Kharkiv Metro Expansion Project

Environmental and Social Due Diligence

Non-Technical Summary

Date: 28 June 2017

Supported by the European Bank for Reconstruction and Development:

European Bank
for Reconstruction and Development

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Glossary

Definitions

The Bank	The European Bank for Reconstruction and Development
The Company	The Kharkiv Metro Company (or KMC)
The Green Line	Oleksiivska Line of Kharkiv Metro System
The Project	Expansion of the metro system expansion: i) extension of the existing 9-station Metro Green Line ("Oleksiyivska") by 3.47 km and construction of two new stations "Derzhavynska" and "Odeska"; ii) construction of a metro depot "Oleksiyivske" and connection to Metro Green Line; iii) acquisition of rolling stock.
The Project Site	Land plots where the extension of the line, auxiliary premises and depot will be constructed

Abbreviations

ACM	Asbestos-containing materials
EBRD	The European Bank for Reconstruction and Development
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment (a volume of Design Documents)
ESAP	Environmental and Social Action Plan
ESDD	Environmental and Social Due Diligence
ESMS	Environmental and Social Management System
ESP	Environmental and Social Policy of EBRD (2014)
EU	European Union
GHG	Greenhouse Gases (restricted to GHG under the Kyoto Protocol: carbon dioxide, methane, nitrous oxide, sulphur hexafluoride and two groups of gases (hydrofluorocarbons and perfluorocarbons))
KMC	The Kharkiv Metro Company (or the Company)
MHC	Ministry of Healthcare
MCC	Municipal company "Kharkiv Metro Construction Management"
NGO	Non-governmental organisation
OS	Occupational safety
OSMS	Occupational safety management system
PR	Performance Requirement of EBRD
PAP	Project Affected Persons
RAP	Resettlement Action Plan and Livelihood Restoration Plan
SEBS	Socio Economic Baseline Survey
SEP	Stakeholder Engagement Plan
TBM	Tunnel Boring Machine

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1. THE PROJECT

1.1 Initiative and its Financing

The City of Kharkiv (the "City or "Kharkiv") with the support of the Government of Ukraine (the "Government") have expressed interest in obtaining joint co-financing from the European Bank for Reconstruction and Development ("EBRD" or the "Bank") and European Investment Bank ("EIB") to improve urban transport in Kharkiv by expanding the current metro system (the "Project").

1.2 Environmental and Social Due Diligence

The ESDD comprises:

- An audit of the Kharkiv Metro Company;
- An environmental and social analysis of the Project and mitigation plans.

This document presents the non-technical summary of the ESDD, including the main findings the environmental and social audit and analysis as well as the measures to mitigate negative impacts identified in the course of the ESDD.

According to the EBRD Environmental and Social Policy (ESP), the Bank categorises each project to determine the nature and level of environmental and social investigations, information disclosure and stakeholder engagement required. A project is categorised "A" when it could result in potentially significant adverse future environmental and/or social impacts which, at the time of categorisation, cannot readily be identified or assessed.

A list of indicative Category A projects (Appendix 2 to the ESP) includes projects, which may involve significant involuntary resettlement or economic displacement. Although Kharkiv Metro Expansion Project is expected to cause physical and economic displacement, its parameters can be well defined at the moment of categorisation. As of June 2017, the City has identified 247 tenants registered in 45 houses that will be directly affected by the construction and operations of the Extension. Potential adverse social impacts will be addressed through mitigation measures envisaged in the Resettlement Action Plan (the RAP). Furthermore, the resettlement can be considered as an opportunity to improve poor living conditions observed.

Key environmental considerations are assessed in the statutory EIA and the ESDD. Potential adverse impacts will be addressed through mitigation measures prescribed in the Environmental and Social Action Plan (the ESAP), and balanced by positive impacts such as improved air quality and reduction of the GHG emissions that are expected due to decrease of the road traffic.

Based on the foregoing, the Project's potential adverse future environmental and social impacts are seen as site specific, readily identified and addressed through mitigation measures. Therefore, the application of Category B to the Project is proposed.

1.3 Project Outline

1.3.1 Project Description

The Kharkiv Metro Expansion Project comprises three main components:

a) Extension of the existing Green Line towards the airport by 3.47 km and construction of two new stations: "Derzhavinska" and "Odeska" (a third station is planned between the two new stations, but does not form part of this project);
b) Construction of a metro wagon depot for the Green Line; and
c) Procurement of 85 units of rolling stock.

The alignment runs mainly along Gagarina Avenue and partially along Derzhavinskaya Street. The proposed extension of the Green Line starts at the already existing part of the route south of the station Metrobudivnykiv and leads south to the planned stations Derzhavinska and Odeska

Both stations and the section from the existing tunnels to the station Derzhavinska (959 m long) are planned to be built in open cut technology, i.e. from the ground surface. For the section between stations

Derzhavinska and Odeska (2514 m long) tunneling by means of a shielded Tunnel Boring Machine (TBM) is planned.

The extension of the Green Line requires installation of the temporary structure for household use of 120 construction workers. The structure will be located nearby the planned Odeska Station. .

The operation of the extended Green Line requires the construction of the Depot. The areas designated for Oleksiivske Depot (7.4 ha) and the Green line connecting line (4.0 ha) are situated on the outer side of the city ring road (Derhachivskiy district of Kharkiv region) nearby the Derhachivska interchange. The Depot area is currently used for deposition of piles of clay soil, delivered from the pit of Peremoha station. Land nearby the land plot earmarked for the connector line is informally used for private gardening.

Management:

The responsibilities for the project components and stages are distributed among:

I. Municipal company The Kharkiv Metro (the "Company" or "KMC"). KMC is a metro operator, subordinated to the Infrastructure Department of the Kharkiv City Council. KMC will also be the future operator of the Project facilities.
II. Municipal company "Kharkiv Metro Construction Management" (Metro Construction Company – "MCC"), a subsidiary of Construction and Roads Department of Kharkiv City council. The key function of the MCC is control over construction of the Metro facilities including selection and management of contractors from design to commissioning stages.

1.3.2 Resettlement and Alternatives

The extension is planned in a dense urban area that is partly occupied by residential and commercial facilities. Acquisition of the land that is currently occupied by these facilities for the Project purposes entails resettlement and economic displacement. In total 45 houses (42 private households and 3 blockhouses with 247 registered tenants) and several businesses will be directly affected by the construction and operations of the Extension.

Minimising resettlement has been a design requirement since the early nineties at the time of the first Feasibility Study of the Extension. Experts of the MCC together with the design institute "Kharkivmetro proekt" (the Designer) have made adjustments to the Project design to reduce the impact on the infrastructure and population:

- Two households and several commercial buildings have already been removed from the list of affected properties by optimizing the alignment of utility networks, access roads, and construction sites.
- An alternative land plot for the construction camp has been selected. The initial site is occupied with private garages, underground food storages and a playground. The Project would have required relocation of these facilities. The new site, located in 200 metres to the North East from the initial one, is free of third-parties' property and public amenities.

To minimize resettlement and improve connectivity in the Derzhavinska Station area, two alternatives to the original design were studied, compared and assessed by the Consultant in the course of Feasibility Studies for the Bank. MCC jointly with the Metro Design Institute have examined the suggested changes in horizontal alignment and decided to keep the original design; however, the alignment will be deepened in accordance with the Consultant's recommendations. According to MCC, both suggested alternatives entail difficulties related to necessity of crossing the main sewer located under the avenue. The excessive cost of transferring the affected utilities network negates the possible social benefits.

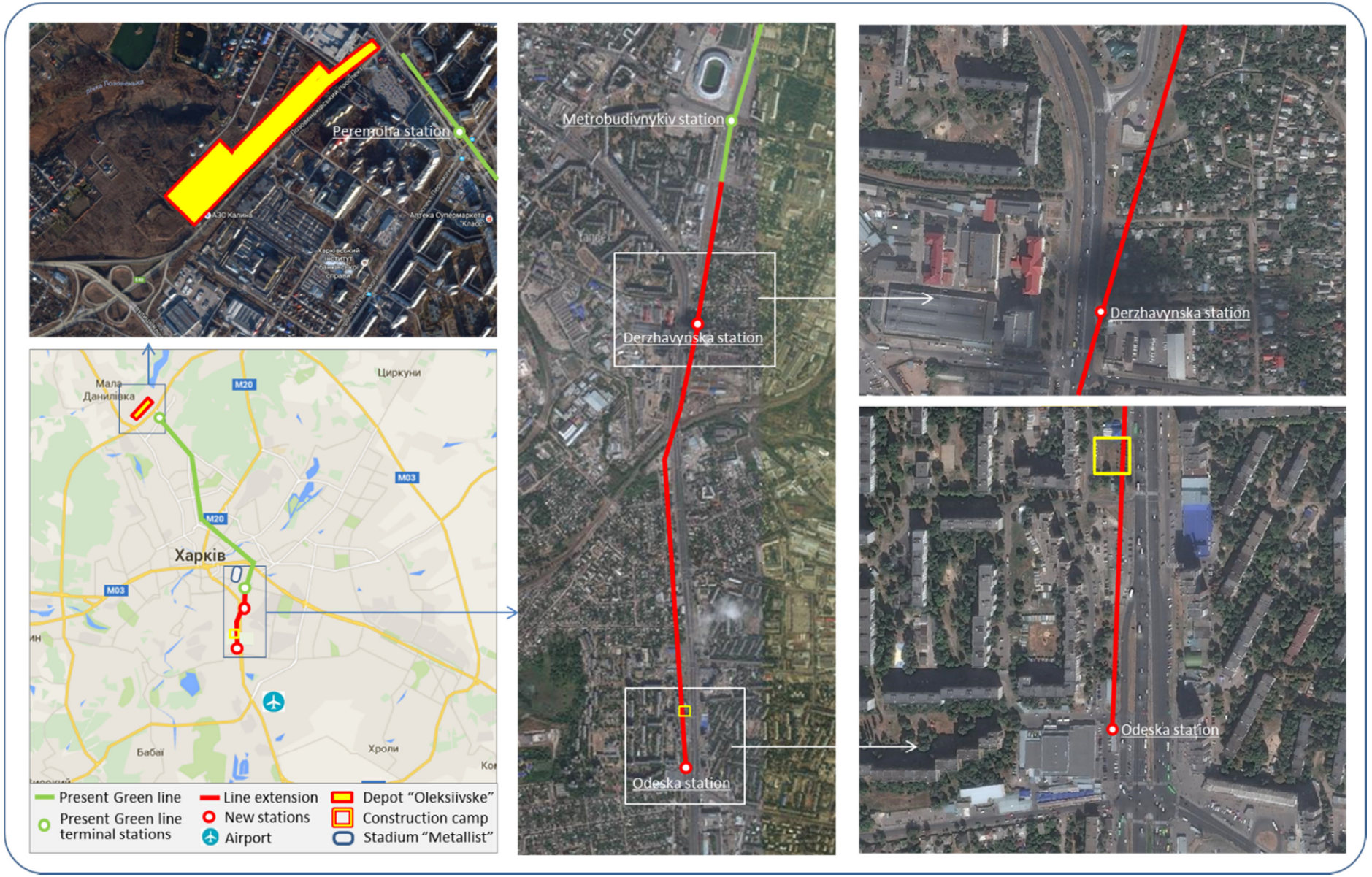

Figure 1 Map of the Project facilities

2. KEY FINDINGS

The key findings of Environmental and Social Due Diligence are presented in the following sections.

2.1 KMC

Negative impacts

- The use of asbestos-containing materials imposes (ACM)[1] the risk of oncological diseases on construction workers, and all the personnel handling these materials through the whole supply chain that precedes the final use;
- Other minor impacts revealed during the Audit have been removed or mitigated at the date of this document publication.

Positive impacts

- Well organized work of the Company is a backbone of the City transport system. KMC provides over 40% of public transportations in Kharkiv. With daily ridership over 650,000 passengers the schedules were met 100% in 2014 and 2015;
- Free or discounted travel privileges for certain categories of passengers (children, veterans, students) and relatively low tariffs make transportations affordable even for underprivileged passengers;
- KMC is a reputable employer that provides appropriate OHS and working conditions to its 2325 employees;
- The Company demonstrates its commitment to reduction of adverse environmental impacts through more efficient use of resources. A sound “2014-2016 Program for Energy Saving” has been developed and partly implemented. Total estimated savings amount to 0.91 million Euro and nearly 25 thousand tonnes of CO_2e. Renewable sources of thermal energy (biomass fuel and sun thermal collectors) are used for heating of Saltivske depot.

2.2 Construction Phase of the Project

Negative impacts

- Land Acquisition, Involuntary Resettlement and Economic Displacement can result in social conflicts unless thoroughly planned and properly conducted;
- Outdated public consultations cannot guarantee the proper stakeholder engagement that can result in social conflicts;

Positive impacts

- Local economic growth: The Project will facilitate the demand for construction materials, engineering services, equipment most of which can be supplied by local, regional or national suppliers and contractors;
- Resettlement can be an opportunity for affected people to improve their living

[1] According to the Order of the Ministry of Healthcare of Ukraine No. 339 as of March 29, 2017 On Approval of the State Sanitary Norms and Rules "On Safety and Protection of Workers against Harmful Effects of Asbestos and Materials and Articles Containing Asbestos", as an exception, materials and articles containing asbestos that are already in use, can continue to be used until they are replaced or disposed of.

- The risk of construction subcontractors' incompliance with EHS requirements can lead to poor performance on the Project site;
- The use of ACM (suggested by the Basic Design Documents)[2] imposes the risk of oncological diseases on construction workers, and all the personnel handling these materials through the whole supply chain that precedes the final use.

conditions.

2.3 Operational Phase of the Project

2.3.1 The Extension

Negative impacts

- Potential waterlogging as a result of raising of the groundwater levels because of damming effect made by tunnels;
- The oil spilled from the oil depot can pollute the Extension's drainage waters;
- Excavation of contaminated ground can cause the spread of contamination.

Positive impacts

- Improved access to safe and reliable transportation services for inhabitants of Kharkiv's southern residential areas and suburbs, as well as access to the south for the people living in other parts of the City;
- Additional 132 workplaces;
- Decrease of road transportations results in less road accidents, less congestion and less direct emissions to air.

2.3.2 The Depot

Negative impacts

- There is a risk of adverse impact on Lozovenka River ecosystem through the discharge of the Depot's storm water.

Positive impacts

- The new depot enables reduction of the headway time and thus enhances the quality of service on the metro's Green Line;
- Additional 453 workplaces.

[2] According to the Order of the MHC of Ukraine No. 339 as of March 29, 2017, manufacturing and use of asbestos is prohibited (regardless of asbestos-containing products and materials type) in the technological processes and during construction and installation work. The Project design documentation will be adjusted in accordance with valid requirements.

3. COMPLIANCE STATUS

3.1 National Legislation

3.1.1 Strategic Planning

The Project has consistently been part of strategic planning both at national level and at local level for all the Project components (the Extension, the Depot, and rolling stock). This is apparent from (e.g.):

- the Regulation of Cabinet of Ministers of Ukraine as of 07.03.2006 No.257,
- the Order of Cabinet of Ministers of Ukraine No.1361-p as of 28.12.2011 “,
- the City Master Plan till 2026 (approved by the decision № 24-22 of Kharkiv City Council as of 23.06.2004)
- the Program of Construction and Development of Kharkiv Metro for 2010-2015 (approved by the decision № 37/10 of Kharkiv City Council as of 24.02.2010).
- the Program of Construction and Development of Kharkiv Metro for 2010-2020 (approved by the decision № 643/17 of Kharkiv City Council as of 19.04.2017).

Despite the solid planning it should be noted that a strategic Environmental Impact Assessment (as applicable in the SEA Directive 2001/42/EC of the EU), has not been applied to any of the abovementioned due to lack of such requirement in the national legislation.

3.1.2 Design and Construction

The Feasibility Study for the extension of the Green line from station “ul Plekhanovskaya” (currently “Metrobudivnykiv”) to station “Odeska” has been conducted in 1992 by the Metro Design Institute “KharkivMetroProekt”.

The next stage - Basic Design Documents – has been developed by “KharkivMetroProekt” (Depot in 2007, Extension – in 2008). The documents have passed the state complex expertise (Depot - on 21.03.2007, Extension – on 23.12.2008) that concluded compliance with design, construction, environmental, sanitary, fire safety and energy efficiency norms and standards. In 2015 and 2016 the Basic Design Documents have been updated and were subsequently approved by the State Expertise (the Extension: ref. No. 00-1599-16/ПБ (00-0548-16/ПБ) dated 20.01.2017; the Depot: ref. No. 00-1598-16/ПБ (00-0474-16/ПБ) dated 28.12.2016).

3.1.3 Environmental Impact Assessment

According to the State Construction Standard “Structure and Content of Project Documentation for Construction” (ДБН А.2.2-3-2014), Environmental Impact Assessment is a part of Basic Design Documents for linear objects of engineering-transportation infrastructure.

According to the State Construction Standard “Composition and Content of Environmental Impact Assessment Materials in Design and Building of Enterprises, Buildings and Structures” (ДБН А.2.2-1-2003), metro construction is subject to full-scale EIA.

The Basic Design Documents for both the Extension and the Depot contain sections on Environmental Impact Assessment (EIA). As indicated in 3.2.1, the State Expertise has approved EIAs as part of the Basic Design Documents.

3.1.4 Public Participation

The following stakeholder engagement activities related to the Project have been carried out to date:

- Public consultations on environmental and social impacts (an element of an EIA), on 27.11.2008 (30 persons participated) and on 28.11.2008 (107 persons participated).

- Publication of environmental statements in the regional newspapers, “Slobidskyi Krai” on 23.10.2008, “Vecherniy Kharkov” on 27.11.2008, “Kharkovskiy Courier”’ on 18.01.2016 and on 25.01.2016.
- The initial stage of the Socio-Economic Baseline Survey (the SEBS) conducted by the Local Community Based Organisations – Street Committees jointly with Osnovyanska and Slobidska City District Administrations (DAs) in July 2016. The survey focused on the owners and inhabitants of the private households and blockhouses that will be directly affected by the Extension construction and operation.
- In January and February 2017 the Project group (included representatives of the Street Committees, Osnovyanska and Slobidska DAs, Executive Committee of the City Council and the MCC) has conducted further surveys in order to specify the SEBS information. At this stage, a standard questionnaire (provided by the EBRD, adapted and translated into Ukrainian by the Consultant) was used. Through such questionnaires, information on 211 project affected persons (PAP) has been collected, while 23 persons have refused to provide their details.

3.1.5 Necessary permits

The construction permit will be issued by the State Architectural and Construction Inspection of Ukraine on the basis of positive conclusion of the State Expertise after the construction contractor is appointed.

As the Operational phase is associated with adverse environmental impacts (besides positive impacts) the KMC should update its current environmental permits for Air Emissions, Special Water Use and Waste Operations at the time of Project commissioning.

3.2 EBRD’s Requirements regarding the Company

The key notes on the Company’s (KMC) compliance are structured along the Bank’s Performance Requirements (PR).

PR	Summary
PR 1 - Assessment and Management of Environmental and Social Impacts and Issues	The management system of the Company is capable of handling environmental and socials aspects of KMC and the Operational phase on an appropriate level. Environmental and social goals are not formalized in overarching policy document.
PR 2 - Labour and Working Conditions	Labour and Working Conditions at KMC are appropriate. HR procedure does not contain a formalized procedure for collecting and processing of grievance from the Company employees; does not contain statement on Non-discrimination and equal opportunity
PR 3 - Resource Efficiency and Pollution Prevention and Control	KMC plans and implements resource efficiency measures mainly for energy savings. An area for improvement would be recycling of train washing water at Moskovske depot. The company does not restrict the use of ACM by its construction subcontractor.
PR 4 - Health and Safety	The main concern is related to securing of occupational health and safety at operations of construction contractors. The KMC has a sufficient policy on health and safety for subcontractors however it does not cover construction phase.

PR	Summary
PR 5 - Land Acquisition, Involuntary Resettlement and Economic Displacement	Not applicable.
PR 6 - Biodiversity and Living Natural Resources	The impact of current facilities on biodiversity and living natural resources is limited to the discharge of storm waters to Kharkiv River from the Saltivske Depot. No violations in discharged water quality are identified.
PR 10 - Information Disclosure and Stakeholder Engagement	KMC discloses its operational information sufficiently; The procedure for dealing with grievance and suggestions is not formalized.

3.3 EBRD's Requirements regarding the Project

The key notes on the Project compliance are structured along the Bank's (PR).

PR	Potential Impact
PR 1 - Assessment and Management of Environmental and Social Impacts and Issues	<u>Assessment</u> The EIA reports (for both the Extension and the Depot) have passed the State Expertise. The impacts of the storm water discharge on the Lozovenka river ecosystem are assessed with the level of details that is insufficient for drawing a reliable conclusion. <u>Management</u> The environmental and social goals of KMC is not formalised in an overarching policy document.
PR 2 - Labour and Working Conditions	MCC does not impose any requirements on Labour and Working Conditions on its contractors (except for legal compliance). Labour and Working Conditions during the operational phase will be covered by KMC's management system, which is mainly appropriate.
PR 3 - Resource Efficiency and Pollution Prevention and Control	Basic design documents contain appropriate measures for securing Resource Efficiency and Pollution Prevention and Control during the construction phase. The drainage system design at the Extension will unlikely prevent potential flooding as a result of raised groundwater level. The risk of pollution of metro drainage waters with oil from the oil depot adjacent to the route of the Extension (or other contaminants) has not been considered in the design documents. Resource Efficiency and Pollution Prevention and Control during the operational phase will be covered by KMC's management system, which is mainly appropriate.
PR 4 - Health and Safety	Occupational health and safety performance of construction contractors is not covered by the Company's/MCC's management system. Health and Safety during the operational phase will be covered by KMC's management system, which is mainly appropriate.
PR 5 - Land Acquisition, Involuntary Resettlement and	The Extension construction and operations require Land Acquisition, Involuntary Resettlement and Economic Displacement.

Economic Displacement	The Resettlement Action Plan (RAP) has been prepared in line with EBRD's requirement PR5.
PR 6 - Biodiversity and Living Natural Resources	The extension alignment crosses an urban area with no natural territories in its vicinity. The impact on Biodiversity and Living Natural Resources is limited to discharge of storm waters of the Oleksiivske Depot into the Lozovenka River. Specification for Water Discharge will be developed in order to assess the impact with sufficient level of details.
PR 10 - Information Disclosure and Stakeholder Engagement	Formal requirements to Disclosure of information on the Project are fulfilled: The Statement of Intent and the Statement of Consequences have been published in the local newspaper. Local TV news highlights the process of the Project preparation. Initial stage of Socio-Economic Baseline Survey (the SEBS) in July 2016 have been combined with informal public consultations with the residents and owners of the affected houses and land plots. In the course of further stages of the SEBS (January and February 2017) details of 211 PAP have been collected using a standard questionnaire. Besides the PAP's details, the questions related to: • the level of knowledge about the Project; • preferred resettlement options; • need for assistance. Public consultations on environmental and social impacts (an element of EIA) of the Project were also conducted in 2008 that did not guarantee the appropriate level of stakeholders' engagement by current standards.

4. ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

The key impacts associated with the Project and mitigation measures proposed are presented along the Bank's Performance Requirements (PR).

4.1 Pre-Construction and Construction Phase

No.	Potential Impact	Mitigation and Management Measures
PR1 Assessment and Management of Environmental and Social Impacts and Issues		
1.1	There are risks of environmental and social impacts and potential issues that can be avoided by establishing an environmental and social policy, principles and objectives.	Establish an environmental and social policy, principles and objectives. It can be aligned with KMC's policy and must be clearly communicated to MCC workers and subcontractors and enforced.
1.2	The impact from discharge of storm waters of an Oleksiivske Depot to Lozovenka River has not been elaborated in the EIA with a sufficient level of detail.	Carry out measurements of Lozovenka River water quality and hydrology and establish the baseline. To develop Specification for Water Discharge in order to assess the impacts of the storm water discharge on the Lozovenka River ecosystem.
1.3	Lack of control over environmental, health, safety and social (EHSS) performance of construction subcontractors can lead to poor performance on Project site to the extent that is unacceptable according to EBRD ESP.	Include EHSS considerations to contractor selection process. Ensure contractors have their own EHS Policy (or apply KMC's policy), dedicated and trained staff, procedures and safe systems of work in place, supervision, regular EHS meetings etc.
PR 2 Labour and Working Conditions		
2.1	Lack of provisions on labour and working conditions for construction subcontractors' workers can lead to poor performance and social unrest on the Project sites.	Require construction sub-contractors to apply the requirements on: • Human resources policies • Child labour • Forced labour • Non-discrimination and equal opportunity • Workers' organisations • Wages, benefits and conditions of work • Occupational health, safety and environment • Grievance mechanism stated in paragraphs 6-17 and 20 of the EBRD ESP PR2.
PR 3 Resource Efficiency and Pollution Prevention and Control		
3.1	The use of ACM[3] imposes the risk of oncological diseases on construction workers, and all the personnel handling these materials through the whole supply chain that precedes the final use.	Prohibit application of asbestos materials in all new developments. Update construction materials specification in order to replace asbestos materials with safe alternatives Include the ban on application of asbestos materials to the tender documents. Communicate the restriction to all contractors and their subcontractors.

[3] According to the Order of the MHC of Ukraine No. 339 as of March 29, 2017, manufacturing and use of asbestos is prohibited in the technological processes and during construction and installation work.

No.	Potential Impact	Mitigation and Management Measures
3.2	Lack of information on materials used for construction can cause damage the health of workers dealing with these materials and to the environment	Conduct inspection of incoming materials to be used by contractors and subcontractors for compliance with EU regulations. Request respective certificates and safety information from manufacturer/ supplier.
3.3	The oil spilled from the oil depot can pollute the Extension's drainage waters	Carry out the soil survey to define oil products in all their forms along the construction site in the vicinity of the oil depot. Develop and implement the measures for monitoring of the groundwater and soil quality based on the survey results. To monitor the extracted spoil for possible oil contamination.
3.4	Potential waterlogging caused by rising of the groundwater levels due to damming effect made by tunnels.	Develop and implement solutions for water drainage along the Extension in order to prevent waterlogging as a result of rising of the groundwater due to damming effect caused by the tunnels Arrange a network of monitoring wells for control of the damming effect within inundation areas.
3.5	The Depot design suggests installation of the gas boilers for heating. Emissions of GHG and pollutants to the atmosphere that can be avoided through the application of renewable energy for heating.	Consider replication of renewable energy solutions for heating (currently applied at the Saltivske Depot) at the Oleksiivske Depot

The Project design documentation will be adjusted in accordance with valid requirements.

No.	Potential Impact	Mitigation and Management Measures
3.6	The quality of the air at the construction area will be negatively affected by dust and exhaust gases.	For dust suppression: • carry out air measurements to establish a baseline level • spray water at regular intervals; • cover storage piles; • set a maximum speed limit; • provide air monitoring against the baseline • Other dust suppression techniques For exhaust gases abatement: • use trucks that meet the minimum standards as follows: – Heavy duty road vehicles: Euro IV – Light duty road vehicles: Euro III – Non-road vehicles: EU Stage IIIa. • To use the low sulphur fuel if available. • To switch off all engines, equipment and machinery when not in use to reduce emission and wastage. • Instruct drivers on the benefits of driving practices that reduce both the risk of accidents and fuel consumption, including measured acceleration and driving within safe speed limits. • Implement the manufacturer recommended engine maintenance programs.
3.7	There is a risk of soil contamination with construction waste primarily with the spoil that can be polluted with oil or other substances.	Adopt and implement Construction Phase Waste Management Plan including the management of spoil in accordance with Ukrainian regulations.
PR 4 Health and Safety		
4.1	Lack of control over EHS performance of construction subcontractors can lead to poor E&S performance on Project site to the extent that is unacceptable according to EBRD ESP.	Adopt 'KMC Policy on Health and Safety for Subcontractors' to construction subcontractors' and subsequent annexes in contracts of MCC with its construction contractors Implement the Construction Health and Safety Management Plan including contractors and sub-contractors
PR 5 Land Acquisition, Involuntary Resettlement and Economic Displacement		
5.1	Lack of transparent written procedures on handling such complex and sensitive issues as land acquisition, involuntary resettlement and economic displacement can lead to mistakes and subsequent social conflicts.	Implement the Resettlement Action Plan that has been developed in line with national legislation and the EBRD ESP PR5. Implement in full the requirements of the Law of Ukraine "On Acquisition of private Land and Other Immovable Property Located at Them, for Public Needs or Social Necessity" № 1559-17
PR 10 Information Disclosure and Stakeholder Engagement		

No.	Potential Impact	Mitigation and Management Measures
10.1	Public consultations on environmental and social impacts (an element of EIA) of the Project were conducted in 2008 that did not guarantee the appropriate level of stakeholders' engagement by current standards.	Conduct a second round of public consultations on environmental and social impacts of the Project. Implement Stakeholder Engagement Plan (SEP).

4.2 Operational Phase

No.	Potential Impact	Mitigation and Management Measures
PR1 Assessment and Management of Environmental and Social Impacts and Issues		
1.1	There are risks of environmental and social impacts and potential issues that can be avoided by an improved management system to international standards	Develop and implement an integrated Environmental, Social and Health and Safety Management System (ESHS MS) including appropriate policies, procedures and documentation. Special attention must be paid to: • Environmental and social policy and goals • Identification, assessment and management of EHS risks and hazards • Introduction of regular internal HSE audits of the whole Company The ESHS management system shall be developed and implemented in accordance with internationally recognized standards such as ISO 14001 and OHSAS 18001 international standards. Formal certification is optional.
PR 2 Labour and Working Conditions		
2.1	Lack of commitment to non-discrimination and equal opportunity principles may lead to social conflict and associated reputational risks	Document and implement the HR policy that contains statement on non-discrimination and equal opportunity
PR 3 Resource Efficiency and Pollution Prevention and Control		
3.1	Lack of control over the damming effect of the extension tunnels can lead to waterlogging of the adjacent territories	Develop the program for monitoring the damming effect of the extension tunnels that includes control of: • underground water levels using a specifically arranged network of monitoring wells • sound operation of drainage facilities subject to the inspection and the preventive maintenance Develop the program for monitoring the levels of the groundwater and the Neogene sand aquifer in the Metro depot and connector line areas. Implement both programs.
3.2	There is scope for reduction of the freshwater consumption, wastewater volumes and associated costs through application of recycling of train washing	Consider introducing recycling of train washing water at the Moskovske and Oleksiivske depot (similar to the Saltivske depot).

No.	Potential Impact	Mitigation and Management Measures
	water at the Moskovske depot.	
3.3	There is scope for reduction of the natural gas consumption, and associated GHG emissions through application of renewable energy for heating at the Moskovske depot.	Consider applying renewable energy for heating of the Moskovske and Oleksiivske depot.
PR 4 Health and Safety		
4.1	The use of ACM[4] imposes the risk of oncological diseases on construction workers, and all the personnel handling these materials through the whole supply chain that precedes the final use.	Update safety instructions for maintenance and decommissioning works dealing with existing ACM. Workers in contact with ACM should be informed about the hazard. Remaining ACMs should be clearly marked.
4.2	There are risks of OHS impacts and potential issues that can be avoided by an improved management system, up to international standards.	All existing risks at the Company should be analysed, and classified according to international standard OHSAS 18001. Special attention should be paid to work with electricity and high-voltage equipment, and life and health risks of train drivers and dispatchers. Risks control and mitigation measures should be developed.
PR 6 Biodiversity and Living Natural Resources		
6.1	There is a risk of adverse impact on Lozovenka River ecosystem through the discharge of the Depot's storm water.	Obtain the permit for the Special Water use with safe discharge levels stated. Follow the Permit conditions.
PR 10 Information Disclosure and Stakeholder Engagement		
10.1	Lack of grievance mechanism to address potential issues can lead to a social conflict.	Formalise grievance procedures based on best practices suggested by the Consultant

[4] According to the Order of the MHC of Ukraine No. 339 as of March 29, 2017, as an exception, materials and articles containing asbestos that are already in use, can continue to be used until they are replaced or disposed of.

5. GREENHOUSE GAS EMISSIONS

The anticipated amount of Greenhouse Gas Emissions (GHG) emissions from the Project's operations has been quantified in accordance with EBRD's Methodology for Assessment of GHG.

The assessment has revealed that the increase of indirect emissions associated with generation of electricity for traction for the extended line with reduced headway times, will be significantly outweighed by the decrease of both direct and indirect emissions as a result of expected:

A. Saved traction energy due to:
   - savings in train movements from the Red Depot to the Green Line and back;
   - new Rolling Stock with more efficient motors;
   - recuperation from braking.

B. Saved mileage of the road transport due to:
   - shortening of the bus routes and removal of buses from service;
   - shortening of the trolleybus lines and removal of buses from service (indirect emissions);
   - switching from cars to metro due to increased attractiveness of the metro system;
   - prevention of the modal shift from metro to cars.

In addition, saved mileage of the road transport will be beneficial for the air quality in Kharkiv through decrease in emissions of non-GHG components such as CO, NO_2, SO_2, Soot, Benzo[a]pyrene, that have an adverse impact on public health.

GHG emissions produced by the new Green Line depot are balanced by an equal reduction in GHG emissions from the Red Line depot A further consideration supporting this is that less (heavy duty) maintenance is required on new Green Line rolling stock.

For the period 2022 to 2052, up to 302 thousand tons CO2 equivalent will be saved; approximately 10,100 tons CO2 equivalent per year.

Considering the year 2030, the decreases in non-GHG components are estimated in the ranges of:

CO:	500 to 710 tons per year
NO_2	87 to 125 tons per year
SO_2	10 to 15 tons per year
Soot	15 to 22 tons per year
Benzo[a]pyrene	0.065 to 0.095 tons per year