB’s rules and procedures.

26. All procurement for this Project will be carried out and managed by NAT (through its PIU), which has previous experience with procurement financed by and requirements of MDBs. The contract management will be done by NAT, with assistance from the Consultant for PIU Support, Contract Management, and Construction Supervision. EBRD also has assigned a dedicated procurement specialist locally based at EBRD Resident Office in Cairo, which will provide guidance and assistance to NAT on procurement matters.

27. **Financial Management.** The PIU supported by the NAT's Finance Affairs & Contracting Department (FACD) will be responsible for the overall project financial management and disbursement work. It will be staffed with Finance General Manager (FGM) who will be supported by the various finance and accounting staff from FACD for maintaining acceptable project financial management arrangements.

28. The accrual basis accounting system will be followed for project accounting. Disbursements will follow the transaction-based approach and the following methods: Advance payment (through advances to the Designated Account) and Direct payment. FACD will maintain project accounts and have custody of supporting documents. The financial progress of the project will be reported on a quarterly basis through Interim Unaudited Financial Reports (IUFRRs) to be submitted within 45 days from the end of each quarter. The project audited financial statements for each year of project implementation will be submitted within six months from the fiscal year-end.

29. **Monitoring and Evaluation.** The PIU will be responsible for project implementation monitoring and evaluation with support from the Construction Supervision Consultant. The Lender Supervisory Services, which will monitor and report to the lender on the effective implementation and completion of the Project, will be provided through the EBRD's Technical Cooperation Fund. The PIU will prepare and provide consolidated project implementation progress report at least on a semi-annual basis.

30. **AIB's Implementation Support.** AIB will join semi-annual supervision missions arranged by EBRD. Physical site visits are depending on the COVID-19 situation. Additional consultants may be mobilized to ensure compliance with AIB's applicable policies.

3. Project Assessment

A. Technical

31. **Project Design.** This project is prepared as a Design and Build contract. The main EPC contractor will be responsible for providing a detailed design of the metro system. The rolling stock and metro operation will be tendering out separately. Systra, one of the leading global engineering and consulting groups specialized in mass transit and rail design, has been contracted by NAT to prepare the project technical design principles which will be the basis for the detailed design to be provided by the main contractor, EPC 1 Lot 1. The design principles include: an upgrade of an existing rail line with sufficient right of way; horizontal and vertical alignment design criteria with respects to urban mobility, urban livability, access to stations which could be at-grade, elevated, and underground; station design criteria for all twenty stations (five new stations and three interchange stations with ENR).

32. The metro system will have a Central Control Point (CCP) capable of handling the following aspects: train control, rolling stock management, mechanical and electrical plant management, security and safety apparatus, automatic fare collection, and power supply. The train control is expected to be based on Communication Based Train Control

system which controls all automatic driving of trains to improve railway safety and operational efficiency.

33. The depot workshop is located near Kafer Abdou station which provides ease of access to bring the train in for services. The rolling stocks are expected to consist of twenty-two electric trains and with nine cars each. The train target operational speed is 100 km per hour, running on a 1,500V Direct Current (DC) power supply system.

34. **Project Main Technical Characteristics** The project main technical characteristics are provided in the Table 3 below.

Table 3: Project Main Technical Characteristics

Route Length	22 km
At grade length and number of stations	6 km with 7 stations
Elevated length and number of stations	16 km with 13 stations
Structural gauge	Standard gauge (1,435 mm)
Maximum authorized speed	100 km per hour
Average headway	5 minutes
Number of tracks	Double track
Power supply	1,500V DC through the third rail
Number of trains	22 trains with 9 cars each
Signaling and driving modes system	Institute of Electrical and Electronics Engineer standards for Communication Based Train Control
Fare collection system	Automatic fare collection system

35. **Project Cost** The project cost has been estimated according to the pre-detail designed by Systra. The project cost was adjusted after the Concept Stage to reflect the adoption of the 1,500V DC power supply instead of the high voltage 25kV power supply system. As a part of project due diligence⁹, the project cost and its main components have been analyzed and compared with similar metro systems (non-tunnel) worldwide. The cost of Component 1 including civil works and rail systems and 10 percent contingency amounts to EUR 1,327 mil. or EUR 60.3 mil. per km which is on the lower end of the comparable range of between EUR 65 mil. to 77 mil. per km. The cost of Component 2, Rolling Stock and 10 percent contingency is EUR 347 mil. or 1.75 mil. per train car. This is found to be in middle of the range between EUR 1.3 mil. – 2.5 mil. per train car. As a result, the project cost and its main components are found to be reasonable and within the range of similar non-tunnel metro projects.

⁹ EBRD, 2021, Technical Due Diligence Report, Final Version, September 27, 2021.

36. **Economic Analysis** A cost-benefit analysis (CBA) was carried out to assess the economic viability of the Project comparing “with-” and “without-project” scenarios, based on data provided by the Feasibility Study of the Alexandria Regional Metro and the EBRD consultant, and the technical due diligence report. Annex 3 provides the detailed Economic and Financial Analysis of the Project.

37. The Project is expected to shift passenger traffic from other modes to rail, thereby generating substantial economic and environmental benefits. The economic merits are mainly falling into three groups: i) User-related benefits through a reduction in generalized costs (GC) of travel; ii) operator-related benefits through changes in operating costs net of changes in revenues for both rail and road operators; iii) reduction in negative externalities, including reduction in the level of road congestion, reduction in the level of road accidents and environmental benefits. The Project exhibits a Base Case EIRR of 12.2%, with an NPV (discounted at 5% p.a. to 2022) of EUR 2.9 billion. The Project is deemed to be economically feasible.

38. **Financial Analysis.** Following advice from NAT, the fare structure for the Cairo Metro has been assumed for the Alexandria Metro. Usually, the tickets cost around EGP 5 (EUR 0.26) for nine-station ride, while EGP 7 (EUR 0.36) is charged for rides up to 15 stations. For the rest of the trip, EGP 10 (EUR 0.52) is charged. An average fare ticket of EGP 5.7 (EUR 0.3) has been estimated. Other non-ticketing revenues (for example, advertising) have been assumed at 10% of the ticket revenues. The operating costs assume that the same timetable is operated throughout the project. No allowance has been made for the renewal of the various systems or for additional rolling stock purchases. While the line will make only a small surplus in its early years, this will steadily increase as demand increases, and as the service frequency remains static. However, the Project exhibits a negative FIRR of -2.7%, as Project cash flows are not sufficient to cover Capex costs. This is not an uncommon result, as the vast majority of international experience with urban rail projects suggests that fare revenues do not cover capital costs¹⁰.

39. However, the GOE has recognized the important of cost recovery and financial sustainability as demonstrated by the significant shift in tariff policy that was implemented in 2018 from a flat rate to distance-linked fares. By 2020, the tariff was increased by 10 folds from the 2017 flat rate of EGP 1 to EGP 10 for 16 stops or more¹¹. An average fare that would need to be applied for the Project to generate a neutral FIRR (0%) would be around EGP 8 or EUR 0.42 (+41%). This fare is within a plausible range that the project can achieve with gradual tariff adjustment strategy to ensure financial sustainability.

40. A sensitivity analysis was carried out by assessing the outcome of adverse scenarios over the base case. These comprise two different elements: i) conventional scenario analysis to assess the impact of different values of independent variables (namely, to reflect the impact of demand risk and cost overruns), and ii) adjustments to reflect a slowdown in economic growth due to the impact of the pandemic and increasing macroeconomic challenges (reflected through the discount rate). The Project is

¹⁰ World Bank Group (2018). The Urban Rail Development Handbook.

¹¹ Systra, 2021, Alexandria Metro Project: Project Feasibility Study Report

economically feasible under all the assessed scenarios. More detail information is provided in the Annex 3.

B. Fiduciary and Governance

41. **Procurement.** The PIU capacity is found to be adequate to manage and carry out procurement.

42. All contracts are subject to EBRD's prior review. Procurement is currently underway as an advanced procurement, ensuring that all contracts should be signed prior to loan effectiveness, with the following description:

- a. **Contract Package Ref 13768597 (EPC 1 – Contract 1)** estimated contract amount of EUR 1.327 billion (EUR 193 million of which is AIIB financing): This is an Engineering, Procurement, and Construction (EPC) for the works (i.e., Civil Works, Electrical & Mechanical, Signaling, Centralized Control, Telecommunication, Automated Fare Collection, Power Supply, Workshop Equipment, Track Works, and ENR Tracks Diversion). The procurement follows a two-stage open tender. The prequalification process has been completed, and the procurement is currently in the first stage procurement, and it is expected that the contract award and signing will be done by end of January 2023.
- b. **Contract Package Ref 13768852 (EPC1 – Contract 2)** estimated contract amount of EUR 347 million (EUR 50 million of which is AIIB financing): This is an Engineering, Procurement, and Construction (EPC) for Rolling Stock contract, comprising the following elements: Rolling Stock cars, Spare Parts, Special equipment, and diagnostic tools. The procurement follows a two-stage open tender. The prequalification process has been completed, and the procurement is currently in the first stage procurement, and it is expected that the contract award and signing will be done by end of January 2023.
- c. **Contract Package Ref 19931411 (PIU Support Consultant)** estimated contract amount of EUR 50 million (EUR 7 million of which is AIIB financing): This is Consultant for PIU Support, Contract Management, and Construction Supervision, including Environmental and Social Implementation Support. The Expression of Interest was already issued in June 2022, and it is expected that the contract award and signing will be done by end of January 2023.

43. **Financial Management.** PIU will be responsible for the overall project financial management and an assessment of the financial management (FM) arrangements for the Project was conducted virtually in December 2021 and updated in June 2022. The review covered the system of accounting, budgeting, flow of funds, financial reporting, auditing, and internal controls at NAT. The assessment process was conducted through interviewing staff, reviewing FM questionnaire and some shared documents.

44. Based on the assessment, FM risk is assigned as Medium and the FM arrangements are acceptable to meet AIIB's requirements. The FM risk rating for the project is the residual risk after mitigation. It is concluded that adequate FM arrangements will be in place for the project to provide reasonable assurance that the proceeds of the financing will be used for the purposes for which they are granted.

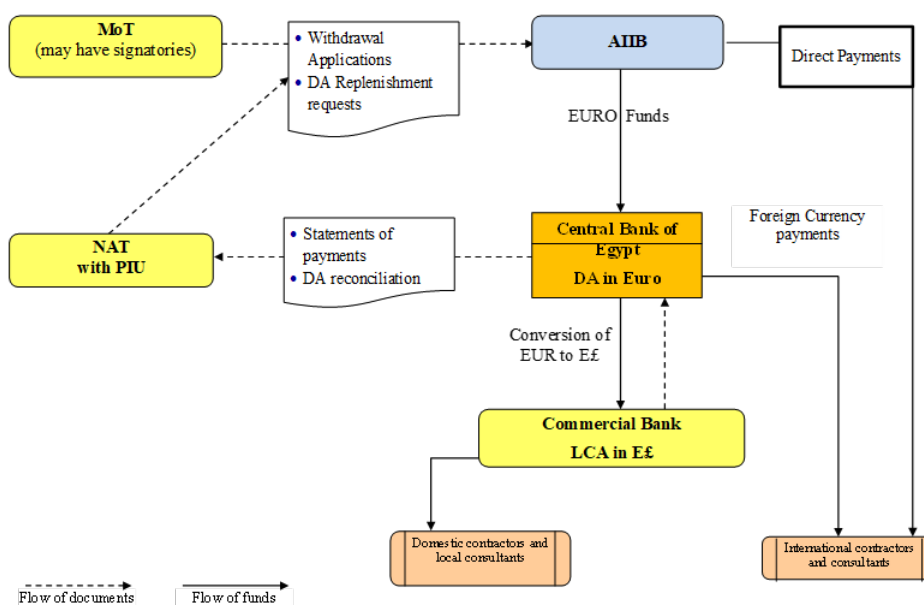
45. The following mitigation measures are agreed: (i) a project FM manual for project finance staff guidance will be prepared within the first six months of project implementation; (ii) project accounting and financial reporting will be automated through NAT's existing Financial Management Information System (FMIS) within the first six months of project implementation; and (iii) NAT's project finance staff will be required to participate in two training sessions to be conducted by AIIB FM and CTL teams within the first year of the project implementation.

46. **Staffing.** NAT's Financial Affairs Unit (FAU) is located under FACD. This unit is headed by the FGM who will be responsible for the Project's financial affairs. The FGM will be supported by the various finance and accounting staff from FACD for maintaining acceptable project financial management arrangements. FAU has some experience with big donor-funded projects, and they have already dealt with EIB and EBRD. But as FAU does not have any experience with FM and disbursement procedures of AIIB or the similar financial institutions like the World Bank or the Asian Development Bank, two training sessions will be conducted within the first year of the project implementation by AIIB FM and CTL teams.

47. **Planning and Budgeting.** PIU will prepare annual project budgets and have them approved by AIIB and other cofinanciers, MOT and NAT. The approved annual budgets will be used for periodic comparisons with actual results as part of the interim financial reporting and the monitoring process.

48. **Funds Flow and Disbursement.** The disbursement of Loan proceeds will be made using the advance payment and direct payment methods. PIU will open a Designated Account (DA) in EUR in the Central Bank of Egypt (CBE). PIU will also open a sub-account in the Egyptian Pounds (EGP) to pay for eligible expenditures in local currency. Funds in a local currency, the Egyptian Pounds (EGP), will be transferred to the sub-account, which may be referred as the Local Currency Account (LCA), from the DA for immediate payment requirements, based on expenditures already incurred or immediately to be incurred, as reflected in the expenditure requests prepared by PIU. Figure 3 below depicts the flow of funds diagram from the Loan Account to the ultimate beneficiaries.

Figure 3: Flow of Fund



49. The eligible project expenditures such as works, goods, consulting services, and non-consulting services will be subject to documentation and using Statement of Expenditure (SoE) format. The Disbursement Letter (DL) will detail out the format for authorized signatories, ceiling of DA, process of submitting claims and other terms and conditions of disbursements related to the project.

50. **Accounting, Financial Reporting and Internal Controls.** The accrual basis accounting system and Egyptian Accounting Standards will be followed for project accounting. The FMIS is based on Oracle program and will be linked to the Ministry of Finance’s Integrated Financial Management Information System. NAT confirmed that starting July 1, 2022, full accrual and automation have been introduced. FACD will be responsible for maintaining project accounts and will use the NAT’s existing accounting software for accounting and reporting of financial statements by opening a new profile for the Project within the first six months of project implementation.

51. The financial progress of the project will be reported on a quarterly basis through Interim Unaudited Financial Reports (IUFRs) to be submitted within 45 days from the end of each quarter. The proposed format and the content of IUFR will be shared by AIB and may include: (a) Project Sources and Uses of Funds, (b) Uses of Funds by Project Activity, (c) Use of Funds by Disbursement Categories, and (d) Designated Account Reconciliation Statement. PIU will maintain all the required ledgers related to disbursement including Loan Register and DA Ledger.

52. PIU will use the existing internal control system of NAT which is assessed to be capable of providing reliable and adequate controls over funds/transactions flow. NAT’s ordinary operation is guided by the local legislation in budgeting and accounting. In addition, the project FM manual will reflect the project FM and disbursement procedures for project finance staff guidance.

53. **External Audit.** NAT is audited by the Supreme Audit Institute currently known as the Accountability State Authority, but due to possible delays of submission of the annual audit report, the project financial statements will be audited on an annual basis by an independent external auditor acceptable to AIIB and in accordance with internationally accepted auditing standards and Terms of Reference acceptable to AIIB. The external audit report for each year of project implementation that includes audit opinion and management letter will be submitted to AIIB within six months from the end of each fiscal year. NAT's fiscal year matches with the Borrower's, which is from July 1 to June 30. The terms of reference to be used for the project audit will be prepared by PIU and cleared by AIIB, before contracting the auditor.

54. **Financial Crime and Integrity (FCI) and Counterparty Due Diligence/Know Your Counterparty (CDD/KYC).** Applicable AIIB's policies and guidelines, KYC/FCIDD has been carried out to assess Financial Crime (FC) risks, including Money Laundering and Financing of Terrorism (ML/FT) risks, Sanction risk, and risk deriving from Integrity Unsoundness when dealing with its Counterparties and Connected Parties in the financing. Integrity screenings have been performed on the state representatives of the GOE, as well as senior management of Ministry of International Cooperation, MOT, and NAT (including the potential authorized persons to sign financing agreements with AIIB). Due to their public status, they are identified by Word-Check One as politically exposed persons (PEPs). No critical findings about the identified PEPs came out of the screenings.

55. **Governance and Anti-corruption.** Each Co-financier will apply its own anti-corruption framework, in AIIB's case its Policy on Prohibited Practices (2016) (PPP). AIIB is committed to preventing fraud and corruption in the projects it finances. It places the highest priority on ensuring that projects it finances are implemented in compliance with its PPP. The EBRD will monitor the work related to tender document preparation and tender/proposal evaluation and award under the financing. Implementation will be monitored regularly by the EBRD. Each of AIIB and EBRD will promptly notify the other about any credible allegation or indication of prohibited practice, as defined in the respective anti-corruption frameworks, in connection with the project, and any resulting investigation will be led by EBRD following its own anti-corruption framework and decision-making process, with AIIB assistance, if agreed upon by the co-financiers. Notwithstanding the above, AIIB reserves the right to investigate, directly or indirectly through its agents, any alleged Prohibited Practices relating to the project and to take and/or require the borrower to take necessary measures to mitigate the risk of such practices and address any issues in a timely manner, as appropriate.

C. Environmental and Social

56. **Categorization.** The project's environmental and social (ES) risks and impacts have been assessed in accordance with EBRD's Environmental and Social Policy (EBRD's ESP) and related Performance Requirements (PRs). To ensure a harmonized approach to addressing the ES risks and impacts of the project, and as permitted under AIIB's Environmental and Social Policy (AIIB's ESP), EBRD's ESP and relevant PRs apply to the project in lieu of AIIB's ESP. AIIB has reviewed the EBRD's ESP and PRs and is satisfied that: (a) they are consistent with AIIB's Articles of Agreement and materially consistent with the provisions of AIIB's ESP, including AIIB's Environmental and Social Exclusion List and the relevant Environmental and Social Standards; and (b)

the monitoring procedures that are in place are appropriate for the project. EBRD has categorized the ES risks of the project as Category A (which is equivalent to Category A if AIIB's ESP were applicable).

57. **Environment.** The Project will result in a number of environmental and social benefits, including increased safety and reliability of the public rail service, removal of level-crossings and thus eliminating collision risks, jobs creation and reduced GHG emissions. However, it is a significant linear infrastructure in an urban environment and its construction and operation have significant ES impacts such as noise and vibration, traffic disruption, underground utility conflicts, and health and safety along the alignment and at crossings including adverse impacts of electromagnetic field exposure. Unknown underground utilities is a major project risk. Land acquisition is necessary at nine locations for implementation of road diversions to create over or underpasses. Noise and vibration impacts have the potential to be significant in certain locations during construction and operation and will be managed in line with the national and international standards and with good practice mitigation measures such as noise barriers and restriction on working times. An Environmental and Social Impact Assessment (ESIA) has been carried out with an Environmental and Social Management Plan (ESMP)¹² included. Risks due to contamination of the depot site have been assessed through a site assessment. Site remediation/management through treatment (encapsulation) and subsequent disposal in a secure landfill, designed for disposal of treated hazardous waste will be undertaken before construction of depot facilities. The ES due diligence carried out by the lenders has revealed the following actions that need close supervision: 1) baseline noise and vibration studies, 2) EPC contractor to closely supervise excavations works to avoid underground utility conflicts, 3) provisions for wastewater treatment at the rolling stock depot near the Kafer Abdou station, and 4) further assessment of Electro Magnetic Field risk by lead Contractor. Mitigation measures have been thorough prepared and included in the ESMP.

58. **Climate Change.** The Project is expected to contribute to climate change mitigation result in terms on GHG emission reduction of approximately 2.6 million tons of CO₂ equivalent (tCO₂e) for the entire project life of 31 years, due mostly to the modal shifting of road vehicles and the diesel train to the electrified metro system. The Government new environment sustainability guidelines to shift toward public transport system that run on electricity will be applied to 30 percent of public project in 2021 and increase to all public project in 2024. As Alexandria is located along the Mediterranean coast which is vulnerable to climate induced flood, storm surge, and sea-level rise (SLR). The Project design includes the potential impact of SLR as well as possible mitigation and adaptation measures to improve its resilience. In addition, the drainage system will be designed to be able to protect the site against potential flooding from a 1 in 100-year storm recurrence event. The climate change mitigation such as energy efficiency from regenerative braking system and resilience aspects have been included scope of work of the tender document for the Component 1.

59. **Social Aspects.** The alignment of the Project is within the current railway corridor, owned by the ENR and it is anticipated that all construction works will take

¹² EBRD's disclosed environmental and social information can be found at <https://www.ebrd.com/work-with-us/projects/esia/grcf2w2-alexandria-metro.html>

place on ENR land, except for additional land needed for a depot and the new stations at Bab Sharq and Sporting. Ministerial decrees were issued and published in the Official Gazette in 2020 and 2021 specifying necessary area for land acquisition for the Project¹³.

60. The land area required for the depot mostly (18.5 ha) belongs to the El-Nahas Company, owned by the Ministry of Public Business Sector, while the private-owned land accounted for 1.9 ha. This land used to be a copper factory which was decommissioned and currently has no usage. A ministerial decree for land acquisition has been issued. The Committee from the Alexandria Survey Directorate (ASD) has completed the land valuation for all required land and NAT has deposited the required compensation with the ASD for the depot land.

61. A total of 20.80 hectares (ha) of land will be required to carry out project activities, out of which private and public land account for 20.59 ha and 0.21 ha respectively. Although, temporary land requirement during the construction is not expected, ENR has available properties that can be utilized if the need arises. Land acquisition and project related activities are likely to generate physical and economic displacement of both title and non-titleholders. The potential adverse impacts of land acquisition include loss of land, loss of structures and loss of trees, community and religious properties, loss of business income and livelihoods. The project is also likely to generate disproportionate impacts on vulnerable groups (women, the elderly, those below the poverty line) and households and businesses which are externally adjacent to the project alignment corridor. Specifically, the project is expected to impact 507 families who have established claims or legal title to private land. Moreover, 8 business tenants and 108 squatters along with shops and households adjacent and outside the project alignment corridor will also be impacted as a result of the project activities.

62. To mitigate the potential adverse impacts of land acquisition and project related impacts, a Resettlement Plan (RP) in line with the principles outlined in the Resettlement Framework has been prepared. The RP includes an Entitlement Matrix that identifies the entitled unit, compensation, and assistance measures. Compensation is provided to titleholder, non-titleholders and vulnerable groups. Long-term rehabilitation measures in the form of a livelihood restoration strategy are also included. The aim of the compensation, assistance and livelihood restoration measures are to improve or at least restore the livelihoods of all displaced people to pre-displacement levels. The nature of the civil works is anticipated to induce short-term impacts related to construction activities, linked to temporary loss of access, labor influx, disruptions to commercial activities and effects on traffic and public utilities. Meaningful consultations with various categories of stakeholders have been carried out during the preparation of the ESIA and RP to ensure that project-affected people are aware of the project details including impacts and safeguard measures to be implemented. The design and mitigation measures related to the project incorporates pertinent issues raised by communities during the consultation sessions. RP implementation will be monitored and reported by NAT on a quarterly basis. Upon completion of the RP implementation, an external independent consultant will carry out the RP audit and report to the lenders including

¹³ WSP, 2022, Alexandria Metro Project: Resettlement Action Plan (RAP)

AIIB. Finally, the ESIA and RP did not identify any Indigenous Peoples within the project's alignment.

Table 4: Land Requirement by Ownership¹⁴

Breakdown of Private and Public Land Use	Area in ha
Private Land Use	
Bab Sharq Station land parcel	0.0632
Sporting Station land parcel	0.0887
Kafr Abdou Station and depot land	20.4436
Total Private Land Use	20.5955
Public Land Use	
ENR property of the Abu Qir railway line and (13) Mosques built on ENR property	ENR owns the 21.7 Km railway corridor and all the facilities located within. Coordination between ENR and NAT is however ongoing to transfer the ownership of the alignment.
ENR warehouse	0.0869
Part of public parking area	0.0380
The administrative building	0.0852
Total Public Land Use	0.2101

63. As Alexandria is an ancient and culturally rich city, the potential for archaeological chance finds is high during excavation works along the existing line to erect the viaducts. The Ministry of Antiquities has already been consulted and further coordination will take place prior to Project mobilization. A chance find procedure is included in the ESMP and training of personnel will be undertaken prior to construction commencing.

64. **Stakeholder Engagement.** As part of the ESIA process, meaningful stakeholder consultation was carried out from November 2020 to January 2021. These were done through key informant interviews (30), focus group discussions (22), meetings (5), and scoping sessions (2). Moreover, additional stakeholder engagement with various categories of stakeholders including women and businesses were carried out during February – June 202 as part of the preparation and finalization of the RP. The key findings of the public consultations have been documented in the ESIA and RP. The project is expected to carry out systematic Stakeholder Engagement throughout the project cycle and the RP includes a strategy for planned engagement activities. The ES documentation in English and summary in local language, has been disclosed by the NAT on its website and in hard copies in the project areas. This documentation has also been disclosed on EBRD's and AIIB's websites which will include links to the documentation on NAT's website and EBRD's website.

65. **Gender Aspects.** Upgrade of the existing line will eventually come with gender benefits, especially in terms of safety, accessibility and affordability. The metro system will provide access to a safe mode of mobility for female passengers by integrating video surveillance system in every car with the central security control unit as well as possible utilization of a female-only car. Adding to that, NAT and any project contractors are

¹⁴ Ibid.

required to manage potential impacts to workers and communities through the development of a number of policies and procedures that include a code of conduct for workers, prevention of child and forced labor, provisions to combat gender-based violence and harassment, occupational and community health and safety, etc. ESMP actions related to gender will be closely monitored. Furthermore, as a part of the ESMP, the metro user satisfaction on (i) tariffs, (ii) timetables, (iii) violence and harassment, (iv) accessibility and (v) cleanliness / hygiene, through an independent auditor, using a robust method that allows identifying trends will be carried out and publicly disclosed, during the metro system operations.

66. Occupational Health and Safety, Labor and Employment Conditions

Mitigation of risks due to electromagnetic field radiation is included as part of the lead contractor's task. Design considerations to enhance derailment containment will lead to reduce risks should a derailment occur. Labor and working conditions will be monitored thru site visits by the lenders. Workers will be trained on and appropriate code of conduct that stipulates the different commitment of labor towards community groups and the different behavior that should be avoided. Stipulations against the use of child labor will be included in contracts. Labor influx is to be minimized by tapping into the local workforce.

67. Project Grievance Redress Mechanism

NAT has an existing grievance redress mechanism which has been extended to community, all workers onsite, including permanent workers, casual workers, service providers, consultants, suppliers, subcontractors, and external stakeholders, accessible to all workers, and at no cost and without retribution. A project-level grievance mechanism (PGRM) will be established for external stakeholders, including the public, to raise concerns, comments and questions about the project. As the PGRM is for the lifetime of the project, resettlement and livelihoods, as well as gender related concerns and questions will be usable.

68. AIIB's Project-Affected People's Mechanism.

Pursuant to AIIB's agreement with EBRD, EBRD's independent accountability mechanism, the Independent Project Accountability Mechanism (EBRD's IPAM), will review, in accordance with EBRD's Project Accountability Policy, all requests relating to environmental and social issues that may arise under the Project. Consequently, in accordance with AIIB's Policy on the Project-affected People's Mechanism (PPM), submissions to the PPM under the Project will not be eligible for consideration by the PPM. Information on EBRD's IPAM is available at <https://www.ebrd.com/project-finance/ipam.htm>.

69. Monitoring and Supervision Arrangements

ES monitoring frequency is as follows; indicators and reporting requirements including quarterly reports to lenders during construction and annual reports thereafter. AIIB team will join the bi-annual supervision missions, subject to travel limitations.

70. Operational Policy on International Relations/Policy Waiver.

The project footprint is entirely within the sovereign territory of Egypt. There are no disputed areas within or in proximity to the Alexandria to Abou Qir corridor.

D. Risks and Mitigation Measures

Table 5: Summary of Preliminary Risks and Mitigating Measures

Risk Description	Assessment (H/M/L)	Mitigation Measures
<p>Sovereign Risk</p> <p>The immediate short-term risk to Egypt's economy stems from the war in Ukraine, primarily through three main channels.</p> <p>i) heightened global risk aversion and the flight to safety led to capital outflows, exposing the risk involved in Egypt's strategy to finance external deficits with portfolio inflows.</p> <p>ii) the disruption in the wheat market due to war are affecting food security.</p> <p>iii) the impact on tourist arrivals from Russia and Ukraine, an important source of tourism receipts, will delay the much-awaited post-pandemic recovery of the sector.</p> <p>Public debt is expected to have increased to over 90 percent of GDP in FY22, due to slower growth and a pause in fiscal consolidation, and to increase further in due to devaluation and higher deficits.</p>	<p>M</p>	<p>In order to mitigate the adverse impacts from the risks, the government has put in place effective response measures and prudent macroeconomic policy. The policy response so far has been to</p> <p>i) let the currency devalue by more than 50 percent and shift towards flexible exchange rate</p> <p>ii) cumulatively increase the policy rate by 500bps in three steps</p> <p>iii) announce a 2-percent-of-GDP relief package to cushion the impact on the affected population groups,</p> <p>iv) already reached staff-level agreement with the IMF and waiting for board approval</p> <p>v) has already signed government to government contracts with wheat exporting countries to ensure smooth supply of wheat in near future.</p> <p>That, along with financial support from the Gulf Cooperation Council, have been enough to tentatively calm the markets. The economy is estimated to grow by 6.6 percent in FY22, higher than earlier estimates.</p> <p>Robust growth and bringing the primary budget surpluses to 2 percent of GDP are expected to improve the level of public debts to GDP which has peaked at 90 percent in FY22 and will revert to downward trend from FY23 onwards.</p>

Risk Description	Assessment (H/M/L)	Mitigation Measures
<p>Project Implementation and Institutional Risk</p> <p>The project is technically complex. The capacity of NAT would be stretched as they are also working in parallel on the implementation of multiple large mass transit projects, e.g., Cairo Metro Line II Purchase of trains and Cairo Metro Line 1 Modernization.</p>	<p>H</p>	<p>The project implementation risk is expected to be manageable given (i) NAT has previous experience with the MDBs and their procurement processes, (ii) the project is using advanced procurement procedures and the procurement process is already well-underway ensuring that the contract signing will be done prior to the loan effectiveness, (iii) EBRD will provide support to NAT to increase the procurement and project management capacity by dedicating a locally-based procurement specialist to provide hands-on guidance and bespoke capacity building workshops alongside dedicated infrastructure EBRD Resident Office staff and (iv) a loan-funded Construction Supervision Consultant to ensure an oversight on all the construction activities and the EBRD appointed and grant funded Lender's Monitor to provide additional Project monitoring.</p> <p>EBRD's technical consultant mobilized as part of due diligence will also ensure that all required interface and integration requirements are suitably defined in the tender documents to ensure effective coordination for implementation and operation of the complete metro system.</p>
<p>Operation and Maintenance Contract Award Risk</p> <p>There is a risk associated with the willingness of the GOE and NAT to introduce a long-term contract with an independent metro operator and the timing thereof.</p>	<p>M</p>	<p>The risk is mitigated by (A) GOE commitment to strengthen the role of the private sector in maximizing the efficiency and quality of services provided to its citizens as demonstrated by (i) the award of the newly constructed metro in Cairo (Cairo Metro Line 3) to the</p>

Risk Description	Assessment (H/M/L)	Mitigation Measures
		<p>French operator RATP (State-Owned Enterprise) in September 2020; (B) the signing of a Public Service Contract (PSC) between NAT and Egypt Company for Metro (ECM) for the O&M of the existing metro lines in Cairo (Lines 1 and 2) in an effort to improve the service orientation of the operator and target efficiency gains; and (C) an operation and maintenance agreement with a private sector operator in form and substance acceptable to AIIB will be one of the project obligations included in the Project Agreement.</p> <p>In case of delays in the O&M contract award, ECM will be expected to run the services.</p> <p>EBRD will provide support to the operator selection and contract award process through its Technical Assistance to ensure that process is in line with international best practice and standards and that delays are minimized.</p>
<p>Procurement Risk</p> <p>High value and complexity of the procurement. Limited capacity of the Client for procurement and implementation of the project.</p>	<p>M</p>	<p>All procurement is subject to EBRD prior review</p> <p>Advanced procurement for all procurement packages, ensuring that all contracts are signed prior to the loan effectiveness.</p> <p>EBRD provides a dedicated procurement specialist, locally based in EBRD Resident Office in Cairo, to handhold the PIU in managing and carrying out procurement for the project.</p>
<p>Financial Management Risk</p> <p>Irregular and unreliable financial reporting due to an absence of finance and accounting</p>	<p>M</p>	<p>NAT has agreed to prepare a project FM manual for project finance staff guidance and automate project accounting</p>

Risk Description	Assessment (H/M/L)	Mitigation Measures
<p>procedures manual for project finance staff guidance, a recent change in its previous practice for manual accounting and reporting at NAT, and lack of experience with FM and disbursement procedures of AIIB or the similar financial institutions like the WB or ADB.</p>		<p>and financial reporting through existing NAT's FMIS within the first six months of project implementation. NAT's project finance staff would participate in two training sessions on FM and Disbursement arrangements within the first year of implementation.</p>
<p>Environmental and Social risk</p> <p>Risk of Contractor/s not following the measures indicated in the ESMP.</p>	<p>M</p>	<p>Contracts will include ES requirements, commitment, and provisions. ES performance guarantee will be required. EBRD safeguards specialist are closely coordinating with NAT for proper implementation of agreed ES actions.</p>

Annex 1: Results Monitoring Framework

Project Objective:		The project aims to support the Government of Egypt (GOE)'s effort to increase access to efficient, safe, and low carbon public transport in the city of Alexandria by upgrading and electrifying the existing Alexandria-Abou Qir rail line.								
Indicator Name	Unit of measure	Base-line Data Year	Cumulative Target Values					End Target 2027	Frequency	Responsibility
			YR1 2023	YR2 2024	YR3 2025	YR4 2026	YR5 2027			
Project Objective Indicators:										
1. Average daily ridership by gender	persons	70,000	0	0	0	260,000	330,000	330,000	Annual	NAT
2. Train service availability measured by train frequency (headway)	minutes	20	0	0	0	5	5	5	Annual	NAT
3. Greenhouse gas emission reductions	ton of CO ₂ equivalent	0	0	0	0	16,000	25,000	25,000	Annual	NAT
Intermediate Results Indicators:										
1. Metro construction progress	percentage	0	20	50	70	90	100	100	Semi-annually	NAT
2. Enabling works progress	percentage	0	30	70	80	95	100	100	Semi-annually	NAT
3. Rolling stock delivery progress	percentage	0	0	0	20	70	100	100	Semi-annually	NAT

Annex 2: Detailed Project Description

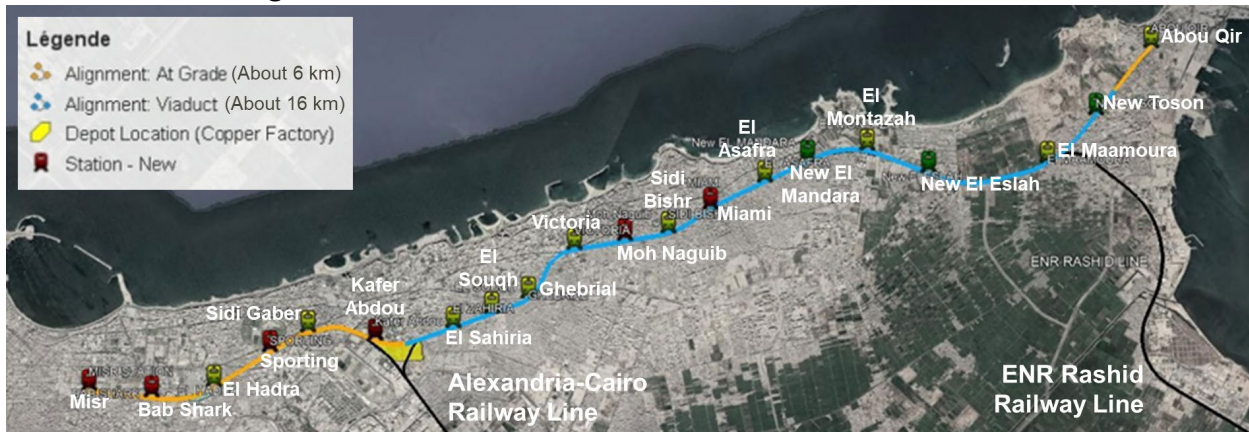
1. The project will finance an upgrade of an existing AAQLTL into an electrified Metro System. The new Metro System will be running on the same right of way of the existing Rail Line.

2. **Designs.** The project feasibility study including basic design was first prepared by Systra Group in 1997. During 2020-2022, Systra also provided an update to the feasibility study and tender documents. The project is a Design and Build contract where the detail design will be provided and constructed by selected tenderer based on the feasibility study and basic design provided by NAT. Engineering, Procurement, and Construction (EPC) form of contract has been selected by NAT for the implementation of this project. The Conditions of Contract for the EPC will be based on the second edition of the “Silver Book” suitable for a turnkey project published by the Fédération Internationale des Ingénieurs-Conseils (FIDIC) in 2017.

Detailed Description of Project Component

3. **Component 1.** Upgrading of the AAQLTL into an electrified Metro System (AIIB: EUR 193 million) This Component will finance the main civil works and construction of the new metro system. The new track based on a standard gauge of 1435 mm with the third-rail system¹ for electric power distribution will replace the existing tracks. Component 1 includes two main sub-sections along 22 km Metro corridor.

Figure A2.1 Alexandria-Abou Qir Metro Line and Stations



4. **Sub-section 1** covers approximately 16 km of elevated track on viaduct with 13 elevated-track stations from New Toson station to El Sahiria station. From the New Toson station to Abou Qir station will be a transition to at-grade track and station at Abou Qir. The Viaduct for Alexandria Metro Project can comprise of simply supported Precast Pretensioned twin U-girder (each U-girder supporting one track only)/Post tensioned Segmental Box Girder with Reinforced Cement Concrete (RCC) sub-structure and bored cast in situ piles foundation. Integration with other mode of transportations is built-in through the interchange stations at El Maamoura to interchange with the ENR Rashid Railway Line and the Victoria stations to interchange with the Ralm Tram. The

¹ The Third Rail (3rd Rail) is a mean to distribute electric power to a railway or metro train usually through an additional rail (a conductor rail or third rail) placed alongside of a railway track.

Miami and Moh Naguib stations are newly added stations while the other 12 stations (including the Abou Qir station) will be built in the vicinity of the locations of the existing railway stations. Along the elevated double track, ballast-less track form and concrete equipped with the third rail system will be used. The track system will be designed with the maximum axle load that will be provided by the Rolling Stock Supplier which should not exceed 19 tons.

5. **Sub-section 2** covers around 6 km of at-grade track and 6 at-grade stations from Kefer Abdou station to Misr (Alexandria) station. From the Kafer Abdou station (connection to the Depot) to the Misr station, the ENR Alexandria-Cairo Railway Line will run alongside the metro track. The Misr station will be integrated with the ENR Alexandria-Cairo Railway Line as an interconnection station while the Sidi Gaber will serve as an interchange station with the Ralm Tram. There are 4 newly added stations along this 6 km corridor, while two stations will be built in the vicinity of the location of the existing railway stations. The track form at grade corridor and in the depot, may be ballasted with concrete sleeper equipped with the third rail system.

6. **Depot** – The Depot is located next to the Kafer Abdou station as well as the Alexandria-Cairo Railway Line. The total land area of around 20.4 hectare has been expropriated from the Copper Factory land. The Committee from the Alexandria Survey Directorate (ASD) has completed the land valuation for all required land and NAT has deposited the required compensation with the ASD for the depot land. The Depot will include the main train stabling, maintenance facilities, Administrative Buildings for both operation and maintenance, Operation Control Center, and a High Voltage Station.

7. **Signaling and Driving Modes System** – The Signaling system proposed for this Project, is mainly based on the Communication Based Train Control (CBTC) technology and standards as defined by the Institute of Electrical and Electronics Engineer (IEEE) standard for CBTC performance and functional requirements (IEEE 1474.1) and the International Electrotechnical Commissions (IEC) Railway applications – Urban guided transport management and command/control systems (EN 62290). The CBTC will provide a primary detection system, based on train localization, independent from track fixed blocks, and ensure safe operation of all passenger train movements on the main line and test tracks. A combined fallback system will also be available, in case of CBTC failure. This fallback system will include an auxiliary train detection system based on track section layout.

8. The Signaling and Driving Modes system shall be composed of various subsystems:
- a. Interlocking (IXL) subsystems: this safety subsystems take care of track elements and route conditions.
 - b. Automatic Train Control (ATC). This subsystem ensures safety and non-safety related functions, that can be of 2 types: (i) Automatic Train Protection functions (ATP): these functions are safety related and ensure train movements and (ii) Automatic Train Operation (ATO): These functions ensure train driving function.
 - c. Data Communication Subsystem (DCS) for train to ground communication, and for trackside communication with centralized equipment.

9. **Telecommunication System** – The telecommunication system is designed to provide robust connectivity to all systems of the Metro operations including the Central Control System, Signaling and Driving Mode system, Automatic Fare Collection, Security and Safety system, Supervisory Control and Data Acquisition (SCADA), Access Control, CCTV, video, and voice recording, telephone and intercom system, operation and maintenance radio, public announcement, and passenger information system.

10. **Power Supply** – The Alexandria Regional Metro Line will be supplied under 220 kV by the national company “power utility company West Delta Electricity Production Company (WDEPC) for the production and the EETC national company for the energy transportation. A High Voltage Station (HVS) will transform the 220kV into 20kV. This HVS will be located inside the Depot nearby the station Kafer Abdou.

11. The metro power supply network consists of three sub-networks: (i) The 22kV sub-network, for the transformation of 220kV/20kV and the transportation of the 20kV; (ii) the "Traction" sub-network, for the transformation of the 20kV into 1500V direct current (DC), the distribution of the 1500Vdc (+) to the Third Rail, and the distribution of the return traction current (-) to the running rail; and (iii) the "Lighting & Power "sub-network" (LPS), for the transformation of the 20kV into 400V/230V 50Hz and for the distribution to different boards according to the nature of the loads. The loads are located in the station and between the stations, nearby the line as well as the Workshop and Depot. Each LPS located in each station will provide the loads of the station and the loads of half of the line on one (East) side and half of the line on the other (West) side, such as all the LPS will provide all the loads of the line. For the Workshop and Depot Complex, 2 LPS will be provided.

12. **Automatic Fare Collection (AFC) System** – The AFC will be designed to accommodate major means of payment including prepaid card and electronic purse as well as credit and debit card with corresponding mediums such as contactless smart card, personal mobile device with QR Code, and a single trip ticket.

13. **Component 2. Low Carbon Electric-Drive Rolling Stock (AIIB: EUR 50 million)** This Component will finance the procurement of rolling stock, spare parts, related special equipment, and diagnostic tools. The Metro system will comprise of around set of twenty-one rolling stocks. Each electric train set is designed to accommodate up to 2,500 passengers², which will be able to provide services to the target 34,000 to 40,000 passenger per hour per direction (PPHPD) by 2035 and 2050, respectively. The maximum operation speed of the train is up to 100 km/h. The commercial speed will be optimized based on safety and level of services standard. The rolling stocks will be powered by the 1,500 VDC power supply through the 3rd rail system. The train will be fully equipped with interactive information displays, security camera and other safety features, as well as Heating, Ventilation, and Air Conditioning (HVAC) system. The train's braking system will be designed as an electrodynamic brake with a regenerative braking³ system in a normal operation.

² Based on NAT's "Standard" load of seven standing passengers per square meter.

³ A regenerative breaking is an energy recovery mechanism that slows down the moving vehicle by converting kinetic energy into current that can be sent back to the power system or stored in battery.

14. **Component 3.** Construction Supervision and Project Management (AIIB: EUR 7 million)
The third Component will provide necessary support to NAT to effectively manage the procurement process; supervise the construction; supervise the implementation of environmental and social management plan and resettlement plan; and financial control, monitoring, and reporting. The scope of work includes: (i) PIU support with respect to daily operations, procurement and contracting, project control and reporting, project accounting and disbursement processing, financial management system, and overall project management system; (ii) supervision of the works contract (Component 1); (iii) assistance with compliance and reporting obligation under the financing documents, and environmental and social implementation support.

15. **Operations and Maintenance.** The maximum authorized line speed is currently specified as 100 km/h. The average distance between stations is 1,121m. The minimum average round trip service speed of 38km/h will be attained with an average station dwell time of about 21 seconds duration. The Signaling and Control system allows an ultimate design headway at the Phase 2 of the Project of 2m 30s. The headway required for Phase 1 is 4 minutes and 20 seconds, this being mainly determined by turn-around times at terminals.

16. Maintenance activities are designed to keep the performance of the metro assets at an optimum level of availability and reliability over their entire life cycle. The new depot site will accommodate the maintenance facilities as well as the Centralized Control Point and all administration services for operation and maintenance. Rolling stock maintenance comprises Light Overhaul and General Overhaul and Corrective Maintenance in accordance with the maintenance plans and procedures. Rolling stock includes vehicles used for track maintenance. Fixed equipment maintenance includes maintenance of signaling, track and electrification, wayside communication equipment, and power supply including traction distribution, lighting and power.

17. **Accessibility** – Accessibility for all passengers is one of the main design features of the metro system. All stations will be accessible to handicapped or disabled passengers through elevators from the street level up to the platform level for stations having different levels.

Annex 3: Economic and Financial Analysis

1. **Economic Analysis.** A cost-benefit analysis (CBA) was carried out to assess the economic viability of the Project comparing “with-” and “without-project” scenarios, based on data provided by the Feasibility Study of the Alexandria Regional Metro and the EBRD consultant, and the technical due diligence report.

2. The Project is expected to shift passenger traffic from other modes to rail, thereby generating substantial economic and environmental benefits. The economic merits are mainly falling into three groups: i) User-related benefits through a reduction in generalized costs (GC) of travel; ii) operator-related benefits through changes in operating costs net of changes in revenues for both rail and road operators; iii) reduction in negative externalities, including reduction in the level of road congestion, reduction in the level of road accidents and environmental benefits. The Project exhibits a Base Case EIRR of 12.2 percent, with an NPV (discounted at 5% p.a. to 2022) of EUR 2.9 billion. The Project is therefore, deemed to be economically feasible.

3. **Methodology and Approach.** A cost-benefit analysis (CBA) was carried out to assess the economic viability of the Project comparing “with-” and “without-project” scenarios. The Economic Internal Rate of Return (EIRR) and Economic Net Present Value (ENPV) of the Project were estimated based on a discounted cashflow analysis considering economic costs and benefits. A Sensitivity Analysis was performed taking into consideration variations in the project expected benefits and costs. The analysis of the lead co-financier (EBRD) has been used as a reference.

4. **Key assumptions.**

- a. All costs and prices are expressed in EUR in 2021 prices.
- b. The capital cost of the project is estimated at EUR 1.764 billion, excluding taxes and duties and including rolling stock acquisition⁴.
- c. The projections cover 35 years of project economic life from 2023 to 2058, including 5 years of construction (2023-2027) and 30 years of operation (2028-2058);
- d. Social Discount Rate (SDR) is assumed at 5 percent.⁵

5. **Overview.** The Project will upgrade the existing 22 km railway line into a high-capacity electrified metro system. The Project is expected to divert passenger traffic from other modes to rail, thereby generating substantial economic and environmental benefits, notably through reduced travel times, GHG emissions benefits and reduced congestion. Headway times are expected to be reduced from the current 15-20 minutes to a targeted 4 minutes and 20 seconds. Passenger demand is estimated at circa 520,000 passengers per day over the next 30 years.

6. **Traffic forecast.** Over the last twenty-five years there have been different feasibility studies which have each produced demand forecasts for the line upgrade. These studies exhibit limitations, as they have not included the impact of any changes to the fare structure and to the

⁴ Contingencies have been excluded in the economic analysis, as recommended by the literature.

⁵ Following Ramsey rule and literature estimations for Egypt.

improvement of other public transport modes, and the Raml tram in particular. Traffic forecasts for these sources are between 0.8 and 1.3 million passengers/day.

7. For the economic evaluation of the Project, traffic forecasts have been updated by the EBRD consultant, by considering the Metro Phase 1 (Abou Qir – Misr) only. Given the existence of multiple alternatives, a four-step model approach was chosen. The key features of the different transport modes are summarized in the Table below.

8. A series of seven model runs were undertaken. An important input to these is what is known as the 'boarding penalty' for each mode. This approach reflects the crowding and unreliability of these alternative services. Although the fares on these modes are different, they are not significantly so and these differences will also be captured within the boarding penalty.

Table A3.1: Comparison between transport modes

Mode	Speed (Km/h)	Headway (min)	Average peak load
Raml tram (current)	11	9	200
Raml tram (upgraded)	22	6	200
City tram	5-8	5-20	100
Rail	20	30	750
Metro	39	4	1,500
Bus and minibus	9-12	10-15	20
Car	15	-	1.5
Collective taxi	12	-	8

9. The forecasts adopted in the evaluation assume that, while the existing rail passengers transfer immediately to the new service, there is a ramp-up of the transfers from the other modes, with 50 percent transferring in 2028, 70 percent in the following year and 90 percent in 2030. All potential transfer traffic has transferred by 2031. No generated traffic was assumed.

Table A3.3: Metro demand forecast (EBRD model)

Year	Passengers / day (000)	Passengers / year (million)
2028	260	95
2040	523	191
2050	580	212
2058	629	230

10. **Project benefits.** The economic merits are mainly falling into three groups: i) User-related benefits through a reduction in generalized costs (GC) of travel; ii) operator-related benefits through changes in operating costs net of changes in revenues for both rail and road operators; iii) reduction in negative externalities, including reduction in the level of road congestion, reduction in the level of road accidents and environmental benefits.

11. **User-related benefits.** The principal user benefit is the reduction in GC using the Metro as compared to the previous rail service and road-based modes. The Metro will operate at an average speed of 38 km/h, and headway times will be significantly reduced. Meanwhile, an average speed of 18 km/h for cars and collective taxis has been assumed. The speed for road-based modes will continue to reduce over time. through reduced travel times, changes in travel costs, improved vehicles and service quality in terms of reliability and punctuality (known as the 'user surplus'). The value of time savings has been set at EUR 2.2/hour in 2021. For future years, the value of time is expected to increase in line with labor productivity.

12. **Operator-related benefits.** These benefits cover the change in operator costs for metro, existing rail, city trams, bus companies, collective taxis and private cars, net of revenues. The operating cost of the Raml and city trams were also estimated based on EBRD consultant. The margin between revenue and expenses for most independent bus and minibus operators is close to zero and the average fare has been taken as the average cost.

71. **Reduction of negative externalities.** Three types of externalities have been considered: i) reduction in road congestion costs (estimated at EUR0.7 cents/vkm), ii) reduction in road accidents (safety costs estimated at 0.03 EUR/km), and iii) reduction in GHG and pollution from NOx and PM. No allowance has been made for any reduction in road maintenance costs.

13. The fuel and energy savings generated by the project, and hence the reduction in GHG, are based on specific tank-to-wheel fuel consumptions. The rail consumptions for the existing railway have been derived from ENR data. The key parameters for GHG savings are presented in the Table A3.4 below. The Project is expected to save 2.6 million tons of GHG. GHG prices are of EUR56/ton for the initial year, consistent with EBRD methodology⁶, and increase in time.

Table A3.4: Key parameters for GHG savings

	Litre / 100km	kg CO ₂ / litre	kg CO ₂ / 100km
Car	8.6	2.4	20.9
Collective taxi	13.9	2.5	34.8
Bus	60.0	2.7	160.8
Existing rail	48.0	2.7	128.6
	kwh / 100km	kg CO ₂ /kwh	kg CO ₂ /100km
Metro	4.15	0.411	1.7
City tram	6	0.411	2.5
Raml tram	12	0.411	4.9

14. **Economic analysis results.** The project exhibits a Base Case EIRR of 12.2 percent, with an NPV (discounted at 5 percent per year to 2022) of EUR 2.9 billion. The composition of costs and benefits is summarized below.

⁶ EBRD (2019). Methodology for the economic assessment of EBRD projects with high greenhouse gas emissions, Jan 2019.

Table A3.5: Project Economic Analysis preliminary results

Item	NPV (EUR mil.)
User-related Benefits	2,517
Operator-related Benefits	726
Externalities	306
Residual value	898
Capital expenditure	(1,544)
<i>ENPV</i>	2,903
<i>EIRR (%)</i>	12.2%

15. **Financial Analysis.** Following advice from NAT, the fare structure for the Cairo Metro has been assumed for the Alexandria Metro. Usually, the tickets cost around EGP 5 (EUR 0.26) for nine-station ride, while EGP 7 (EUR 0.36) is charged for rides up to 15-station ride. For the rest of the trip, EGP 10 (EUR 0.52) is charged. The approximate passenger split has been taken as 5 percent travelling over 16 stops, 20 percent more than 9 stops and 75percent under 9 stops, giving an average fare ticket of EGP 5.7 (EUR 0.3). Other non-ticketing revenues (for example, advertising) have been assumed at 10 percent of the ticket revenues. The operating costs assume that the same timetable is operated throughout the project. No allowance has been made for the renewal of the various systems or for additional rolling stock purchases.

16. Table A3.6 summarizes the revenue and operating expenditure forecast of the Project. While the line will make only a small surplus in its early years, this will steadily increase as demand increases, and as the service frequency remains static. However, the Project exhibits a negative FIRR of -2.7 percent, as Project cash flows are not sufficient to cover Capex costs. This is not an uncommon result, as the vast majority of international experience with urban rail projects suggests that fare revenues does not cover capital costs⁷.

17. However, the GOE has recognized the important of cost recovery and financial sustainability as demonstrated by the significant shift in tariff policy that was implemented in 2018 from a flat rate to distance-linked fares. By 2020, the tariff was increased by 10 folds from the 2017 flat rate of EGP 1 to EGP 10 for 16 stops or more⁸. An average fare that would need to be applied for the Project to generate a neutral FIRR (0%) would be around EGP 8 or EUR 0.42 (+41%). This fare is within a plausible range that the project can achieve with gradual tariff adjustment strategy to ensure financial sustainability.

⁷ World Bank Group (2018). The Urban Rail Development Handbook.

⁸ Systra, 2021, Alexandria Metro Project: Project Feasibility Study Report

Table A3.6: Project Revenues, Costs and Operating Margin
(in EUR mil., unless otherwise indicated)

Year	2028	2040	2050	2058
Passengers per year (number)	95	191	212	230
Ticket Revenues	30	61	68	73
Other Revenues (10%)	3	6	7	7
Total Revenues	33	67	75	81
Operating Cost	38	38	38	38
Operating Margin	(4.9)	28.9	36.2	42.4
Operating Margin (%)	-15%	43%	49%	52%

18. **Sensitivity Analysis.** A sensitivity analysis was carried out by assessing the outcome of adverse scenarios over the base case. These comprise two different elements: i) conventional scenario analysis to assess the impact of different values of independent variables (namely, to reflect the impact of demand risk and cost overruns), and ii) adjustments to reflect a slowdown in economic growth due to the impact of the pandemic and increasing macroeconomic challenges (reflected through the discount rate). Table A3.7 shows the results for the sensitivity analysis; the Project is economically feasible under all the scenarios.

Table A3.7 Sensitivity Analysis Results

	EIRR (%)	NPV (EUR mil.)
Baseline case	12.2	2,902
Demand - 20%	10.0	1,875
Capex +20%	10.7	2,592
Opex + 20%	11.9	2,801
Downside scenario 1 (Demand -10%, Capex & Opex + 10%)	10.4	2,234
Downside scenario 2 (Demand -20%, Capex & Opex + 20%)	8.7	1,566
Optimistic Economic Recovery scenario (SDR 6%)	12.2	2,162
Pessimistic Economic Recovery scenario (SDR 4%)	12.2	3,857

Annex 4: Member and Sector Context

1. The Arab Republic of Egypt recent and on-going macroeconomic reforms have led to robust economic growth, declined inflation rate, and improved business environment for private sector. However, the global COVID-19 pandemic since early 2020 compounded with global energy and food crisis brought about by the supply disruption due to the war in Ukraine have caused significant adverse impacts on the fiscal status and overall economic performance and more recently food security and livelihood due to high inflation arising from rapidly increasing commodity and energy prices. Around 60 percent of Egypt's wheat consumption (the main ingredient of bread, the staple food of Egyptian) has to be imported and most of which is from the Black Sea region⁹ which ceased to be available after February 2022. The government has put in place effective response measures and prudent macroeconomic policy to weather the global pandemic and economic crisis and is one of the few economies worldwide to maintain positive economic growth (2.3 per cent in the calendar year 2020 and 2021), and growth is forecast to rebound to 5.9 and slightly decline to 5.0 percent in 2021 and 2022¹⁰ due to the impact of the global food and fuel crisis, respectively.

2. Egypt was the first county in Africa to invest in a metro system to provide fast, safe, and efficient mass public transportation to the rapidly growing urban population in the Cairo metropolitan area which has roughly doubled in the size of population from 10-20 million in during 1987-2020. The Cairo metro system, owned by the National Authority for Tunnels (NAT), comprises of three lines, Line 1-3 which were operational in 1987, 1996, and 2006, respectively and carries over 3.5 million daily passengers.

3. Alexandria is Egypt's second largest city with a population of around 5.16 million inhabitants¹¹. It is a fast-growing industrial city, which is home to Egypt's largest seaport serving 75 percent of Egypt's imports and exports. Because of the rapid expansion of population, urbanization, and economic activities, Alexandria is facing significant urban challenges including a mismatch between rapidly growing population and quantity and quality of public utility services, deteriorating environmental quality, high unemployment, and constrained mobility due to worsening traffic congestion.

4. Over the last three decades, Alexandria has faced significant challenges to provide its residents with fast, efficient, safe, and convenient lack of effective planning and coordination, complex and cumbersome regulations, and severe under-investment in all transport modes. This has increased reliance on petroleum-based modes of transport for urban mobility, including shared taxis and cars, which account for 54 per cent and 39 percent of trips respectively with only 7 percent made by train, tram, and bus. The predominance of car and shared taxi usage not only increases road congestion and worsens air quality, but also indicates a significant latent demand for quality and energy-efficient public transport modes.

5. Buses and minibuses are the main transport mode in Alexandria. The network includes 87 lines covering over 1700km. In 2013 the Alexandria Public Transport Authority ("APTA") owned

⁹ USDA, 2022, Egypt: Grain and Feed Annual, Report No. EG2022-0009

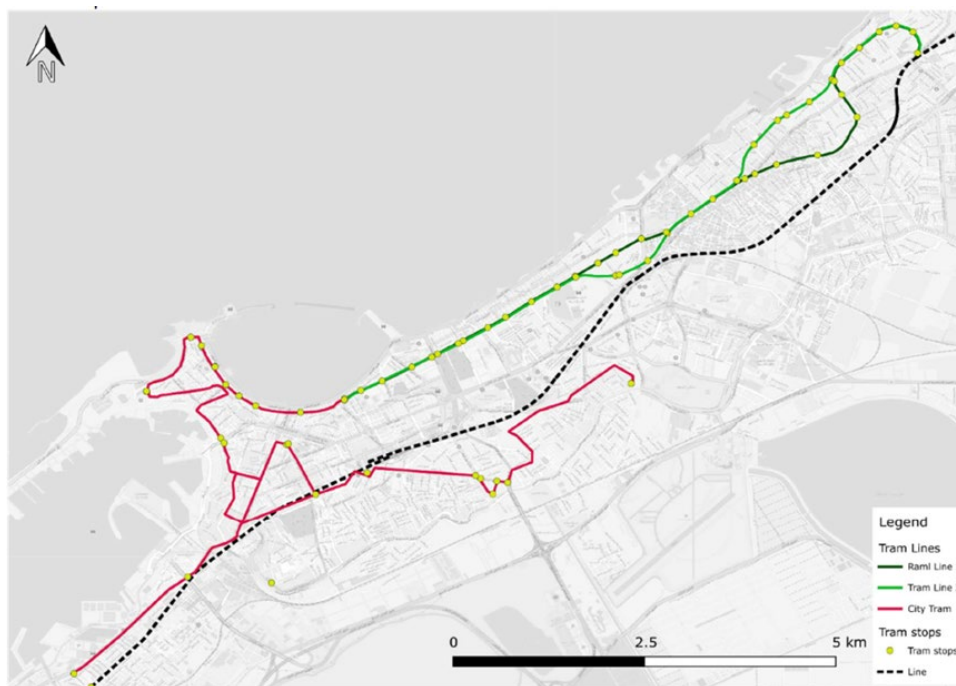
¹⁰ IMF, 2022, World Economic Outlook April 2022.

¹¹ The Egyptian Central Agency for Public Mobilization and Statistics (CAPMAS), 2021, Egypt in Figures 2021.

340 buses and 135 minibuses. In 2020, it owned 200 buses. Average headways are a little over 30 minutes and roundtrip times are around 115 minutes, suggesting relatively low levels of service. This is due to an expansion of network with a constant fleet of vehicles (Source: AFD, 2015). According to APTA, 244,000 passengers used the APTA bus network in 2019 every day. Public owned buses represent a small share of the total fleet. In 2010, over 4,000 private buses were registered, including nearly 3,000 business buses (other buses were for school and tour purposes).

6. There are two types of trams in Alexandria: Al Raml Tram and City Tram. The two systems are displayed on Figure A5-1: Map of Trams Systems in Alexandria. APTA owns 40 trams. On Al Raml tram, two lines run from the old city at Raml station (near Saad Zaghlol square) in the west, to Victoria (El Nasr) station in the east. Line 1 runs via Cleopatra El Kobra station and Safer station. Line 2 runs via Sidi Gaber train station and Gleem station. Most stations are at grade and the system is open (no control of access through fare gates) as fare control happens on board.

Figure A5-1: Map of Trams Systems in Alexandria



7. Al Raml tracks are mostly segregated from road traffic, although there are several junctions. These junctions, as well as the short distances between stations drive commercial speed down to 12km/h. Priority is not guaranteed for trams, as no priority system has been implemented. Some of junctions are equipped with traffic signals, which are controlled and manually operated by a traffic police officer. It is estimated that about 15 to 20 minutes are spent on road crossings out of the total run time.

8. City tram lines serve the old city, on a 28km infrastructure with 17 lines. Unlike Al Raml, tracks are mixed with traffic, which impact greatly the commercial speed of trams. There are about 130 stops overall, the average distance between stops being 250m. Overview of APTA bus and

trams systems characteristics and use are listed in the Table A5-1: APTA Bus and Trams Systems Main Characteristic.

Table A5-1: APTA Bus and Trams Systems Main Characteristics

Description	Trams: RAML	Trams: CITY	BUSSES
Daily Number of Passengers	141,000	38,000	244,000
Vehicle Capacity	600-800	220 (average)	35-50
Number of Owned Units	40	108	161 nibus-511 Bus

9. There are 3 lines in Alexandria including: (i) Alexandria – Cairo line; (ii) Alexandria – Abou Qir/ Rosetta line; (iii) Alexandria – Matrouh line (via Borg El Arab). Between Misr and Sidi Gaber, the Abou Qir line is side to side with the Cairo line (this segment is a two double track section). Both lines primarily offer passenger services although they are also used for freight transport during nighttime. Services to Rosetta use the Abou Qir line until El Maamoura where the line splits. There is only one service per day to Rosetta and 1 service per day from Rosetta.

10. In terms of ridership, ENR indicated that there are approximately 71,000 passengers per day (69,000 with a ticket bought at stations and almost 2000 buying a ticket on board). In one month, there are almost 2 million passengers using the line (1.99M). At the moment, fares are very low, one ticket costing EGP 3 at the station and EGP 15 when purchased on-board.

11. Shared taxis are private vehicles with a maximum capacity of 14 seats, allowed to operate in urban areas. Their routes and fares are defined by local authorities and in Alexandria, they serve the whole city.

12. In conclusion, the public transport system in Alexandria is not scaled for its population. It has a wide capacity shortage, poor condition of equipment and infrastructure as well as a lack of integration among the different modes. Priority has also been given to other modes than public transport, which explains why the public transport ridership has fallen since the 1980s.

Annex 5: Sovereign Credit Fact Sheet

Background. Egypt is a lower-middle income country, with a population of around 104 million and income per capita of around USD 4000 in 2021, strategically located between Asia, Africa and Europe. The economy is relatively well-diversified internally, self-sufficient in energy, and earns large amounts of foreign exchange from tourism and remittances. A legacy of heavy state involvement in the economy has resulted in low external competitiveness and private sector weaknesses.

Following a macroeconomic crisis in 2016, the authorities, supported by an IMF program, made a decisive turnaround in economic management. They floated the currency, tightened the monetary policy, reduced inflation, and achieved a remarkable fiscal consolidation, including by reforming fuel subsidies. Subsequently, growth has returned, driven by increased gas production and public sector investment, public debt has stabilized, and FX reserves recovered. That said, the economy remained dependent on external financing.

Key Economic Indicators 1/	FY19	FY20	FY21	FY22	FY23*	FY24*
GDP growth 2/	5.5	3.5	3.3	6.6	4.4	5.2
Inflation 2/	13.9	5.7	4.5	8.5	12.0	8.0
Budget overall balance	-7.6	-7.5	-7.0	-6.2	-7.4	-7.5
Public debt 3/	80.1	85.3	89.2	89.2	85.6	84.6
Gross public financing needs	36.5	38.0	37.4	34.8	33.9	27.9
Current account balance	-3.4	-2.9	-4.4	-3.6	-3.5	-2.9
External debt	36.0	34.1	36.3	32.3	28.2	25.9
Gross external financing needs	8.5	6.9	7.8	7.5	6.6	6.0
Gross international reserves (USD billion) 4/	43.9	37.2	41.1	37.1	33.2	..
Exchange rate (EGP/USD) 4/	16.7	16.1	15.7	18.8	24.6	..

Source: IMF country report 21/163; WEO Oct 2022; 1/ in percent of GDP unless stated otherwise; FY is Jul 1-Jun 30

Notes: 2/ percent change, year-on-year, average; 3/ IMF definition (includes National Investment Bank and Social Insurance Fund); 4/ data from the central bank, end of period; for FY23 gross international reserves are as of Sept 2022 and exchange rate as of Dec 1st, 2022

Recent developments. The economic impact of the pandemic was less than feared as the collapse of the tourism sector was partly offset by resilient remittances and import compression. The economic response was also modest but well-targeted. A large IMF program helped restore confidence and maintain market access. As a result, Egypt avoided a recession and GDP grew by 3.5 percent in FY20 and 3.3 percent in FY21. Unemployment increased initially, but later declined. Despite higher pandemic expenditures, the overall fiscal deficit barely changed, thanks to reprioritization. The exchange rate had been stable throughout the pandemic, while foreign reserves had also recovered. The IMF program ended successfully in June 2021.

The war in Ukraine in February 2022 caught Egypt off-guard, as risks have materialized simultaneously in key vulnerability areas, upending the economic outlook. The economy is being affected through three main channels. First, heightened global risk aversion and the flight to safety has led to capital outflows, exposing the risk involved in Egypt's strategy to finance external deficits with portfolio inflows. Second, the disruption in the wheat market due to war are affecting food security. Egypt sources around 80 percent of its wheat from Ukraine and Russia. Although the impact on the current account is likely to be relatively mild, prices of bread will be under pressure—an issue that is sensitive politically and has in the past led to social unrest. Finally, the impact on tourist arrivals from Russia and Ukraine, an important source of tourism receipts, may delay the much-awaited post-pandemic recovery of the sector. Other channels of impact are muted. Higher bill for oil imports has been offset by higher gas export revenues.

The generally appropriate policy response was to devalue the currency by 15 percent, increase the policy rate by 300bps, announce a 2-percent-of-GDP relief package to cushion the impact on the affected population groups, and request yet another IMF emergency assistance. That, along with financial support from the GCC, were enough to tentatively calm the markets after February 2022.

However, tightening of global monetary conditions and sustained increase in global commodity and energy prices throughout 2022 put pressure on exchange rate to depreciate further and increased the capital outflows from Egypt. These pressures resulted in another 15 percent depreciation of Egyptian pound as well as 200bps increase in policy rates in end-October 2022. Since then, the authorities have reached staff-level agreement with the IMF for another USD3 billion facility over a 46-months period. This new IMF program will generate additional financing of about USD5 billion from other sources in current fiscal year and strengthen external position.

Outlook and risks. The economy has been estimated to grow by 6.6 percent in FY22, higher than the earlier estimates formed at the start of the war. However, the growth forecast for FY23 has been revised downwards to 4.4 percent. Inflation is bound to increase sharply due to devaluation, high commodity and food prices, and supply chain disruptions. The recently agreed IMF program is expected to help sustain confidence in macroeconomic stability and shift towards flexible exchange rate regime. The most recent projections are for some consolidation in the fiscal deficit and public debt in FY23.

In the medium term, Egypt's economic outlook remains robust. Ultimately, growth should return to its potential, of around 6 percent, supported by exports, domestic recovery and public investment. This depends on the continued progress in structural reforms aimed at improving the environment for private-sector-led growth, as well as on maintaining macroeconomic stability, to which the authorities are committed.

The key risk to the medium-term outlook is that of reforms getting derailed either by affected vested interests, or by social discontent of the many groups left behind by the increasing costs of living and difficulties in finding decent jobs. Macroeconomic risks are related to the high level of debt, high refinancing needs (above 30 percent of GDP, due to short domestic maturities), further tightening of global monetary conditions and unexpected geopolitical events. However, risks are mitigated by a large share of domestic debt held by the liquid and captive domestic financial system, the good relations with official creditors, the lengthening of maturities and adequate reserves. Egypt's sovereign credit rating (B, B+, B2 for S&P, Fitch and Moody's, respectively) have been affirmed for the past three years. Moody's and Fitch changed Egypt's outlook to negative in May 2022 and November 2022, respectively, citing heightened risks to country's external shock absorption capacity.

According to IMF's assessment from June 2021, Egypt's public debt was sustainable, albeit subject to significant risks.¹² The upcoming IMF program is expected to safeguard debt sustainability, but the progress to safer debt levels may be somewhat delayed. Debt is expected to have increased to about 90 percent of GDP in FY22, due to slower growth and a pause in fiscal consolidation. However, with the agreed IMF program, and under a scenario of economic recovery as well as return to previously envisaged primary surpluses of around 2 percent of GDP, public debt would revert to a downward trend from FY23 onwards.

¹² IMF's assessment is qualified in that debt "remain[s] sustainable, but not with a high probability". The probability qualification is required by IMF policies in case of large programs. Otherwise, such qualification is not required, and debt would be assessed simply as "sustainable".