TRANSFORD LLC

Multifunctional Transshipment Terminal at Port of Poti, Georgia

Updated
Environmental and Social Impact Assessment

Tbilisi
2015

Contents

List of Tables

List of Figures

1 Introduction

Private company “Transford” LLC is acting as a Developer for the new Multifunctional Transshipment Terminal (hereinafter “Terminal”) at Port of Poti (Georgia). Based on Terms of Reference issued by the “Transford” LLC, the Black Sea Ports Design Institute «Chernomorniiproekt» (Odessa, Ukraine) has prepared the preliminary engineering design for construction and re-construction of the Terminal at the territory of former Poti Shipbuilding Factory (Shipyard) #201, within Port of Poti aquatory. The Project considers re-construction of existing premises and berth, as well as the construction of new premises and two new berths. At the first stage (Phase I) the Developer (Transford LLC) is planning to reconstruct previously operated berth N1 within the area of former Poti “Shipyard #201".

Figure 1: General view of the Port of Poti

The Developer (Transford LLC) has contracted the environmental consultant “Universal Company” Ltd to undertake Environmental and Social Impact Assessment (ESIA) and submit the Georgian version of EIA Report to the Ministry of Environment and Natural Resources Protection of Georgia (MoENRP) for obtaining Environmental Permit. At the same time the Developer has arranged preparation of the English version of Environmental and Social Impact Assessment ESIA as Updated EIA in accordance with the lender’s requirements (IFC Performance Standard 1: “Assessment and Management of Environmental and Social Risks and Impacts”).

At the initial stage of EIA process a screening of the project has been undertaken in order to determine the need for complete EIA and Environmental Permit. In accordance with the requirement of the paragraph (p) of the Article 4 of the Law of Georgia “On Environmental Impact Permit” (2007), the new construction and major reconstruction of the sea ports in Georgia do require the Environmental Permit, which should be issued based on positive conclusion of the Ecological Examination (Expertise) of the Project EIA by the Ministry of Environment and Natural Resources Protection of Georgia.

The EIA for the project has been prepared following the requirements of Georgian environmental legislation and was examined by Ecological Examination (Expertise) committee of the Ministry of Environment and Natural Resources Protection of Georgia in May 2015. The positive conclusion of the Ecological Examination will become integral part of the Construction Permit (when applied to) to be issued by the Ministry of Economy and Sustainable Development of Georgia. This document is supplemental package that assesses project following IFI requirements on top of national

2 Updated ESIA

Based on the screening exercise undertaken at the pre-feasibility stage (including visual assessment and check-lists), EIA prepared in accordance with Georgian legal requirements it has been concluded that the Terminal Project at Port of Poti involves demolition of the berth #1, reconstruction, construction and dredging. Project has the potential to cause limited adverse environmental and social impacts, that are few in number (including marine environment, air and water quality, noise) generally site specific, largely reversible and readily would be addressed through mitigation measures.

The purpose of the updated Environmental and Social Impact Assessment (ESIA) process is to ensure that the Project is designed and developed in a manner that avoids, reduces and mitigates negative environmental and social impacts, while maximizing project benefits. Prior to making a funding decision, the potential lender (IFC, OPIC and other) and Georgian Government have to be assured that:

- The elements of the investment program would meet Georgian national requirements and existing international financial institution standards (particularly IFC requirements).
- The project includes all necessary mitigation measures to minimize any significant adverse change in environmental, health and safety, and socio-economic conditions.
- Appropriate public consultation and disclosure are undertaken in line with Georgian national law as well as the IFIs requirements, thus ensuring all reasonable public opinions are adequately considered prior to a commitment for financing.

In accordance with IFC requirements stated in IFC Performance Standard 1: "Assessment and Management of Environmental and Social Risks and Impacts", the overall scope of ESIA includes:

- Scoping and identification of key environmental and socioeconomic issues.
- Definition of baseline conditions of key environmental and social resources that could be affected by the Project.
- Consultation with people who may be affected by the project and other stakeholders.
- Assessment of positive and negative impacts of the proposed project on environmental and socioeconomic resources, including analysis of project alternatives.
- Planning of management practices and mitigation measures that are sufficient to avoid, reduce, or compensate for significant adverse environmental and social impacts.
- Development of monitoring program to verify whether the mitigation is properly implemented and is effective in accomplishing its goals.

The tasks of the scoping/inception phase, have been primarily focused on identifying the impacts caused by the project to be assessed (and how) and which of these impacts are significant and most important. The geographical area of influence is to be considered for each of the different environmental and social parameters as well as. The method used for

scoping on this project comprised the desk study and the visits by the social and environmental teams in October – November 2014 to the proposed sites of the Multifunctional Transshipment Terminal Project at Port of Poti and the affected areas of Poti municipality, also neighboring areas. Meetings have been held with local officials, with relevant ministries, other interested parties including non-governmental organizations and local population as well as in Tbilisi.

The ESIA for the Terminal Project was prepared in Georgian language to address concerns and issues, meeting the Georgian legislation. This Updated ESIA is intended to address the lending IFI requirements, identifying environmental and social impacts and relevant mitigation measures, and ensuring effective stakeholder consultation and disclosure process. Besides, the project should meet both Georgian and IFC's Performance Standards during the construction and operation phases, and the strongest requirements should be applied in case of some discrepancies.

The ESIA prepared for the Terminal Project in Port of Poti under the local legislation covers the following:

1. Existing legislative and regulatory framework;
2. Description of the planned activity,
3. Background environmental and social conditions of the region
   - Physical-geographical characterization of the region;
   - Geomorphology, geology, hydro-geology and hydrology;
   - Ambient air condition and climate;
   - Seismic conditions;
   - Flora and Fauna;
   - Description of the receptors sensitive to change (including marine environment);
   - Transport infrastructure;
   - Social-economic environment.
4. Methodology for the environmental and social impact assessment;
5. Impact assessment of the project construction and O&M phases including:
   - Natural and social environmental impact identification and analyses:
   - Expected emissions, noise dissemination etc. in the atmospheric air during the process of the planned activity;
   - Potential impact on surface and groundwater conditions;
   - Land and other resources (use of water, energy and other resources);
   - Industrial and construction waste as the factor of environmental pollution;
   - Social-economic environment – impact on human health, impact on industrial and urban areas, impact upon the transport flow, community and occupational safety.
   - Identification and assessment of possible emergency situations during construction and operation process of the Terminal;
   - Impact assessment in accordance with the general classification, direct, indirect, secondary, cumulative,
   - Cultural heritage;
   - Protected Areas.
6. Proposed mitigation measures to reduce adverse environmental and social impacts
7. Environmental Management Plan, including Monitoring Program

The content of the "Updated ESIA" provides information on the above components in English and also addresses the requirements of IFC Performance Standard 1: "Assessment and Management of Environmental and Social Risks and Impacts" and international best practice.

3 Environmental and Social Objectives of the Report

The objective of the updated ESIA is to describe the types of expected adverse environmental and social impacts caused by demolition of the port berth #1, construction and operation of the multifunctional transshipment Terminal (PhaseI), to elaborate relevant mitigation measures, in accordance with IFC and OPIC requirements . These actions and measures should allow reducing the effects of identified negative environmental and social impacts to an acceptable level or completely eliminating them.

In order to meet the above mentioned objectives, the ESIA should help:

- To minimize impacts of the berth #1 demolition works
- To minimize the traces left by the project's construction phase (dredging, temporary access roads, structures, temporary construction site etc.);
- To exclude contamination of the soil and surface water at the reconstruction-construction as well as in the subsequent operation phase;
- To exclude the damage of sensitive areas and archeologically important sites (if/where any discovered);
- To restore the vital regime of the habitats exposed to the impact on receptors located outside the territory of the Project.
- To prevent permanent negative impact on livelihood of local population (such as fishery, livestock, pastures, other.)

During the preparation of Updated ESIA for the Terminal at the territory of "Poti Shipyard №201 " (the N1 berth – Phase I), the attention was paid to the approaches of International Financial Corporation (IFC) which are reflected in the " Environment, Health and Safety (EHS) Guidelines" for Ports Harbors and Terminals[1] and IFC General EHS guidelines [2] and the IFC Performance Standard 1: "Assessment and Management of Environmental and Social Risks and Impacts"

4 Environmental and Social Impact Assessment Methodology

This report addresses the study area affected by the construction of the Terminal related to Phase-I of the Project. The evaluation of impacts is proportionately based on an assessment of their extent (local/regional/national), duration (short, medium or long term effects) and reversibility (temporary or irreversible effects).

Ports, harbors or terminals projects have impacts on physical, biological and socio-economic and cultural resources at the construction and operation/maintenance stages of the project. This impact assessment addresses all of the activities involved in the project, including specific technologies (such as dredging). The report furthermore defines direct, indirect and cumulative impacts.

[1] http://www.ifc.org/wps/wcm/connect/9e558c00488556ebbaf4fa6a6515bb18/Final+-+Ports,+Harbors+and+Terminals.pdf?MOD=AJPERES

[2] http://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final+-+General+EHS+Guidelines.pdf?MOD=AJPERES

Preliminary screening of potential impacts and major receptors based on proposed project outline, initial environmental site reconnaissance at the project pre-feasibility stage and the desk study of the existing sources on the existing environment, reviews of other studies/projects have been conducted in Port of Poti. Based on outcomes of the scoping exercise and check-lists, the scope of assessment and the content of the report have been determined.

Baseline data for the physical, biological and socio-economic conditions have been developed specifically for the Terminal Project by special groups of environmentalists, biologists, air, soil and water quality specialists/chemists, ecologists and sociologists.

The following baseline data collection/survey methods have been applied and actions undertaken

- The study area has been defined widely enough to include all the territories likely to be significantly affected by the Project. For the description of environmental and socio-economic baseline conditions the study area is defined within Poti municipality administrative boundaries. For the identification of specific impacts (air quality, noise, vibration, marine water and sediments quality the study area is defined within 1250m radius around the Terminal site (to cover closest neighboring residents - inland direction, as well as dredge disposal location outside Port of Poti aquatory – sea direction). For the identification of impacts on socio-economic environment – the study area is again defined within Poti municipality administrative boundaries;
- All relevant national and local agencies have been contacted to collect information on the baseline environment and sources of data and information on the existing environment is adequately referenced.
- The desk study reviews of existing sources and field reconnaissance / surveys were used in order to ensure the complex analysis and verification of data collected during the field surveys.
- Field works were conducted by the environmental team in October – November 2014 in order to verify the information collected from the reference materials and describe the present conditions of physical and biological resources based on outcomes of the scoping stage and finalizing the identification of potential receptors.
- The socio-economic baseline study of the Project area was carried out through review of existing information from state statistics department, different studies previously carried out within the scopes of different projects conducted by local and international institutions.

5 Legal and Regulatory Framework

5.1 Georgian legislation

Georgian legislation comprises the Constitution, environmental laws, international agreements, subordinate legislation, normative acts, presidential orders and governmental decrees, ministerial orders, instructions and regulations. Along with the national regulations, Georgia is signatory to a number of international conventions, including those related to environmental protection.

In Georgia, The Ministry of Environmental and Natural Resources Protection (MoEP) is responsible for regulating the natural environment. The MoEP implements all policies designed for the protection and conservation of the environment and for the sustainable use and management of Georgia’s natural resources. This includes controlling activities that have a potential adverse impact on the environment and natural resources and issuing environmental licenses and permits.

The following Georgian laws and regulations are applicable to the Project:

Law of Georgia on Protection of the Environment (1996)

The Law regulates the legal relationship between the State and persons/legal entities in terms of the environmental protection and/or utilization of natural resources on all Georgian territory including its territorial waters, airspace, continental shelf and special economic zones. The Law covers environmental education, environmental management, economic sanctions, licensing, standards, environmental impact assessment and related issues. The law considers various aspects of ecosystem protection, protected areas, global and regional environmental management, protection of ozone layer, biodiversity and the Black Sea, as well as aspects related to international cooperation.

Law of Georgia on Environmental Impact Permit (2007)

The Law gives a complete list of activities subject to ecological examination (Article 4, Chapter II) and defines environmental examination through the EIA process as an obligatory step for obtaining authorization for implementation of the planned development. The legislation sets out the legal basis for issuance of environmental permits, including implementation of an ecological examination, public consultations and community involvement in the processes. According to the established procedure the granting permission for, or refusal to issue, a permit is based on the findings of the EIA report and associated environmental documentation presented to the MoEP by the project proponent. Paragraph 6 of the law requires the applicant to organize and undertake public consultation of the EIA report prior submission of the final version of the document to the MoEP.

Regulation on Environmental Impact Assessment (2009)

Detailed procedures for environmental impact assessment, the environmental impact assessment phases and the structure for preparation of environmental assessment reports are given in the Regulation on EIA issued in 2009 and amended by MENRP Decree #31, dated May 15th 2013. The Regulation is aimed to support the ESIA process and its compliance with the Law on Environmental Impact Permit. The Regulation establishes the requirements for preparation of the EIA report. The stages of carrying out the EIA are defined in the Clause 5 of the Regulation while the content of the EIA report is defined in the Clause 6 of the Regulation.

Law of Georgia on Ecological Examination (2007)

The Law makes an ecological examination obligatory for issuance of development permits. An objective of the Law is to preserve the ecological balance through the incorporation of environmental requirements, sound use of natural resources and sustainable development principles. Demonstration of sustainable ecological outcomes is necessary to obtain a development permit. The review of and decisions related to ecological examinations is regulated by the MoE.

Law of Georgia on Licenses and Permits (2005)

The Law regulates activities which may result increased hazard to human life or health, involves interests of importance to the State or public, or connected to consumption of State resources. The Law defines the full list of activities which require licenses and permits, and sets out the rules for granting, amending and abolishing licenses and permits. The objective and main principles in the regulation of activities via licenses or permits are as follows:

- the security and protection of human health;
- the security and protection of the conditions and cultural environment of humans;
- protection of state and public interests

In compliance with this law, the license or permit issued by a foreign country under an international agreement or law is recognized by Georgia and has the status similar to that granted to the documents issued by Georgia.

Law of Georgia on Water (1997)

The Law regulates the major general legal relationships with respect to Georgia's water resources as follows:

- Between the State and physical/legal entities in the field of water protection, study and consumption;
- State and physical/legal entities involved in water protection, study and use on land, underground, continental shelf, territorial water and especially active economic zones;
- State and physical/legal entities involved in commercial water production and international trade in water;
- Defines the competences of autonomous republics, local government and self-government for water related issues;
- State and physical/legal entities involved in groundwater protection, study and use consistent with requirements of the law of Georgia on "Natural Resources";
- State and physical/legal entities involved in the protection of aquatic life, study, reproduction and use, in compliance with the law of Georgia on Fauna; and
- Regarding the use and/or consumption of fauna, flora, forest, land and other natural resources whilst utilizing water.

Recent amendments to the Law are made in 2014 and also the new Draft Law on Water is under public consultations at the moment.

Law of Georgia on Soil Protection (1994)

The Law aims at ensuring preservation of integrity and improvement of soil fertility. It defines the obligations and responsibility of land users and the State regarding the provision of soil protection conditions and ecologically safe production. The Law sets the maximum permissible concentrations of hazardous matter in soil and restricts the use of fertile soil for non-agricultural purposes, the execution of any activity without prior striping and preservation of top soil, open quarry processing without subsequent re-cultivation of the site, terracing without preliminary survey of the area and approved design, agricultural activities that could lead to overgrazing, wood cutting, damage of soil protection facilities, and any activity that could potential deteriorate soil quality (e.g. unauthorized chemicals/fertilizers, etc.). The recent amendments to the Law are made in 2014.

Law of Georgia on Ambient Air Protection (1999)

The Law regulates protection of the atmospheric air from adverse anthropogenic impact within the whole territory of Georgia(Part I, Chapter I, Article 1.1). Adverse anthropogenic impacts are any human induced effects on atmospheric air causing or capable of causing a negative impact on human health and environment (Part II, Chapter IV, Article II.I).

Law of Georgia on the System of Protected Areas (2003)

The law establishes categories of protected areas and defines the list of activities permissible within boundaries of each category of protected areas. The list of permissible activities for each category is determined taking into account the purpose of protected area and its management plan, and is in line with international conventions and agreements signed by Georgia. The protected territories shall be created in Georgia for the purpose of

protecting and renewal of the most important national heritage – unique, rare and distinctive ecosystems, plant and animal species, natural formations and cultural areas; ensuring the development of scientific, educational, recreational and natural resource preserving arrangements. The recent amendments to the Law are made in 2014

Forest Code of Georgia (adopted on 22.06.1999, lastly amended on 6.09.2013)

The Forest Code of Georgia regulates legal relationships pertinent to the tending, protection, restoration and use of the forest fund and its resources.

Law of Georgia on Red List and Red Book of Georgia (2003)

The law regulates legal relationships related to the preparation of the Red List and Red Book of Georgia, and protection and use of endangered species.

Law of Georgia on Cultural Heritage (2007)

The law sets “compulsory conditions for the implementation of large scale earth works”. The decision on the construction of structures of special importance is made by the authorized state entity, on the base of the clearance letter issued by the Ministry of Culture and Monument Protection. If physical or legal person discovers cultural heritage during works and proceeding of works can damage or endanger the cultural heritage, according to this law the physical/legal person shall immediately cease works and inform the ministry about cessation of activities and discovered cultural heritage within 7 days.

Law of Georgia on Public Health (2007)

The law stipulates the rights and obligations of population and legal entities in the field of public health and sets the state obligations in prevention of contagious diseases. The law covers the obligatory control on prevention of zoonotic diseases, diseases caused by food and specific infections, provides the safety of biological, chemical, technological processes at workplace and the product safety. The purpose of this law is to promote public health and healthy lifestyle practices, ensure environmental health, promote family reproductive health and prevent the spread of contagious and non-contagious diseases. This law applies to all individual or legal persons, except individuals who are under individual treatment or rehabilitation. Responsible body is the Ministry of Labor, Health and Social Affairs of Georgia. For providing a healthy environment for public health, the Ministry determines Environmental Quality Standards (atmospheric air, water, soil, noise, vibration, electromagnetic radiation) which include maximum permissible concentrations and harmful impact norms.

Law of Georgia on Wildlife (1996)

The main goal of this act is to ensure protection and restoration of wildlife, its habitats, preservation and sustainability of species diversity and genetic resources, creation of conditions for sustainable development, taking into account the interests of present and future generation, also legal ensuring of wildlife protection (including in-situ and ex-situ conservation, translocation and reproduction of wildlife) and state-based provision of use of wildlife objects.

Waste Management Code (2014)

The purpose of the Code is to provide the legal basis for implementation of measures aiming at prevention of generation of waste and increased re-use, for environmentally-sound treatment of waste (including recycling and extraction of secondary raw materials and

energy recovery from waste, as well as safe disposal). The objective of this Law is to protect the environment and human health: a) by preventing and reducing the adverse impacts of the generation of waste; b) by introducing effective mechanisms of management of waste; c) by reducing overall damage caused by resource use and improving the efficiency of such use.

Labor Legislation (2010)

Georgian Labor Law comprises Labor Code of Georgia (lastly amended on 27.09.2013), governs the work relationships in all enterprises, institutions and organizations. This law establishes the requirements regarding human rights and creation of safe and healthy working environment including health and safety conditions, social security and insurance;

5.2 Environmental Standards in Georgia

The following environmental norms and standards are currently regulating the quality of water and ambient air in Georgia:

Technical Standards (Regalement) for Protection of Surface Waters from Pollution;
Standards for waste water discharge to surface waters from industrial and non-industrial facilities;
Standards for water abstraction from the surface water bodies;
Technical data form for the water abstraction from the surface water bodies;
Standards for emission of pollutants to the ambient air;
Regulation on calculation of maximum allowable emissions of pollutants to ambient air;
Decree on approval of norms for qualitative condition of environment;
Other standards and regulations, as relevant

According to the complex of revised standards in the field of environmental protection, environmental load rates involve the quotas for the use of natural resources that are set at the state level, in consideration of the principles for sustainable use of natural resources. Qualitative norms of the environmental condition establish the requirements to the qualitative conditions of the environment and define the limit of permitted concentrations of the expected hazardous substances for human health and environment, in the soil and air. Maximum permitted concentrations of hazardous substances for human health and environment are given below:

Soil quality assessment criteria are defined under the standard “Methodological Guidelines for Assessment of Level of Chemical Pollution of Soil” (MG 2.1.7.004-03).

Table 1: Maximum Allowable Concentration of hazardous substances in soil

Component	Unit	MAC Value
Metals		
Arsenic	mg/kg	2
Cadmium	mg/kg	2
Copper	mg/kg	3-132*
Mercury	mg/kg	2.1
Nickel	mg/kg	4-80*
Lead	mg/kg	32-130*
Selenium	mg/kg	-
Zinc	mg/kg	23-220*

Total Hydrocarbons	mg/kg	0.1
Cyanide	mg/kg	0,2
Inflammable Organic Admixtures		
Benzene	mg/kg	0.3
Toluene	mg/kg	0.3
Total Xylene	mg/kg	0.3
Semi-Inflammable Admixtures		
Benzopyrene	mg/kg	0.02-0.2*
Isopropyl benzene	mg/kg	0.5
Pesticides		
Atrazine	mg/kg	0.01-0.5*
Lindane	mg/kg	0.1
DDT (and its metabolites)	mg/kg	0.1

Note: The range for these elements is calculated based on system of hazard coefficients (hazard factors): K1(translocation), K2 (migration in water), K3 (migration in air), K4 (general health and sanitary) given in Table 2 MG 2.1.7.004-03 "Methodological Guidelines on Assessment of Level of Chemical Pollution of Soil" It also considers that type of soil: sandy soils, clay soils with ph<5.5, clay soils with ph>5.5

Groundwater quality standards are regulated under the normative established for drinking water and correspond to the WHO and EU requirements/standards.

Surface water quality criteria are defined under the GoG Decree #425 "Regarding the Approval of the Technical Regulation for Protection of the Surface Waters of Georgia from Pollution" dated 31 December 2013, as well as under the Sanitary Rules and Norms "Regarding Protection of the Surface Waters from Pollution" approved under the Decree # 297/N issued by the Minister of Health and Social Affairs of Georgia on 16 August 2001.

Table 2: Maximum Allowable Concentrations of hazardous substances in surface water

Research Parameter	Unit of Measurement	MAC Value
pH		6.5-8.5
Na	mg/l	200
Chlorides	mg/l	350
Cyanides (total)	mg/l	0.1
Boron	mg/l	0.5
COD (Chemical Oxygen Demand	mg/l	30
BOD (Biochemical Oxygen Demand)	mg/l	6
Total Petroleum Hydrocarbons	mg/l	0.3
As	mg/l	0.05
Cr^{6+}	mg/l	0.05
Cu	mg/l	1.0
Hg	mg/l	0.0005
Ni	mg/l	0.1
Pb	mg/l	0.03
Se	mg/l	0.01
Zn	mg/l	1.0
Phenols (Total)	mg/l	0.001
Benzene	mg/l	0.5
Tuluene	mg/l	0.5
Ethylbenzene	mg/l	0.01
Benzopyrene	mg/l	0.000005

Note: Surface (fresh) water quality characteristics do not apply to the seawater. The Table-2 above contains most commonly tested components/elements/pollutants extracted from 1346 elements presented in Georgian Ministry

of Health (MoH)Decree #297 in the Table of MACs for surface water bodies of Georgia. The same Decree #297 (Chapter 2.1.5. "Protection of Black Sea coastal waters from pollution") contains the **hygienic** norms for bathing water quality within so-called "sanitary zones" of seawater use (resort areas, not Port of Poti) which are mostly related to microbiological characteristics (bacteria quantities, coli index, etc).

Limit of permitted concentration of the hazardous substances in the atmospheric air is defined under the hygienic normative: "*Concentrations* of *Air* Born Pollutants for Settlements (*HN 2.1.6*. *002-01*)

Table 3: Maximum Allowable Concentrations of some hazardous pollutants in ambient air

Substance	Maximum allowable concentration (MAC), mg/m^3	
	Maximum Single	Average Day and night
Asbestos containing dust	0	0.06
Silicon dioxide >70%	0.15	0.05
Silicon dioxide 70%-20%	0.3	0.1
Silicon dioxide <20%	0.5	0.15
Carbon Monoxide	5	3
Nitrogen Oxide	0.4	0.06
Nitrogen Dioxide	0.2	0.04
Sulfur Dioxide	0.5	0.05

Note: maximal single limit implies the rapid concentration, which shall not be exceeded

In order to avoid the significant impact caused due to **noise during the day and night hours,** environmental acoustic background standard is applicable in Georgia: "Sanitary Norms 2.2.4\2.1.8 003\004-01-Noise at work sites, dwelling, public buildings and residential territories". According to this normative document, the norm for noise dissemination at the border of the residential area for day hours (from 7:00 until 19:00) 55 decibels is acceptable, but for night hours (from 19:00 till 7.00) 45 decibels; permitted value for the noise level on the territory of an industrial enterprise amounts to 70 decibels.

5.3 Environmental Impact Assessment in Georgia

The EIA for the Terminal Project prepared in accordance with Georgian legislation has been examined by the Ecological Expertise procedure under the Ministry of Environment and Natural Resources Protection of Georgia (MENRP)in May 2015. The positive conclusion of the Ecological Examination will become integral part of the Construction Permit (when applied) to be issued by the Ministry of Economy and Sustainable Development of Georgia. The description of the EIA approval/permitting process in Georgia including public consultations, which successfully went through the Terminal EIA, is presented below.

According to the Law on Environmental Impact Permit and the Regulation on EIA, the EIA process in Georgia includes a methodology for the assessment of effects and the identification of significance that will take into account the 'magnitude' of the impact (duration, spatial extent, reversibility, likelihood and ability to comply with national standards) and the 'sensitivity' of the receiving environment, including local communities. Sensitivity is determined on the base of combination of desktop studies and site specific surveys; these include a review of the local population (including proximity / numbers and vulnerability) and presence of sensitive biological and physical features on the site and surrounding areas. The significance of impacts is discussed in the context of both before and after any proposed mitigation, where the following hierarchy of feasible mitigation measures is applied:

alternatives/site selection, elimination through design, application of best practice management and monitoring techniques, compensate/offset.

Paragraph 6 of the Law on Environmental Impact Permit requires the project proponent to organize a public discussion of the EIA to the MENRP prior to submission of the final version of documentation. The permit application/issuance procedure for the Project, establishment of the timeframes for information disclosure and public review and discussion in accordance with Georgian Law will include the following steps:

(1) The project proponent publishes information on the Project in central and regional newspapers. The advertisement has to include the project title, location, place and the date, time and venue of public disclosure meeting(s). It will also identify locations where the ESIA can be reviewed and where comments may be submitted.

(2) Within one week after publishing the information in the newspapers, the project proponent submits the EIA report (hard copy and electronic version) to the MoE. A period of 45 days is allowed for public comments on the EIA. Between 50 and 60 days after publication, the project proponent will hold a series of meetings to receive comments from stakeholders (which may include government agencies, local authorities, NGOs, community members). Within five days of the meetings, the project proponent will submit minutes of the meetings (summary of comments and discussions) to the MoE.

(3) All comments received from the stakeholders at the meeting or in writing are reviewed and addressed in the final version of the EIA. A copy of all written comments, the minutes together with a comment-response section are included in the final ESIA as an Appendix. The final EIA is submitted to the MoE and made available to the public, along with a project location map, an executive summary, and the any necessary reports on emissions and allowable limits. The permit is to be issued or denied within 20 days from registration of the submission.

In terms of environmental permitting procedure - the Law of Georgia on Environmental Impact Permit sets the legal basis for issuance of an environmental permit, including implementation of an ecological examination, public consultations and community involvement in the processes. If the Construction Permit procedure is initiated through the Ministry of Economy and Sustainable Development (MoESD) then the Ministry of Environment and Natural Resources Protection (MENRP) issues the conclusion of Ecological Expertise based on examination of ESIA documents received from the MoESD as part of the entire project package submitted by the proponent. The conclusion of Ecological Expertise (positive or negative) issued by the MENRP becomes a pre-requisite and an integral part of the Construction Permit issued by MoESD.

5.4 IFC Performance Standards

The Project is required to meet the international standards of the International Finance Corporation (IFC) of World Bank Group. The IFC Performance Standards are considered for the preparation of the ESIA and corresponding management plans as reference of good international practice. The international environmental and social safeguard policies of these organizations, as the main international conventions that Georgia is a signatory are outlined below.

When the Project is being implemented with support of the IFC, the requirements of the IFC Performance Standards (PS) are to be met. If the Project is being implemented with support of OPIC, the IFC PS requirements will need to be met as well. OPIC Environmental and Social Policy Statement (October 15, 2010) adopts the IFC Performance Standards on Social and Environmental Sustainability and Industry Sector Guidelines and any subsequent revisions to those standards as a standard for the environmental and social review process.

The IFC Performance Standards are the key documents through which the IFC manage the quality and level of assessment required for the projects which they finance. As mentioned above, the IFC Performance Standards are being considered for this project as reference of good practice. The following Performance Standards are relevant to this Project:

- PS1 Assessment and Management of Environmental and Social risks and Impacts;
- PS2 Labor and Working Conditions;
- PS3 Resource Efficiency and Pollution Prevention;
- PS4 Community Health, Safety and Security;
- PS6 Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- PS8 Cultural Heritage.

PS5 addressing land acquisition and resettlement and PS 7 addressing indigenous peoples are excluded because no resettlement considered and no indigenous peoples will be affected by the Project - so these PS-s are not applicable.

Specific reference will also be made to the following the World Bank Group Environmental, Health, and Safety (EHS) guidelines:

- General EHS Guidelines (April 2007);
- EHS Guidelines for Ports, Harbors and Terminals (April 2007).

Specific legislation and guidelines applicable to particular disciplines that will be considered during the ESIA process will be detailed in the relevant sections of the ESIA Report.

5.5 International Conventions

The following international laws and conventions have been ratified by Georgia and are relevant to this Project:

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (1973)
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1971)
- MARPOL 73/78 -International Convention for the Prevention of Pollution from Ships (1973)
- Vienna Convention for the Protection of the Ozone Layer (1985)
- Convention on the Protection of the Black Sea Against Pollution (1992)
- United Nations Framework Convention on Climate Change
- Convention on Access to Information, Public Participation in Decision Making and Access to Justice in Environmental Matters (1998)
- Convention on Long-Range Trans boundary Air Pollution (1979)
- United Nations Convention to Combat Desertification (1994)
- Basel Convention on the Control of Trans boundary Movements of Hazardous Wastes and their Disposal (1989)
- Convention on the Conservation of Migratory Species of Wild Animals (1979)
- Agreement on the Conservation of Bats in Europe (EUROBATS) (2001)
- Agreement on the Conservation of African-Eurasian Migratory Water birds (2001)
- UN (Rio) Convention on Biological Diversity (1992)
- Paris Convention on the Protection of the World Cultural and Natural Heritage (1972)
- European Convention on the Protection of the Archaeological Heritage (1992)
- Convention for the Protection of the Architectural Heritage of Europe (1985).

The Project should also meet the following International Labor Organization (ILO) core labor standards, all of which have been ratified by Georgia:

- Forced labor (C105)
- Child Labor (C182)
- Discrimination (C111)

- Freedom of Association and the Right to Organize (C 87)
- Equal Remuneration (C100)
- Minimum Age (C138).

Specific legislation and guidelines applicable to particular disciplines that will be considered during the ESIA process will be detailed in the relevant section of the ESIA Report.

5.6 Marine sediment quality guidelines

Environmental Quality Standards (EQSs) for marine, freshwaters and sediments have been developed by various countries and although there are no global values for marine sediments quality standards, many countries have their own standards which are used to assess pollution levels in the marine environment. EQS values vary from country to country and are often incomplete. EQS are not available for many parts of the world. Georgia doesn't have the EQS for marine sediments, as well as any sediment quality guidelines (SQG). In the absence of regional standards it is still preferable to compare values obtained against an EQS to assess the extent of pollution and potential for ecological damage.

For instance for the EU the EQS for marine sediments are discussed in Technical Guidance Document for deriving Environmental Quality Standards, Common Implementation Strategy for the Water Framework Directive (2000/60/EC) - Guidance Document No. 27 (TGD No.27).

For US the marine sediments screening benchmarks are presented at the US Environmental Protection Agency (EPA) website (please follow the link http://www.epa.gov/reg3hscd/risk/eco/btag/sbv/marsed/screenbench.htm

For Canada there are Canadian sediment quality guidelines (SQG) for the protection of aquatic life, developed by the Environment Canada (Guidelines Division, Science Policy & Environmental Quality Branch) as a part of its obligations under the Canadian Environmental Protection Act (CEPA).

The Dutch Target and Intervention Values2000 (the New Dutch List) commonly used in EU countries as a benchmark, will be applied for the subject project. The fragment of table below is taken from:
http://www.esdat.net/Environmental%20Standards/Dutch/annexS_I2000Dutch%20Environmental%20Standards.pdf

Table 4: Summary of saltwater sediment guidelines

Adopted for List II metals by VROM (New Dutch Standard)

Component	Unit (dry weight)	MAC Value Dutch (VROM)
Metals		
Lead	mg/kg	530
Chromium	mg/kg	380
Zinc	mg/kg	720
Copper	mg/kg	190
Nickel	mg/kg	210
Arsenic	mg/kg	55
Cadmium	mg/kg	12
Cobalt	mg/kg	240
Mercury	mg/kg	10

There are also international standards for sampling of sediments:ISO 5667-19:2004 provides guidance for the sampling of sediments in marine areas for analyses of their physical and chemical properties for monitoring purposes and environmental assessments. It encompasses sampling strategy, requirements for sampling devices, observations made and information obtained during sampling, handling sediment samples, and packaging and storage of sediment samples. ISO 5667-19:2004 does not provide guidelines for data treatment and analysis. There is also UNEP Mediterranean Action Plan MED POL Phase III Monitoring Activities "Methods for sediment sampling and analysis" UNEP (DEC)/MED WG.282/Inf.5/Rev.1 22Feb2006

5.7 Gaps between Georgian legislation and IFC requirements

The following gaps/differences between the IFC Performance Standards requirements and the Georgian environmental legislation relevant to the proposed Project:

- Screening and Classification: The Bank's guidelines provide detailed description of procedures for screening, scoping and conducting ESIA and explain a complete list of stages, which are not envisaged under the Georgian national legislation.

- Georgian legislation considers term EIA not ESIA (as it is commonly used by IFIs – WB/IFC, EBRD, other), although the social component of the impact assessment is presented in Georgian EIA regulation, requiring socio-economic baseline data for the project area and assessment of impacts related to population health and safety, livelihoods, employment, etc.

- Environmental Management Plans: The Georgian legislation does not specify format of environmental and social management plans (EMP) and stage of their provision for the projects subject to EIA and do not request ESMP for the projects not requiring EIA.

6 Project Description

Transshipment Terminal construction and operation are planned in the Port of Poti, at the territory of former “Poti Shipbuilding Factory No.201” (“Shipyard No.201”). Project territory is located at the Northern part of the Port of Poti, so called New Port, which is separated from the sea by West Mole and New North Mole (Fig.2) and its inner aquatory is formed by Pier-1 and Pier-2.

The project is design to meet an aggregated dry cargo turnover in the amount to 1,560,000 tons per year.[3]The new port expected cargo on annual base in structure would include[4]:

1. Bulk Cargo – 700,000 tons;
2. Container Cargo – 640,000 tons (64,000 TEU);
3. General Cargo – including heavy-weight cargo – 190,000 tons;
4. Roll-on/Roll-off (Ro-Ro) cargo – 30,000 tons.

6.1 Planned composition of the Terminal

The projected Multifunctional Transshipment Terminal (hereinafter Terminal) is projected for reloading bulk cargo, containers, metals, packaged goods, heavy cargo, irregular cargo and other general cargos on the adjacent types of transport and also for short-term storing in open depots. The construction of terminal is planned in the two successive phases.
The composition of the Terminal after both construction phases finished will include:

- sea cargo front with the total length of 423 m with the reloading equipment, consisting of two berths with the depth of 12.0m and 13.0m at the cordon from “0” of the port;
- three storage spaces with the total area of 21,000 m^2 for short-term storage of cargo in the volume of one and a half or double shipload lots, including two storage spaces– one at Berth #1 and the other – in the rear end of territory, in the area of the workshop building.
- railway cargo front the total length of which is 1070m together with the mechanized lines, providing cargo handling of train sets, stocking and reloading of cargos, consists of five cargo-handling lines, including two lines on the quay cordon, two –at the back of the quay storage space and one – along the rear storage space in the area of the workshop building;
- automotive cargo front with the total length of 320m with one mechanized line providing cargo handling to trailers and trucks/lorries;
- Park of transshipment mechanisms;
- Block of offices and utility rooms

6.1.1 Terminal construction Phase I

According to the Design Institute “Chernomorniiproject” (Odessa) terminal preliminary design has considered technological and technical conditions for the **Phase-I**, putting into operation the limited composition of Terminal, as follows:

- Water approach, maneuvering and operational areas with the depth of 13.0m
- Rehabilitation of the entrance gate and caps of piers (breakwaters) #1 and #2;
- Berth #1 of 253m length with the depth of 13.0m at the cordon
- Temporal rear joining Berth #1 and temporal bank stabilization;
- Container storage-sorting site;

[3]see Annex #1, page 62, article 3
[4] Port preliminary design

- Open storage areas for bulk and general cargoes of reduced sizes:
  (with the total area of 21.0 thousand m^2 for short-term storage of cargo in the volume of one and a half or double shipload lots, including two storage spaces– one at quay #1 and the other – in the rear end of territory, in the area of the workshop building);
- The main technological equipment such as portal cranes, gantry crane, trucks/lorries, mobile cranes "Sennebogen-835"[5]
- Storm water collecting and pretreatment system

In more details the Terminal Phase-I Scope of Works is as follows:

Berth 1 Works

Demolitions to Berth 1 (removal of two existing derelict cranes)
Renovation of Berth 1 (permanent construction works):

- Form piling mat (level profile for piling rig operations
- Sheet (Larssen) piling to Berth 1 (1605 No)
- Drive circular steel piles to support new berth
- Construct RC piles caps connector beams
- Fill voids and compact with selected approved fill
- Install new ducting drainage with treatment/settling chambers
- Install new crane rails
- Prepare shuttering reinforcement for top of berth RC slab
- Pour concrete to new Berth 1 RC slab
- Berth 1 Mooring Fell (construct new mooring point at north end of Berth 1)

Piers and Dredging Works

Renovations works to pier 1
Renovation Works to pier 2
Dredging inside harbor area to depth of 12.5 m total bulk dredging **820,000 m^3**
Dredging between harbor and breakwater to depth of 12.5 m total bulk dredging **605,000 m^3**
Dredging channel to depth of 12.5 m total bulk dredging **175,000 m^3**

Other Works

Demolishing of existing buildings 2 no.
Renovation of a defense shelter
Creation of 38,000 m^2 of open storage areas
Creation of 10,000 m^2 of open storage areas
Rehabilitation of existing railway lines
Installation of tower lights
Installation of projectors
Installation of check points
Renovation of office building including workers welfare facilities
Installation of security CCTV

[5] *SENNEBOGEN - port cranes manufactured by Sennebogen Maschinenfabrik GmbH (Germany) for various applications in the harbors. The port cranes guarantee with their robust undercarriages and the large supporting squares high stability for heavy lifting works. The maritime paint finish offers good corrosion protection for the maritime usage, as well as chromed and nickel-plated piston rods. The spacious port cabs enable good ergonomics and perfect sight into the ship with flexibly adjustable telescopic cab elevations. SENNEBOGEN provides solutions for diverse port operations.*

Street signage
Fire Suppression Systems
Renovation of existing warehouse including roof 5,000 m^2
Additional 340m of railway lines

The transshipping complex makes provision for transshipment of bulk cargoes, as well as cargoes in containers and general cargoes by the following technological schemes:

wagon - crane – warehouse and backwards;
wagon – crane – vessel and backwards;
warehouse- crane – vessel and backwards;
warehouse – crane - warehouse.

Bulk cargoes arrive and depart at/from UTC in gondola wagons and transport ships.

The main mass of general cargoes arrives at the port and departs piece by piece. A transport package of general cargoes is a unit load device made of a certain class of product groups by using different ways and means of packing. Containers arrive at the TC and depart from TC by sea, railway and automobile transports. Transshipping of containers of the international standard is offered to be carried out by portal cranes equipped with a spreader.

Wagon operations

Unloading of gondola wagons, covered wagons and open platforms is carried out by portal cranes using slings either suspenders with slings or a spreader. Types of the applied load-grappling devices are defined by specialists of the cargo area according to the type of cargo. Unloading of bulk cargo from the gondola wagons is foreseen to be carried out by a wheel-mounted crane made by Sennebogen, equipped with clamshells of 3.0-3.5 cubic m.

Storage operations

General cargoes are stored in warehouses either in an ordinary way putting lining between the cargo rows or in a “checked” manner, so that to unsling the cargo after delivery of it to the warehouse and then to attach slings to it. Bulk cargoes are stored in piles on these storage platforms by type of the cargo. On storing bulk cargoes a temporary protecting fence must be installed from the side of the crane runways and the railway tracks, as well as between the piles.

Storage of the containers is envisaged on the open storing platforms within a cranes operating radius. The platforms should be specialized for storing export, import and empty containers. Containers placement points and the articulated vehicles route must be marked in the territory of the warehouse and the motor way.

Vessels operations

Loading/unloading all kinds of cargo should be performed on berth #1 by using three portal cranes mounted on the berth with the corresponding replaceable load-grappling devices.

On transshipping containers the roof hatches of the container carriers should be arranged along the berth cordon between the crane rails. Cargo handling on berth #3 can be carried out by pneumatic wheel-mounted cranes of Sennebogen, equipped with a hook or a clamshell.

6.1.2 Phase II of the Terminal

Phase-II of the Terminal development which considers construction of Liquid Transshipping Complex/Terminal (LTC) for the oil products and LHG (Berth #2) is not defined yet, so the design data is not provided The stand-alone new EIA will be prepared for the Phase-II construction and operation.

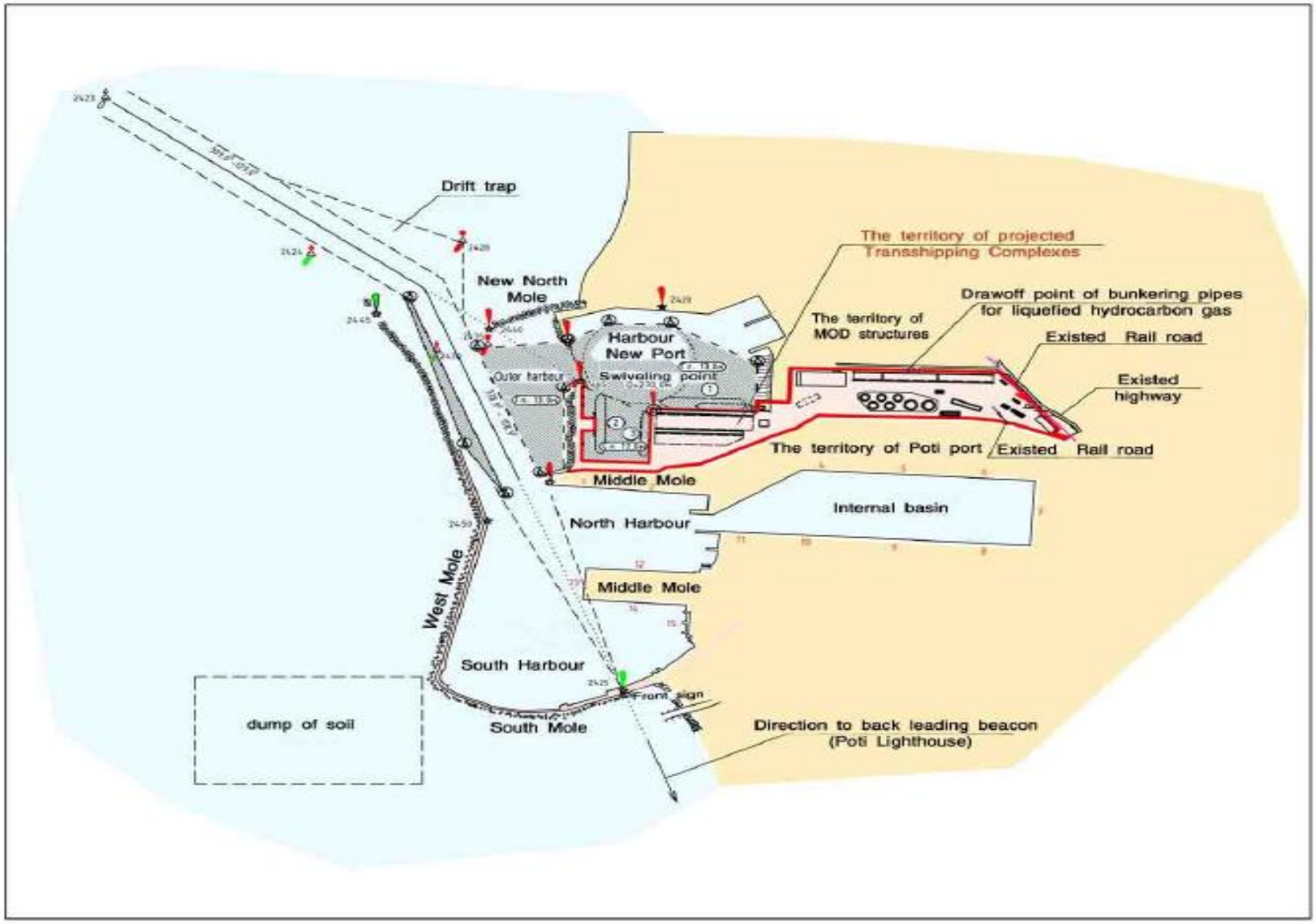


Figure 2: Layout plan of the Port of Poti and new Terminal area

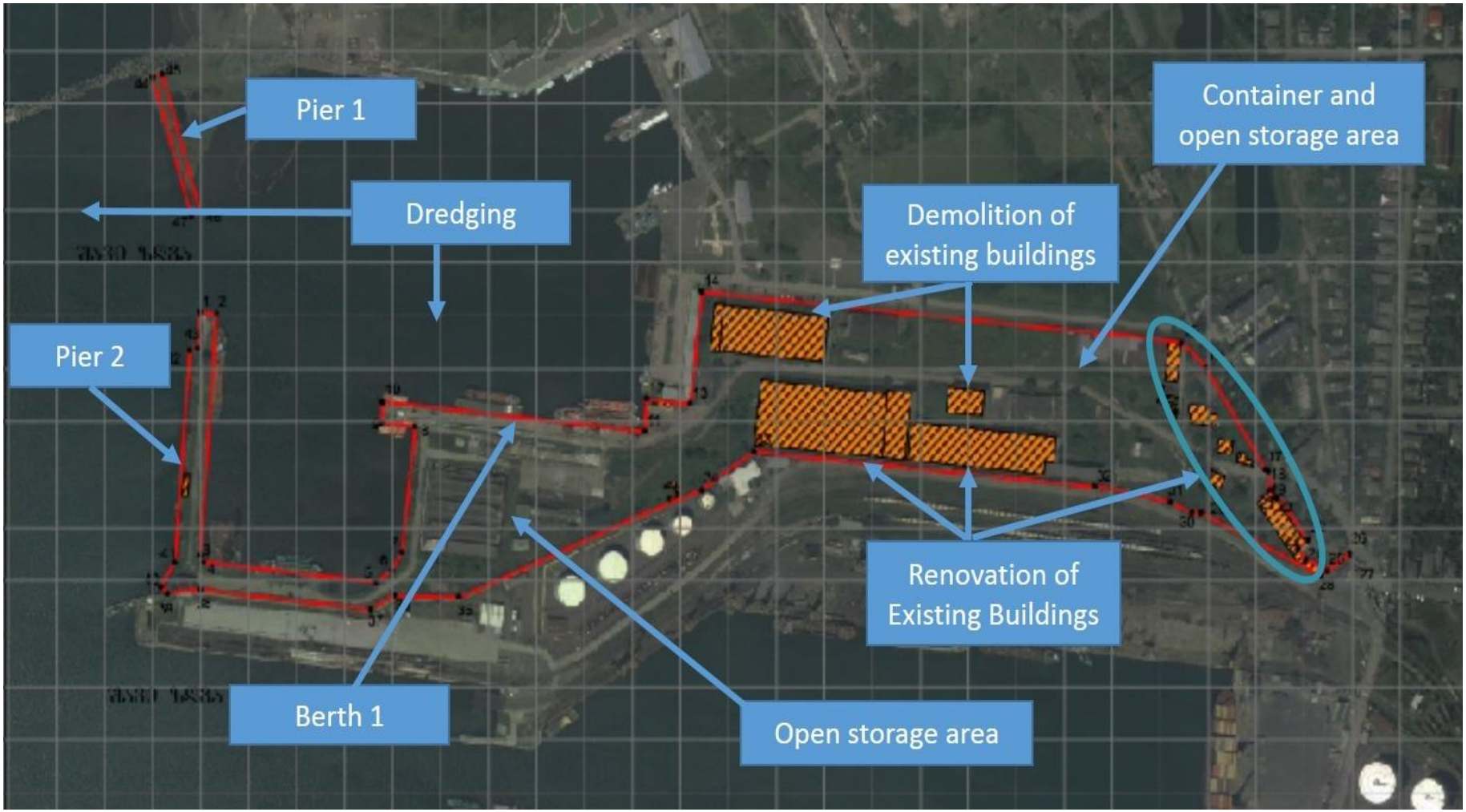


Figure 3: Layout plan of the proposed Terminal- Phase I

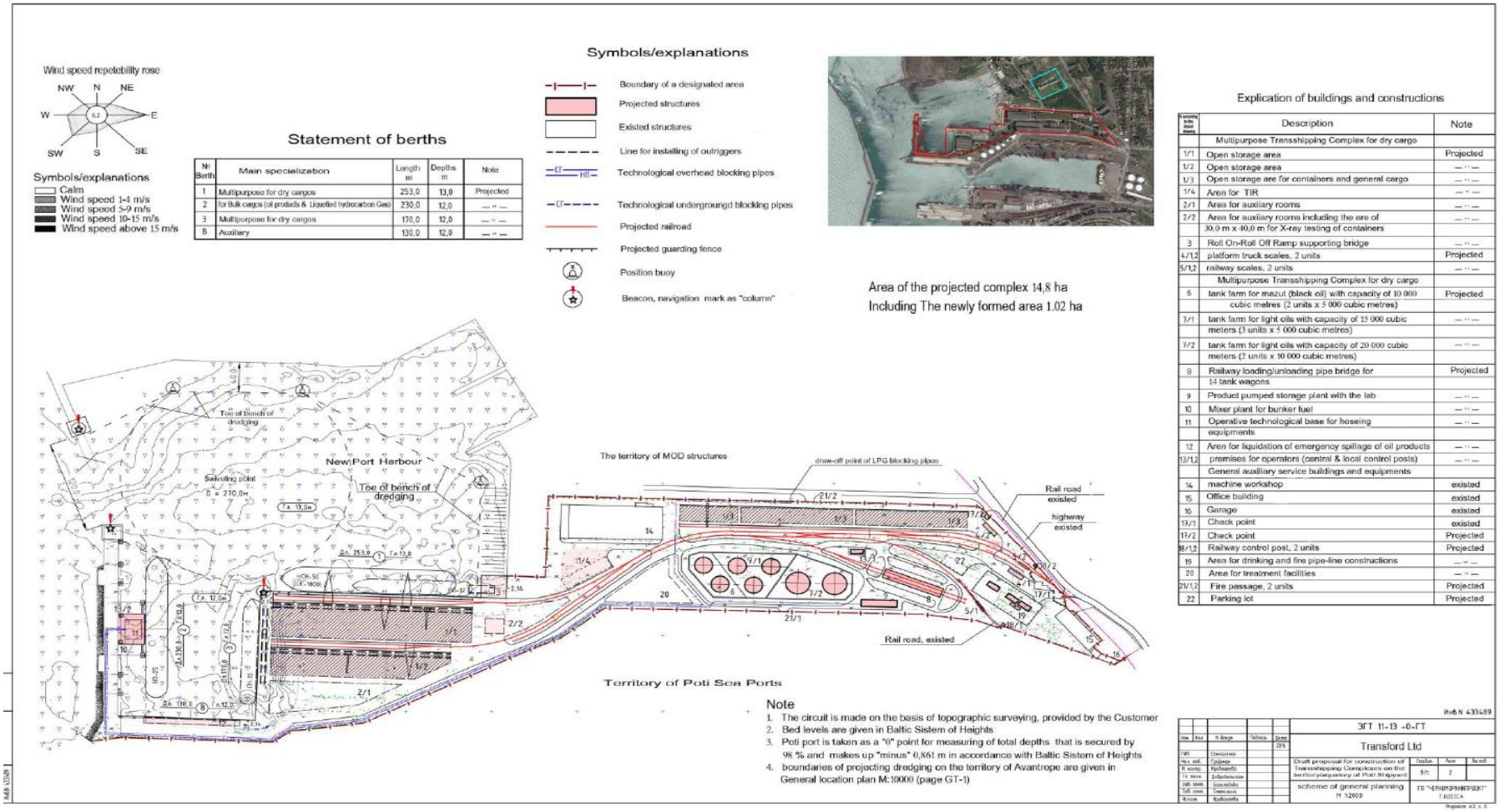


Figure 4: Layout plan of Phase-I and Phase-II of the Terminal project

6.2 Existing facilities

Construction of the new Terminal is planned at the territory and aquatory of JSC "Ship-building Factory of Poti" (Shipyard # 201) that was purchased in 2013 by Transford LLC.

JSC "Ship-building Yard of Poti" is situated to the north from New North Pier of Poti Port and its water area is a part of the so-called New Port aquatory (or Military harbor).

The New Port is located to the north-east from the Poti Port and from the west it borders with the outer harbor, separated from it by Pier 1 and Pier 2.

Entry to the aquatory of New Port is from the second knee of the approach channel of Poti Port, the width of which is 80 m and the depth – 13.0 m. At present piloting of vessels through the approach channel of Poti Port is allowed for vessels with the draught up to 10.5 m, the length of 240 m and the width of 35 m.

Entrance gate of New Port formed by capping of quay piers # 1 and # 2 have the width of 90 m, the depth of 3-5 m.

The total area of the New Port harbor is about 17.5 ha; the depth of its most part is 4-6m.

Berthing and shore facilities of JSC "Ship-building Yard of Poti" are located in the south-eastern part of the New Port. Berthing and shore facilities of the Ministry of Defense (MoD) of Georgia are located in the north-eastern part of the New Port.

At the territory allotted for construction of the new Terminal, the area of which is about 13.0 ha, at present there are 26 buildings and facilities of the former "Shipyard #201, the total area of which is about 32.8 thousand m^2, including the following main buildings:

- Office building (site area 1081 m^2);
- Garage (site area 313 m^2);
- Storage buildings (three buildings, total site area 1936m^2);
- Workshops of different specialization (five buildings, total development area 26450 m^2).

Buildings and facilities which are not to be used in the composition of the projected Terminal are being demolished by the Client (Transford LLC).

There are two entries: one entry for cars and one railway entry from the urban area to the project site. The railway is transiting to/from the main Poti Port.

There are the following hydro-technical facilities at the territory the project site:

- fitting-out wharf (ship repair embankment or Berth-1), of the length of 231m and width of 42m, with the depths of 4-6 m, which is considered to be reconstructed and deepened for reception of dry-cargo vessels;
- section of connection of the fitting-out wharf with berth #10 of the MD of Georgia, of the length of 31.5m with depths of 4 - 6.5m;
- Coast-protecting structure (breakwater) Pier 1, of the length of 92.0m;
- Coast-protecting structure (breakwater) Pier 2, of the length of 236.0m;
- Economic embankment, of the length of 137m;

Economic embankment and Pier 2 are forming a basin, the width of which is ~220m, the depths - 4–6 m in which three docks are envisaged to be arranged, including a freight dock for the acceptance of tankers, a freight dock for the casual acceptance of small-displacement vessels and an auxiliary dock.

A rear leading beacon of the first knee of the second knee of the approach channel of Poti seaport is installed on the cap of pier #2.

6.3 Site Conditions

The project site is located within the territory of Poti Port, former “Shipyard No.1”. This shipyard has not been working for the last two decades and at present, majority of its infrastructure are dismantled or completely deteriorated. Currently, there are several buildings, some of which can be used for the Project. The project territory is located in well-developed transport infrastructure industrial zone. There is a railway branch on the territory; the area is connected to the central highway with ground road. Project territory is a flat terrain, on which the vegetation practically does not exist. There are transmission lines, as well as damaged water supply, sewage and storm water collecting systems. As the ecological audit of the existing facilities undertaken by the baseline study team shows – there are some contamination spots at the site. The locations of debris and domestic waste are either already cleaned up, or will be cleaned during the construction-reconstruction works. The laboratory analysis of the soil samples has been undertaken to assess the level of ground contamination. The results of the analysis are presented in Subsection 8.7 “Geology and Soils”. Impact analysis and recommendation for mitigation are presented in Subsection 12.7 “Impact on soil quality”

The existing berth had not been functioning during the period of several decades. Pictures at Figure 5 below clearly show the existing condition at the Berth 1 and the urgency for reconstruction. Originally the Berth 1 was not intended for the ships with high displacement.

Figure 5: Views of the existing situation at Berth No.1

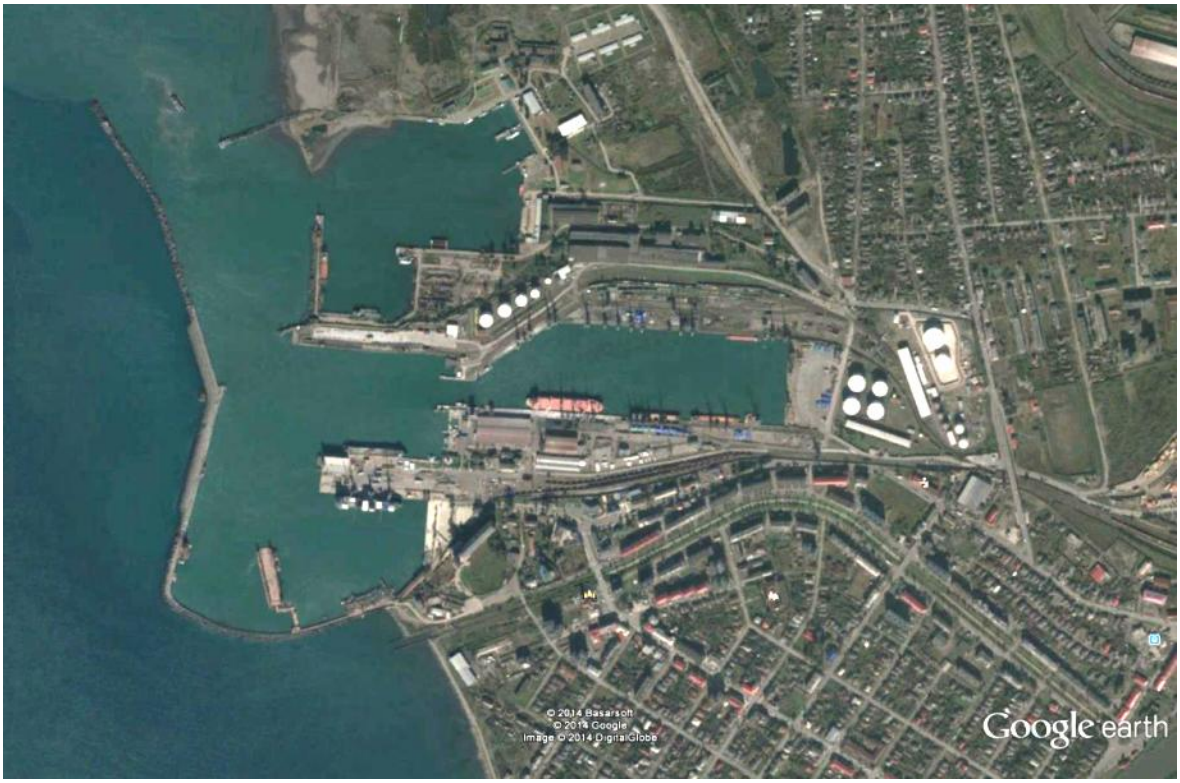


Figure 6: Aerial photo of the Port of Poti (Google Earth)

Figure 7: Boundaries of the Terminal territory with Berth-1 development shown in yellow

6.4 Key Construction Activities Planned for Phase I

The project phase I includes the following activities:

1. Berth # 1 for the acceptance of dry cargo vessels – reconstruction of the existing ship repairing dock including forming the depth of 13 m.

The berth is considered for the following working loads:

a) evenly distributed load: intensity of load 2 t/m² in the zone of 2m width, adjacent to the cordon line; intensity of load 4 t/m² in the zone of 14.5 m; intensity of load 6 t/m² in the zone of 6m width intensity of load12 t/m² in the rear zone;

b) Overhead loading:

–from portal cranes with load carrying capacity of 100t with 8 rollers in the derrick leg, with maximal pressure on the roller is 35 t, crane track – 10.5 m;

–from handling equipment to the pneumatic system with maximum pressure on outrigger - 120 t/m², with a track of 5.1m;

c) Designed vessel – BCS (bulk cargo ship) – 50, the length of 205m, with displacement of 80000 t and CC (container carrier)–1800 length of 205м, with displacement of 47700t.

2. Strengthening of the head of pier # 2 while forming the depth of 13m in the water area.

3. Partial disassembling and strengthening of the head and body of pier # 1 on forming the depth of 13m in the water area.

4. Trestle for supporting the ramp adjacent to the territory of the ship-repair yard, which borders with the territory, belonged to the Ministry of Defense of Georgia and berth # 1.

The trestle is reckoned on the following working loads:

1) Evenly distributed load – 4t/m²;

2) Load from automobile transport – H-30.

Designed vessel: Ro-Ro with the length of 140m, DWT10600t.

Hydro-technical solutions include defining borders of the bottom shoulder of the dredging trench of the water area from the existed coastal constructions of the new port harbor.

By preliminary calculations of the harbor constructions stability it is admitted:

–the distance from the bottom shoulder of the trench to the berths of the Ministry of Defense of Georgia makes up 34m;

– the distance from the bottom shoulder to the cordon line of pier # 2 makes up 32m;

– the distance from the bottom shoulder to the facilities on the opposite side of the territory is 40m.

Entrance gates of the harbor of New port with the width of about 90.0m and the depth of 3.0 - 5.0 m at the entrance are formed by caps of piers #1 and #2. A rear leading mark of the first sweep of the access channel is posted on the cap of pier #2.

Taking into account the piloting large-capacity vessels and necessity of deepening and widening of the entrance gates, the cap of pier # 1 should be disassembled with the following restoration in a new place. The caps of the both piers should be strengthened (reconstructed) in connection with increasing the passage depth.

The required width of the entrance gates, defined in the process of discussing optimal schemes of piloting the designed dry and liquid cargo vessels, made up about 120.0m.

6.5 Dredging works

Internal water area of the new port harbor occupies about 17.5 ha, prevailing depths – 4.0 - 6.0 m. Without damaging the strength and hydro-technical characteristics of the adjacent objects and hydro-technical facilities the part of the water area adjacent to the fitting-out wharf (Berth-1) should be deepened up to 13.0m. The deepened water area of about 10.0 ha is planned to be used as an entrance roadstead arranging on it maneuvering and operational water areas, which are adjacent to the reconstructed fitting-out wharf. The boundaries of dredging area are shown in red on Figure 8.

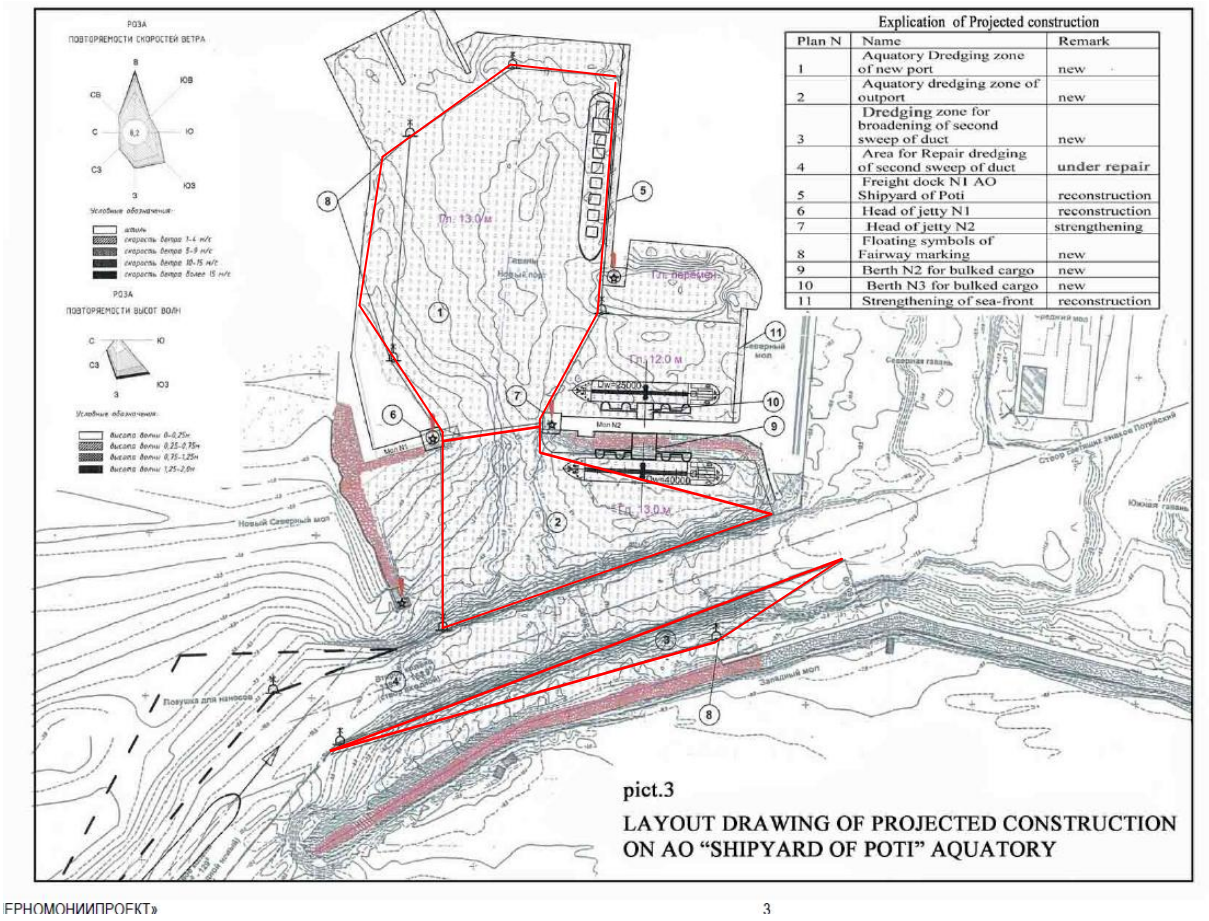


Figure 8: The dredging area shown in red at the New Port layout plan

Besides the part of the water area adjacent to pier #2, it is subject to be deepened to the depth of 12.0m in the implementation of the plans of the Client concerning acceptance of vessels for liquid cargoes in the mentioned water area (Phase 2).

According to the measured depth and the given designed depths, the volume of dredging works is calculated by areas and the average depth for each projected section taking into account the technological excesses for the depth and width. Ratio of slope in the foundation pit is admitted to be 1:3. The total volume of dredging works will be - 1600 thousand m3, including:

1. Dredging inner harbor area to depth of 12.5 m total bulk dredging **820,000 m3**
2. Dredging outer harbor area to depth of 12.5 m total bulk dredging **605,000 m3**
3. Dredging channel side triangle to depth of 12.5 m total bulk dredging **175,000 m3**

The distance to the dredge material disposal area is – 1.5 km. The detailed discussion on the dredging is presented in study Subsection 12.3 "Impact of Dredging Works"

6.6 Terminal Operation Schedule and Personnel

"Transford" is planning to hire employees from local population of Poti at both construction and the operational phases. According to Feasibility Study the Terminal operation is intended to last for 24 hours, through three-shift regime, shift duration – 8 hours. According to preliminary evaluation conducted by "Transford" LLC for the Phase-I, at the construction stage averagely 40-50 persons will be employed. At the operational stage (Phase-I) – total up to 130 persons will be employed, including: administrative personnel (7); operating personnel for Phase-I Universal Transshipment Complex (100), energy-mechanical service (5); guards (16)

Table 5: Terminal operation schedule and personnel

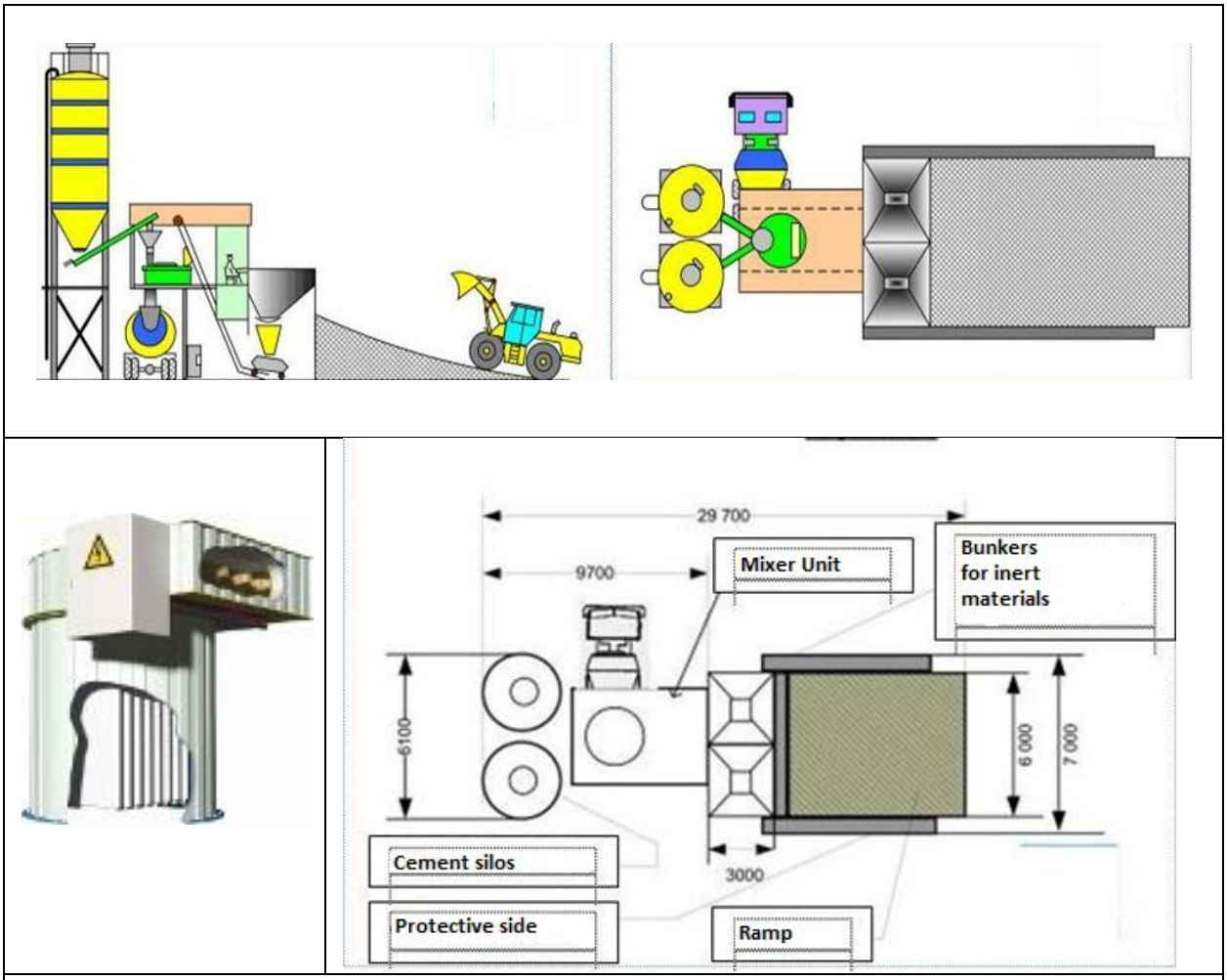
##	Name	General number, persons	
		Totally	**Including maximal per shift**
1	**Administrative personnel**	**7**	**7**
2	**Operating personnel – total:**	**163**	**67**
	including		
2.1	Universal TC (Phase-I)	100	47
	from them:		
1.	Operative-managing personnel	10	10
2.	Workers on cargo handling operations	60	24
3.	Warehouse workers	10	5
4.	. Maintenance works	20	8
2.2	Liquid TC (Phase-II)	56	17
	from them		
1.	Operative-managing personnel	5	2
2.	Tank battery	9	3
3.	Elevated track	8	2
4.	Product pumping	12	3
5.	Freight dock	8	2
6.	Laboratory	5	2
7.	Area of liquidation of emergency oil spill	9	3
2.3	Energy-mechanical service	5	2
2.4	Junior service staff	2	1
3	**Guarding**	**16**	**4**
Totally		**186**	**78**

Source: Preliminary design prepared by the design institute "Chernomorniiproject" (Odessa)

6.7 Organization of Construction Works

The supply of materials to the construction site will be through the main motorway passing through Samegrelo Street and the existing entrance ground road. Construction materials will be stored, at the construction site. The special area will be allocated for construction compounds (car park, mechanical repair workshop, office, etc.). Construction-installation works will be performed through the shift method, with the minimal number of labor staff which should have two or more professions. Total duration of the construction process is approximately 1 year.

Bulk of the concrete mixture required for the construction works will be supplied from the batching plant operating at the territory of Poti (Existing licensed Concrete Batch Plant in Maltakva district, within 10 km from the site, operating for about 15 years based on Environmental Permit issued by the Ministry of Environment in 2000). If that concrete is not sufficiently supplied in required quantities or according to required schedule, the use of one unit of small capacity (100 cubic meters) concrete mixer is intended to be installed at the construction site (the schematic outline of the small mixer is shown on the Figure 9 below). The emissions of the site-located small batch plant are calculated for the materials required for the maximum operational capacity 5 m^3/hour and presented in the Subsection 12.6 "Impact on ambient air quality" According to preliminary design prepared by the design institute "Chernomorniiproject" (Odessa), about 4.0-4.5 thousands m^3 of concrete will be used/casted during the construction in total.



Technological process of supplying inert materials and cement to the concrete unit

Figure 9: Schematic layout of the mobile concrete batch plant (Source: Universal Company)

Inert materials required for construction works will be supplied from the existing licensed quarries in the ravines of the rivers Rioni and Khobistskhali. It is not planned to install the back-up fuel reservoir at the construction site. The vehicles will be filled with fuel at the gas station. The equipment required for the construction/reconstruction works of berth N1(according to preliminary calculation by "Transford") is presented in the table below:

Table 6: Tentative list of construction machinery and equipment

№	**Machinery-equipment**	**Quantity**
1	Self-unloading vehicles	4
2	Excavator	1
3	Mobile crane	1
4	Concrete batcher	1
5	Water pump	1
6	Concrete pump	2

6.8 Water and Energy Consumption

Detailed design solutions of engineering networks are not provided and will be specified at subsequent stages of projecting after development and coordination of the solutions on technological equipment and reception of TC (technical conditions).

Requirements of water consumption and water discharge in energy supplies are defined by expert knowledge, have preliminary character and are provided by Chernomorniiproject.

Main consumers of electrical energy of universal transshipping complexes are:

- Technological equipment (portal/gantry cranes; mobile pick-&-place devices, others);
- Internal electrical equipment and electric lighting of buildings and facilities;
- Personnel loading of vessels moored at berths #1 and #3 for cargo handling operations;
- Current collectors of plumbing facilities;
- Objects of connection and video observation;
- External lighting of the territory.

The general consumers of the terminal are:

- Internal electrical equipment and electric lighting of the administrative building, the unit of service spaces, the unit of engineering services, the checkpoint and other auxiliary buildings and facilities;
- Electric collectors of the water pumping station, technical water supply pumping station, main sewerage pumping station of communal waste water;
- Objects of connection and video observation;
- External lighting of the territory.

Table 7: Energy and water consumption for the Terminal

Name	**Measurement unit**	**Index**
Power consumption	Total capacity, kilowatt (kW)	**3,700.0**
	Total annual consumption - MWh/year	**9,200.0**
Water consumption	m^3/daily	**90.0**
	Thousand m^3/year	**25.0**

Source: Preliminary design prepared by the design institute "Chernomorniiproject" (Odessa)

Total designed capacity (sum of outputs) of all electric motors of the equipment to be used at operation phase – in kilowatt (kW)
Total annual energy consumption is calculated in MWh (megawatt-hour) per year

Megawatt hours (MWh) are one million watts amount of power delivered/consumed in one hour. Data is provided within preliminary design document prepared by "Chernomorniiproject" (Odessa)

6.9 Waste management during the construction

The outline "Waste Management Plan" for the Construction Phase is presented in Subsection 17.10 of this report. Impacts from demolition works at Berth-1 and proposed mitigation are discussed in Subsection 12.7. The mitigation measures during the demolition are also presented in Section 14, Table 47 "Environmental and Social Mitigation Measures at Construction Phase". The construction waste from demolition of old/existing structures will be disposed according to the "Code of Georgia on Waste Management" (2014), IFC PS3 and local legislation at the locations officially designated (and provided to Contractor) by the Poti Municipality, following the standard procedure.

According to Paragraph 12 "Wastes" of IFC PS3, the developer Transford LLC will avoid generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, Transford LLC will reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment. In order to reduce the volume of waste transportation for disposal and reuse the concrete waste, it is proposed by Transford LLC to crush the concrete waste generated from demolition of the existing structures of Berth-1 (concrete foundations, concrete sleepers, concrete covers and bases, monolithic concrete top-coat, precast concrete slabs, concrete arrays rear coupling, concrete piles, etc.) and to re-use about 80% of it for the backfilling behind the sheet piles to be installed along the entire reconstructed Berth-1.

Where waste cannot be recovered or reused, Transford, will dispose it in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the construction waste material. If/when the generated waste is considered hazardous (as defined by international conventions or local legislation), Transford LLC will oblige contractors to apply good international industry practice (GIIP) alternatives for its environmentally sound disposal.

For hazardous waste disposal Transford LLC will use contractors that are reputable and legitimate enterprises licensed by the Georgian Ministry of Environment and Natural Resources Protection and obtain chain of custody documentation to the final destination. The developer Transford LLC will dispose demolition waste at the municipal landfill, at the locations indicated by corresponding municipal authority and landfill operator, with all permits obtained. Hazardous waste will be managed by licensed companies according to the local/international practice.

The characteristics and quantities of demolition waste are presented in the table below:

Table 8: Characteristics and quantities of demolition waste at Berth-1

	Description		**Quantity**	**Unit**
1.1.1	**Removing existing structures Phase 1, berth №1, stage 1**			
1	Dismantling the railway of wooden sleepers by elements. Number of sleepers per 1 km =1600 and number of rail pieces =1440		0.20	km
2	Transportation of waste up to 2 km		21.00	t
3	Transportation of waste up to 10 km		112.75	t
4	Dismantling of crane tracks by beams of rails P50		2.36	100m
5	Transportation of waste up to 2 km		12.30	t
6	Dismantling of concrete foundations		45.00	m3
7	Transportation of waste up to 10 km		108.00	t

8	Dismantling of crane tracks on concrete sleepers of rail P50		2.36	100m
9	Transportation of waste up to 2 km		12.30	t
10	Transportation of waste up to 10 km		64.90	t
11	Dismantling cranes on vehicles bollards		9.00	item
12	Transportation of waste up to 2 km		5.67	t
13	Dismantling fenders		20.00	item
14	Transportation of waste up to 2 km		0.74	t
15	Transportation of waste up to 10 km		10.80	t
16	Dismantling of concrete covers and bases		5.15	100 m3
17	Transportation of waste up to 10 km		1,236.00	t
18	Dismantling monolithic concrete topcoat		1,225.10	m3
19	Transportation of waste up to 10 km		3,062.75	t
20	Cutting fittings		61,465.00	item
21	Dismantling precast concrete slabs		1.64	100 m3
22	Transportation of waste up to 10 km		410.00	t
23	Removing the pre-cordon area and frame covers		0.20	m
24	Transportation of waste up to 2 km		0.20	t
25	Excavation of soil		0.27	1000 m3
26	Transportation of waste up to 10 km		440.00	t
27	Dismantling of concrete covers and bases		0.55	100 m3
28	Transportation of waste up to 10 km		132.00	t
29	Dismantling of concrete arrays rear coupling		21.50	100 m3
30	Transportation of waste up to 10 km		5,375.00	t
31	Excavation of soil, group 4		1.42	1000 m3
32	Excavation of soil, group 1		2.77	1000 m3
33	Transportation of waste up to 10 km		6,917.00	t
34	Cleaning macadam		0.100	1000 m3
35	Transportation of waste up to 10 km		170	t
1.1.2	**Removing existing structures Phase I, berth №1, stage 2**			
1	Dismantling of crane tracks on the beams of rails P50		1	100 m
2	Transportation of waste up to 2 km		6	t
3	Dismantling cranes on vehicles bollards		5	item
4	Transportation of waste up to 2 km		3	t
5	Dismantling fenders		17	item
6	Transportation of waste up to 2 km		1	t
7	Transportation of waste up to 10 km		9	t
8	Dismantling of concrete covers and bases		7	100 m3
9	Transportation of waste up to 10 km		1,608	t
10	Dismantling monolithic concrete topcoat		564	m3
11	Transportation of waste up to 10 km		1,410	t
12	Cutting fittings		28,760	item
13	Dismantling precast concrete slabs		0	100 m3
14	Transportation of waste up to 10 km		63	t
15	Dismantling monolithic concrete topcoat		141	m3
16	Transportation of waste up to 10 km		354	t
17	Cutting fittings		6,930	item
18	A breakdown of reinforced concrete pre-stressed piles 45x45		105	m3

1.1.3	**Removing existing structures Phase I, berth №1, stage 3**			
1	Dismantling of the top structure of monolithic reinforced concrete		106.20	m3
2	Transportation of waste to 10 km		265.50	t
3	Cutting fittings		3,140.00	item
4	Cutting of reinforced concrete piles and reinforced concrete tongue		54.00	item
5	Cutting of metal piles of channel		2.00	item
6	Dismantling of concrete covers and bases		0.14	100 m3
7	Transportation of waste to 10 km		26.60	t
8	Excavation of soil, group 1		0.09	1000 m3
9	Transportation of waste to 10 km		136.00	t
10	Cleaning macadam		0.02	1000 m3
11	Transportation ground up to 10 km		25.50	t
12	Excavation of soil, group 4		0.03	1000 m3
13	Transportation soil up to 10 km		45.50	t
14	Excavation of soil, group 4		0.16	1000 m3
15	Transportation of waste to 10 km		280.00	t

Source: Feasibility Study prepared by "Chernomorniiprject" (Odessa)

6.10 Decommissioning phase in case of terminating the operations

Decommissioning phase of the universal handling complex stipulates three options:

- Short-term suspension or repair of the site, or its structural units
- Long-term suspension of the site or some of its structural units;
- Total liquidation of the site and some of its structural units.

a) Short-term suspension or repair of the site, or some of its structural units.
In case of suspension of the multifunctional transshipment complex or its separate section, or repair(current or capital repair, commissioning service of the complex shall elaborate the operative plan related to temporary suspension of the operations, which, in the first place, should involve the safety requirements and coordination with all the interested parties).

b) Long-term suspension of the site or some of its structural units.
In case of long-term suspension or conservation of the operations at the multifunctional transshipment complex, or in its separate section, commissioning service of the complex shall elaborate the conservation plan for long-term suspension of the operations. Mentioned plan should be coordinated with the authorized state bodies (Ministry of Economy and Sustainable Development of Georgia, Ministry of Environment and Natural Resources of Georgia). Key content of the plan is the safety requirements.

c) Total liquidation of the multifunctional transshipment complex or its structural units.
In case of full cancellation of the multifunctional transshipment complex, for the purpose of restoration of the environment up to the acceptable conditions, a special project should be processed. Operating company of the multifunctional transshipment complex is responsible for drafting the mentioned project. According to the applicable rule, special project for abolition of an enterprise should be coordinated with the authorized state body Ministry of Economy and Sustainable Development of Georgia, Ministry of Environment and Natural Resources of Georgia) and the information should be provided to all interested physical persons and legal entities.

The project should stipulate the rules and sequence for termination of the technological processes, dismantlement of the premises and equipment, rules and conditions for the dismantlement works, requirement for meeting the safety and environmental protection

measures, as well as the rules and conditions for hazardous wastes decontamination and allocation, re-cultivation works etc.

Transford LLC, as developer, in cooperation with design institute “Chernomorniiproject” (Odessa)and the awarded/selected Construction Contractor will prepare the Terminal decommissioning program for the project prior to construction commencement. The decommissioning programwill be supported by the Terminal Decommissioning Environmental Management Plan.The programwill outline the methods for decommissioning, paying particular attention to:

- Comparing the methods of partial and/or complete removal of Terminal buildings and facilities constructed within the scope of the present project;
- Considering integration and cooperation with other companies/vendors and port authority of the Port of Poti during decommissioning;
- Expected timeframes and costs of removal;
- Environmental impacts;
- Monitoring;
- Regular reviews to reflect changing circumstances and knowledge over the project lifetime.

The program will not cover decommissioning (demolition, dismantling) of the hydro-technical structures of the Port of Poti (berths, breakwaters, piers, etc.).

This program is to be reviewed and revised as necessary throughout the lifecycle of the project to reflect changing circumstances of sources, receptors and regulatory requirements, and to incorporate improvements in knowledge and understanding of the marine environment and advancements in technology and working practices. In general the impact from decommissioning (in terms of air emissions, dust, noise, vibration, etc.) usually doesn’t exceed the impacts analyzed for construction or operation phases, especially in particular case of proposed Terminal decommissioning, when no dredging or hydro-technical works are expected.

7 Analysis of Alternatives

Alternatives to the proposed Multifunctional Transshipment Terminal were evaluated to determine whether they were reasonable and environmentally and socially preferable to the proposed action. The alternatives considered include the no-action alternative, location alternative, functional (profile) alternative and design alternatives.

7.1 No-action Alternative

In case of no-action alternative there will be no impacts generated by the project construction and operation activities, and thus, less adverse impact on physical, biological and socio-economic environment. At the same time the deteriorated facilities of the former Shipyard #201 without proper management are generating certain level of adverse impact on both marine and terrestrial environment. From the socio-economic prospective the no-project alternative reduces the employment chances for the local population, also reduces prospective for economic development not only for Poti but for entire Western Georgia region, because the Caucasus and Central Asian countries will look for the other, probably more expensive alternative shipment routes, that may lead to new green field developments.

7.2 Location Alternative

The proposed Terminal project is based on reconstruction of the existing territory (and aquatory) of the former Shipyard #201 at the Port of Poti, within strictly defined boundaries. So the location was a primary option from the very beginning, to redevelop the existing gray field within the industrial zone of the Port of Poti for the purpose of multifunctional transshipment terminal. Any other options for the new location of the Terminal may again lead to green field development.

7.3 Profile (or functional) Alternative

There were several unsuccessful attempts since early 90-ies to rehabilitate the former Shipyard #201 through attracting various investors, but there was no market for the ship repair or ship building activities. The only economically effective solution for the redevelopment of the existing territory was the privatization and changing the function to commercial shipment/transshipment activities. Considering that there are very limited commercial fishing activities along the Georgian coast, as well as the fact that Poti doesn't represent the touristic center to attract passengers'/cruise ships – the only functional option was to design the multifunctional/universal cargo terminal. This is in line with the economic demand and increased cargo turnover along the so-called "silk route" from China and Central Asia to Europe and vice versa.

7.4 Design Alternatives

Considering the very limited territory and aquatory of the New Port harbor it has been decided from the very beginning that there should be minimum reconstruction works, just sufficient to accept standard dry cargo ships, container ships and the auto ferries. So the design solutions are limited to very minor modification of entrance gates and the berths. The dredging works are necessary to ensure required depth in the inner harbor. Any other design alternative (for instance less depth or less length of berth) may have reduced the functionality, attractiveness and thus economic effectiveness of the proposed project. In terms of environmental impact – the dredging works within the inner aquatory and access to Port of Poti are ongoing since 1930-ies (due to River Rioni silt/sediments inflow) and the additional dredging of the New Port will not generate any significant, new or unusual impacts onto marine biota along Poti coast. The impact

of dredging works on marine environment is discussed in more details in Subsection 12.3”Impact of Dredging Works”.

7.5 Dredge Disposal Alternatives

There was always only one option for the disposal of dredge material from the Port of Poti area: so-called “Canyon” area of sea bottom, starting just200m to the West of the Port of Poti outer breakwater (West Mole) first knee and continuing/deepening to the West towards open sea (Figure 2). The disposal of the dredge material in the “Canyon” is ongoing since 1930-ies. In Decree #57 of Government of Georgia (GoG) dated 15 January 2014 “On ships movement schemes, corridors and special zones within Georgian territorial waters of the Black Sea”, the Canyon location is mentioned in Chapter 17 of the Decree as designated area #42 (with exact indication of coordinates) for disposal of any material dredged within Port of Poti aquatory. The “Canyon” location is at the natural depression of the sea bed. Based on monitoring data of the Port of Poti and the former Coast Protection Department of Georgia (dismissed/revoked in 2004) the material disposed/dumped in the Canyon is not transported/distributed towards the coast and is rapidly covered by other sediments from the steep slopes of the canyon – which is positive process if the disposed dredge material is contaminated. The on-shore treatment/disposal option for contaminated/hazardous sediments has been also considered. As per discussion with the MoENRP the on-shore disposal is not an option because will not be approved by the Ministry due to absence of adequate areas for such quantities and the close proximity of the Kolkheti National Park. There is no location further in-shore to accommodate such amount of marine sediments, creating new spot of contamination versus 100 years disposal location. It should be also noted that the presence of heavy metals traces in sediments is not only an indication of pollution from ships, this is also due to the silt brought by River Rioni from Chiatura area where there are a manganese and other heavy metals ore deposits. In more details these issues are discussed in Section 12.3 Impact of Dredging.

8 Baseline Conditions for Physical Environment

8.1 Study area for Environmental Baseline

As it has been mentioned in Section 4" the study area for the Project ESIA was defined as follows:

a) The study area is defined within Poti municipality administrative boundaries for the description of environmental and socio-economic baseline conditions (approx. 4.5 km).

b) The study area is defined within 1250m radius around the Terminal site boundaries (to cover neighboring residents' inland direction, as well as dredging and dredge disposal areas from the sea side) for the identification of specific impacts (air quality, noise, vibration, marine water and sediments quality).

c) The study area is defined within Poti municipality administrative boundaries for the identification of impacts on socio-economic environment – (approx. 4.5 km);

The schematic map of ESIA study area is presented at Figures 10 and 11

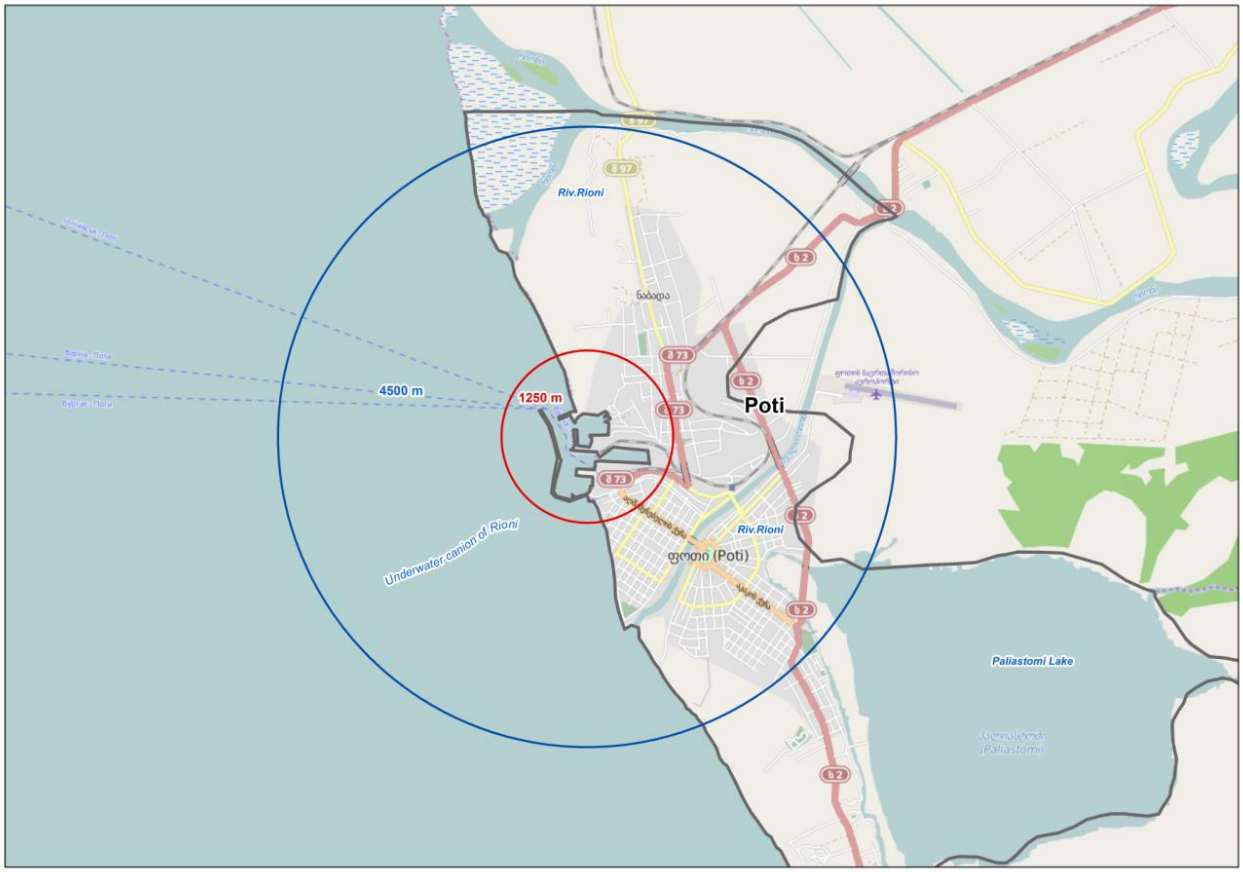


Figure 10: Study area – schematic plan

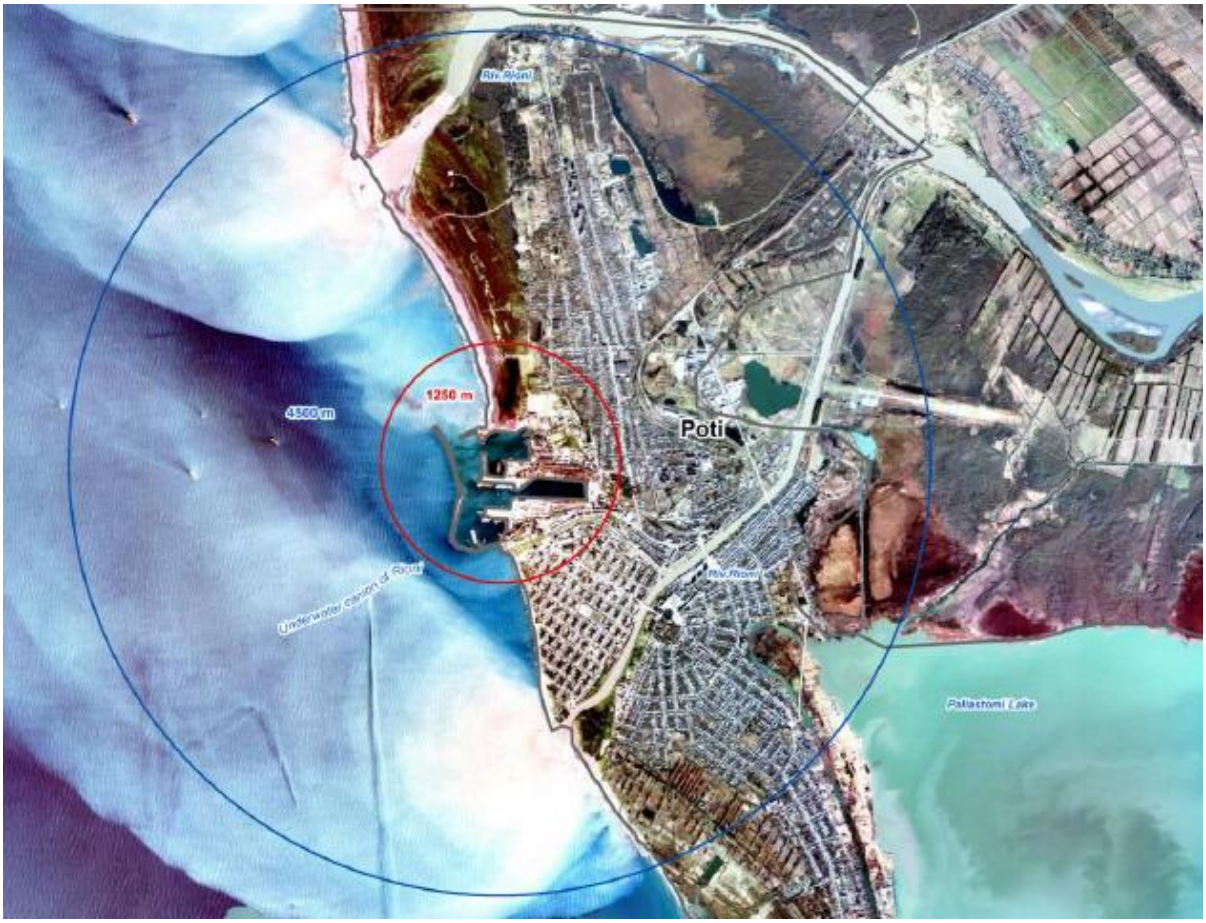


Figure 11: Study area – satellite view

8.2 Meteorological Conditions

Town of Poti is located at south-east coast of the Black Sea, which belongs to the subtropical zone. Local climate is mainly influenced by the Black Sea and the Caucasus Mountains located in the north-east that protects it from invasion of cold air masses, due to which the winter is mild and warm.

Temperature

Average monthly temperature in Poti varies from 6 to 23^{o}C, average temperature of February and August accordingly is 5.8^{o}C and 22.6^{o}C. Average annual temperature achieves 14.3^{o}C. The lowest temperature is 11^{o}C, high is +41^{o}C. The coldest month of the year is February, the warmest – July.

Kolkheti lowland is distinguished for being humid, because the Caucasus mountain range enhances condensation. The region is characterized by abundance of rainfalls and the average annual indicator amounts to 1810 mm. Their peak is in July-October. According to the data of Poti meteorological station, maximum daily amount of rainfalls is 268 mm. Average number of the rainy days is 175. Rainfall division is seasonal: as a rule, summer is more humid and rainy, than winter.

The monsoon regime of the winds is noticeably expressed in Poti region. Here the eastern winds are mainly dominated, at the same time the west and south-east winds are rather frequent. Average annual indicator of the wind velocity is 4,3 m/sec. Maximum speed of the expected wind velocity per annum amounts to 26 m/sec. Meteorological conditions

characteristic to the project area is presented in the below table (according to the data of Poti meteorological station). (Reference: “Construction Climatology” (PN 01. 05-08)).

Table 9: Ambient Air Temperature

Month Aver	1	2	3	4	5	6	7	8	9	10	11	12	Aver annual	abs max annual	abs min annual
ºC	5.7	6.4	8.8	11.9	16.4	20.3	23.1	23.5	20.5	16.5	11.9	7.9	14.4	41	-11

Rainfalls and Humidity

The study area is humid due to the air condensation processes supported by vicinity of the Caucasus Range. The region is characterized by high precipitation rates with average annual rainfall as high as 1,810 mm. The peak rainfall rates are recorded during July-October period. According to data of Poti weather station, the maximum recorded daily precipitation amounts to 268 mm. The average number of days with precipitation is 175. The precipitation pattern is seasonal, i.e., as a rule, summer and autumn are more humid compared to winter and spring.

Rainfall and humidity characteristics are given in the below tables.

Table 10: Rainfalls regime, mm

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
Average monthly	138	119	116	75	56	176	193	216	181	193	180	166	1809
Average min	10	22	13	7	4	8	9	7	7	4	3	21	3
Average max.	227	347	220	178	123	553	516	488	527	412	456	340	553
Number of rainy days	16.8	16.3	17.8	10.8	14.5	11.8	15.5	14.0	14.7	13.0	12.2	15.5	172.9

Table 11: Evaporation, humidity, moisture

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
Evaporation mm	54	51	55	60	62	62	75	70	58	60	54	54
Relative air humidity %	74	74	75	78	80	82	83	84	85	81	75	72

Wind

Wind characteristics. Nature of wind regime is mainly breezy throughout the year. Prevails East (31.3%), South-West (18.8%) and the West (15.0%) winds. Calm recurrence– 8.2%.
The maximum wind speed recorded during the observation period:

- from Land rhumbs - 40 m / s;
- from Marine rhumbs - 33 m / s.

Seasonal distribution of wind directions identified three specific periods: warm, transition and cold.

Warm Period (June, Julyand August) is characterized by the quiet wind regime when the South-West (30.1%) and the West (20.2%) wind share prevailed. The recurrence of East wind direction is up to 12.6%. The recurrence is the lowest in this period of storms (the speed of 10m/s) (3.7%) and is one of the highest (9.4%) while calm.

Transition period (March, April, May, September, October) is characterized by an abundance of east winds (constitute 29,0%). the recurrence of West and South-West winds is respectively up to 15.3% and 18.9%, storms recurrence is up to 9,2% and calms repetition is up to 8.0%. Cold period (January, February, November and December) is characterized by the abundance of East winds (52.7%). Storms recurrence is up to 14.2% and 7.2% while calm. Wind recurrence according to speed and direction is presented below in the table

Table 12: Wind speed recurrence according to directions

Highest wind speed possible 1, 5, 10, 15, and 20 once a year. m/sec				
In 1 year	In 5 years	In 10 years	In 15 years	In 20 years
26	32	34	37	38

Wind direction and calm repetition(5) per annum								
N	**NE**	**E**	**SE**	**S**	**SW**	**W**	**NW**	**Calm**
3	7	37	4	6	21	17	5	8

Average highest and lowest wind speed m/sec	
January	**July**
8,3 / 3,5	4,6 / 2,0

Storms: On average, 40 days during the year hurricane is recorded (speed - 10 m / s and more), including wind speed of at least 15-17 days to 15 m / sec. From the point of view of safety of navigation the most dangerous are winds of the western and southwest directions due to the big dispersal of waves, which recurrence respectively is 15% and 13%. The most likely timing of their actions is November, December, January. Maximum speed is 30 - 33 m / s Average duration of less than 10 hours. Maximum registered duration is 5 days and nights.

East hurricanes are fixed more frequently; their recurrence is more than 70%.Maximum wind speed is 33-40 m/s. The average length is 10 - 20 hours. Maximum duration is 7 days.

Table 13: Seasonal and directional distribution of winds, %

Period	**Direction**		**Calm**	**Wind speed, m / s**				**Total**
				1-4	**5-9**	**10-14**	**More than 15**	
Summer period (June, July, August)			9.4					9.4
	N			1.4	0.3			1.7
	Land Direction (rhumbs)	NE		3.1	0.3			3.4
		E		10.3	1.6	0.5	0.2	12.6
		SE		4.5	0.4			4.9
	S			6.8	2.8	0.8	0.1	10.5
	Marine Direction (rhumbs)	SW		20.4	8.1	1.4	0.2	30.1
		W		16.1	3.7	0.3	0.1	20.2
		NW		5.7	1.4	0.1		7.2
	Total		9.4	68.3	18.6	3.1	0.6	100
Transitional period (September, October, March, April, May)			8.0					8.0
	N			2.4	0.3	0.1		2.9
	Land Direction (rhumbs)	NE		5.4	1.2	0.1	0.3	7.0
		E		15	8.7	3.2	2.1	29
		SE		3.8	0.8	0.2		4.8
				4.5	1.7	0.5	0.1	6.8
	Marine Direction (rhumbs)	SW		12.3	5.2	1.2	0.3	18.9
		W		11.2	3.2	0.7	0.2	15.3
		NW		5.6	1.4	0.2	0.1	7.3
	Total		8.0	60.3	22.6	6.2	2.9	100

Cold Period (November, December, January, February)			7.2					7.2
	N			1.5	0.1			1.6
	Land Direction (rhumbs)	NE		6.6	1.9	0.3	0.1	8.9
		E		27	15.8	6.3	3.6	52.7
		SE		4.1	1.3	0.2	0.1	5.7
	S			2.6	1	0.2	0.1	3.9
	Marine Direction (rhumbs)	SW		3.5	2.8	0.9	0.2	7.4
		W		3.6	3.2	1.5	0.5	8.8
		NW		1.8	1.4	0.5	0.1	3.8
	Total		7.2	50.7	27.5	9.9	4.7	100

Annual			8.2					8.2
	N			1.7	0.3			2.0
	Land Direction (rhumbs)	NE		5	1.1	0.1	0.1	6.3
		E		17.3	8.7	3.4	1.9	31.3
		SE		4.2	0.9	0.1		5.2
	S			4.6	1.8	0.5	0.1	7.0
	Marine Direction (rhumbs)	SW		12.2	5.3	1.1	0.2	18.8
		W		10.4	3.4	0.9	0.3	15
		NW		4.5	1.3	0.3	0.1	6.2
	Total		8.2	59.9	22.8	6.4	2.7	100

8.3 Ambient Air Quality

According to the visual audit results, no stationary sources contributing to ambient air pollution are located within the study area. The quality of the ambient air in the study area may be affected by exhaust gases produced by machinery and transportation means operating in the sites of the nearby container terminals and production facilities, as well as by the vehicles moving along the city bypass road. It is obvious that no air quality gauging stations exist in Poti for years, and therefore practically no air quality data are available for the project impacted area. Due to such situation, it was found reasonable to apply the methodology approved by the Ministry of Environment and Natural Resources of Georgia (РД 52.04,186-89). This methodology recommends application of the population-based approach for evaluating the baseline ambient air condition for the areas lacking any observation data. Ambient air quality assessment has been made according to this methodology, based on number of the population of the settlement (see the table below).

Table 14: Recommended baseline pollution levels based on population density

Population, (thousand)	**Background level of contamination, mg/m3**			
	NO2	**SO2**	**CO**	**Dust**
250-125	0.03	0.05	1.5	0.2
125-50	0.015	0.05	0.8	0.2
50-10	0.008	0.02	0.4	0.1
<10	0	0	0	0

Note: *when assessing the impact upon the ambient air, the background pollution indicator was taken on the basis of the methodology, in consideration of the number of Poti population (53 000 person).*

8.4 Marine Sediments Quality

Proceeding from the project data of the harbors mentioned in the previous chapters, for the maintenance of the new port, which implies the non-stop movement of vessels with high displacement, dredging works are required within the boundaries of the internal water area. Mentioned works are intended to be performed on the area 17 hectares for safe movement of the vessels with high displacement, to be received to the berth. The depths within the internal water area of the new port are averagely within 4.0 meters, according to the "Environmental Audit Report for Current Operation of Port of Poti" 2009, prepared by Gamma for Poti Sea Port Corporation and ADB. The marine sediments quality has been assessed through the sampling and laboratory testing prior to planning the dredging works.

Sediment quality assessment performed in 2015:

The results of the analysis undertaken by the laboratory of Examination Center "GEOANALYTIKA" (Caucasus Alexandre Tvalchrelidze Institute of Mineral Resources of the Tbilisi State University) within the period 28.05.2015 – 05.06.2015 are presented in Tables 15 and 16. The original reports from the laboratory are attached in the Annex 1 of this study.

Figure 12: Sediments sampling locations (shown in red)

Considering that Georgia doesn't have legally adopted benchmarks for the marine sediment quality, the results in the table above are compared with the Dutch Standard as it is common currently in number of EU countries.

According to the statement received from the laboratory of Examination Center "GEOANALYTIKA" the sediments samples have been taken based on ISO5667-19 procedure. The samples have been analyzed based on
ISO 11464:2006 Soil quality -- Pretreatment of samples for physical and chemical analysis
ISO 11465:1993 Soil quality -- Determination of dry matter and water content on a mass basis -- Gravimetric method
ISO 11466:1995 Soil quality -- Extraction of trace elements soluble in aqua region
ISO 11047:1998 Soil quality -- Determination of cadmium, chromium, cobalt, copper, lead, manganese, nickel and zinc -- Flame and electro thermal atomic absorption spectrometric methods. Apparatus – Aanalyst-200 and AAC-115

Table 15: Content of heavy metals and hydrocarbons in sediments from New Port aquatory

(Dry weight – DW) (28.05.2015 – 05.06.2015)

N	Sample No:	Cu mg/kg dw	Pb mg/kg dw	Zn mg/kg dw	Ni mg/kg dw	Co mg/kg dw	Cd mg/kg dw	Mn mg/kg dw	TPH mg/kg dw
1	Samp#1	35.55	30.50	100.7	66.51	18.98	1.51	4100	93
2	Samp#2	56.1	38.15	107.6	59.0	24.68	1.84	4100	677
3	Samp#3	61.2	45.03	118.2	18.8	27.74	1.99	5400	1177
4	Samp#4	81.6	70.58	158	39.0	25.09	2.3	3850	1213
5	Samp#5	102	82.47	170	22.85	25.6	3.16	4000	4080
6	Samp#6	132.6	53.9	150	55.9	27.13	1.94	4350	2723
The Dutch target and intervention values, 2000	Target value Intervention value	36 190	85 530	140 720	35 210	9 240	0.8 12	- -	

Source: Examination Center "GEOANALYTIKA"

The water samples for TPH analysis have been taken based on ISO5667-3 procedure and analyzed under ISO 9377-2 Determination of Hydrocarbon Oil Index

The original reports from the laboratory are attached to this Package as Annex 1

Table 16: Total Petroleum Hydrocarbons in water samples (28.05.2015 – 05.06.2015)

N	Samples ##	TPH, mg/l	Intnl MTL (mg/L)	Georgia MAC (mg/L)
1	4W	12.2	0.1[6]	0.3 (see *Table 2*)
2	6W	18.75		

Source: Examination Center "GEOANALYTIKA"

According to the pre-dredging assessment performed in 2003 for the Port of Poti access area, oil content and heavy metals were detected in the extracted sediment from the port entrance channel as well. The assay was performed in the laboratory of the Department of Mineralogy and Petrology of the Technical University of Georgia in 2003. Following the world practice for sediments analysis before dredging – these data is considered outdated for the 2015 project and cannot be referred to.

The presence of heavy metals traces in sediments does not only indicate their pollution from ships, but also due to the silt brought by River Rioni from Chiatura area where there are manganese and other heavy metals ore deposits.

As it is stated in the Subsection 5.6, Georgia doesn't have any legally approved standards or benchmarks for the marine sediments quality, including maximum allowable concentrations (MAC) or maximum tolerable concentrations (MTC). However it is accepted practice that during the implementation of international projects or projects sponsored by international financial institutions (IFIs) the international best practice or best available technologies are used where national legislation doesn't cover the gaps.

Comparing the results of the sediment analysis performed in 2015 with the international benchmarks for sediments (presented in Subsection 5.6) it is clear that concentration of several metals exceeds to various extent the adopted benchmarks for maximum acceptable and maximum tolerable concentrations of the heavy metals and TPH in marine sediments – so the certain layers of the dredge sediment should be classified as contaminated.

[6]Atlantic PIRI, 2012 Risk-Based Corrective Action, User Guidance. Reference Documentation for Petroleum Impacted Sites in Atlantic Canada. Version 3.0. July 2012 (accepted by CCME for marine water – see Table A2 of Environmental Quality Standards NSE – Nova Scotia Environment)

Conclusion:

With sampling and laboratory analyses performed in the period *28.05.2015 – 05.06.2015* in the area of New Port the following was identified:

- Sediment contains contaminants Cu, Pb, Cd, THP in concentrations above the internally accepted screening levels (The Dutch Target and Intervention Values, 2000), or contaminants of the potential concerns are present in the sediment to be dredged.

The additional set of activities will be performed along the process of the additional environmental study for dredging as sampling campaign performed in 2015 resulted with the screening of the sediment quality. The "Transford" LLC shall commission a third party consultant to perform EIA of the capital dredging against Terms of Reference agreed by IFC and OPIC. The following as a minimum will be performed before dredging works commence:

- Concentrations of the contaminants of the potential concerns identified in the sediments should be compared with the baseline levels;
- Additional sampling campaign should be performed to fulfill international requirement in terms of sampling numbers required for the volume of sediment planned for dredging;
- Additional sampling would assess vertical profile of sediment in respect to presence of contaminants of the potential concerns and will estimate volumes of contaminated sediments
- Samples containing contaminants of potential concerns should be further processed by both elutriate and bioavailability tests
- Toxicity tests will be required for any of contaminants of potential concerns found to be bio-available;
- Integrate information on the characteristics of the dredged material and proposed deposit site conditions Canyon;
- Comprise a summary of the potential effects on human health, living resources, amenities and other legitimate uses of the sea and define the nature, temporal and spatial scales and duration of expected impacts.

8.5 Noise baseline measurement

According to the audit process, no fixed noise and vibration disseminating stationary sources are revealed currently within the study area. The noise is mainly disseminated due to traffic and container terminals special machinery operations.

The instrumental measurements were conducted for evaluation of background noise levels in the study area. Measurements were conducted using the noise and vibration measurement equipment - ИВШ-1 (the instrument has undergone metrological check under the established procedure). Measurements were carried out in December, 2014 during the daytime (from 11:00 to 18:00), three times a day and the average values were taken as the background indicator. Measurement results are given in the Table below:

Table 17: Noise dissemination levels research results

Point #	**Name of the point**	***Sound levels and equivalent levels of the sound, dbA (day) + night***	***Georgia noise limits, dbA***	***IFC (General EHS Guidelines) dbA***
1	Project area	39.8	70	70
2	Nearest residential zone is remote by approximately 750 m.	39.1	45(max60) (night) 55(max70) (daytime)	45 (night) 55 (daytime)

See Subsection 12.5 “Noise impact analysis” for more detailed information on noise and vibration modeling undertaken in March 2015

8.6 Natural Radiation Background

Radiation safety issues in Georgia are regulated by the laws of Georgia "On health care", Nuclear and Radiation Safety and secondary legislation: "Radiation Safety limits (RSN -2000) and "Principal Hygienic Standards Applicable to Handling Radioactive Substances and Other Ionizing Radiation Sources”.

The radiation background monitoring on the study area was conducted in September 2012, and was aimed at the study of gamma-background of the area and search for possible uncontrolled radioactive sources. It should be noted that the natural background radiation characteristic to Poti area amounts to 8-15 μR/h (micro roentgen/hour), and remains stable in recent years. The scintillation dosimeter -СРП-68-01, #3213 was used for radiation monitoring. Dosimeter is intended for radiometric gamma-background determination, for detection of radioactive deposits etc. The device allows measuring of the flow of gamma radiation from 0 to 10000 sec^{-1}(Hz) and the range of measuring of exposure dose is from 0 to 3000 μR/h (micro Roentgen/hour) or 30 μS/h(microSievert/hour).

Gamma-background monitoring was carried on by profiles, the distance between them amounted to 1.5-2.0 meters and the gamma-background measurements were carried out in the 5 points through so-called Envelope method and the intersection of diagonals.

During the measurement, sensitivity of the device СРП-68-01was periodically inspected. During the control radiation monitoring process open parts of the project area were thoroughly checked.

According to the measurement results, the radiation gamma-background on the study area amounted to 7-15 μR/h, which is typical to Poti area. No uncontrolled radioactive sources and/or radioactive pollution were identified at the territory of the Terminal.

8.7 Geology, Hydrogeology and Soils

Geomorphology and Geology

Study area is located within Kolkheti accumulated lowland. This area represents a geotectonic depression, where a large number of terrigenous materials are accumulated. Geologically, the lowland is constructed through the 10 km thick Mesozoic and Tertiary sedimentary cliffy rocks. These deposits are covered by relatively recent Pliocene terrigenous material, with thickness of 1.0 kilometers. Kolkheti tectonic submergence is continuing in the modern geological epoch, accordingly, sand-clayey sediments formation is on-going. The main role belongs to the lacustrine marshy sediments, the capacity of which in some places is 35-40 meters. The following types of terrain are separated within the area of Kolkheti lowland:

- Black Sea shore modern dune strip - which follows the coast and consists of 1-3 m high and 30-100 m wide sand dunes;
- Rioni River alluvial plain, flat terrain, slightly descended to the west (0.0003-0.0005), with absolute altitude 0-18m;
- alluvial plain and alluvial-marine lowland, which is almost flat and complicated due to former rivers, inter-river depressions, weakly expressed riverbeds and drainage channels

The lowland is slightly inclined towards the sea; its average slope is 0.0005 meters. Western part is composed of wetlands. From the east to the west its absolute altitude varies from 10-18 m to 0-3 m. Within the boggy deposits, the terrain is composed of the peat domes elevated 3.04 m higher above the wetland surface. The selected geographical location for construction of the project terminal belongs to Kolkheti Lowland by its geo-morphological view point. The terrain is even. Due to the geotechnical location it belongs to the Kolkheti sub-district of the western depression zone of the Georgian Block. The geological structure of the region is composed of quaternary deposits, which are attributed to the alluvial soils due to the genetic origin, with thicknesses exceeding several tens of meters.

Engineering Geology

Information on the engineering - geological data within the water area of the new port is not available. In conjunction with the technical-capacities for fulfillment of the construction-reconstruction works of the multifunctional transshipment complex, the physical-mechanical data of the rocks participating in the geological construction of the nearby areas might be taken into account. However, before commencement of the project works, it is expedient for the significant sections of the complex, to additionally research the engineering-geological conditions particularly to the sections of the harbor reconstruction.

In the period from October to December 2014 Ltd "GeoTechService" took over the full range of engineering-geological studies in the sea port of Poti, in so-called new port area (former shipbuilding factory) to assess the endurance of existing soil (field, laboratory and desk studies). The overall objective of the work was the reconstruction of the former factory and organization berth N1 for receiving vessels with a large displacement in its place. Engineering – geological investigations were conducted both in land area, as well as in marine waters.

The overall objective of the Project is reconstruction of the pier of the former Shipyard #201 and construction of berth #1 in place for the reception of ships with large displacement. Engineering-geological work was carried out inthe land and maritime domain area.

In particular nomenclature varieties of soils were determined and seven engineering-geological elements were identified (hereinafter GE) as a result of processing existing source material field and laboratory research materials:

GE 1. Technogenic soils (cobbles, gravel, sand, construction residuals and others):

GE 2. Sandy silt, gray -bluish, saturated;
GE 3. Dark gray clay, soft plastic, gleizated with thin middle layers of sand and clayey sand and lenses (0.1-0.3m);
GE 4.Clayey sand, dark gray, gleizated, plastic, with middle layers of soft plastic clay and fine grained sand and lenses;
GE5. Clayey sand, dark gray, fine grained, gleizated, medium dense, with shell debris inclusions;
GE 6. Sand, dusty, dark gray, gleizated, medium density, saturated, shell debris inclusions, with middle layers of soft plastic clay and lenses;
GE 7. Sand, fine grained, dark gray, gleizated, medium density, shell debris inclusions, with middle layers of soft plastic clay and lenses with 0.2-0.5 capacity, saturated;

Conclusion:

1. According to the above, seven engineering-geological elements were detected in depth research of investigation of the studied area;
2. Studied area belongs to the climatic region III and III b sub-region;
3. From the geomorphologic point of view, the proposed research area is located in western depression zone of Kolkheti Lowland, in Black Sea aquatory;
4. The geological structure of the district is composed of quaternary deposits with thicknesses exceeding several tens of meters;
5. According to deformity GE3 GE4 GE5 soils belong to the group of compressible soils;
6. According to data of Standard penetration trial -GE 1 techno genic soils belong to the group of soft consistency. GE 2 – lamas belong to flows of plastic consistency, GE 3 - clays to hard plastic groups, GE 5, GE 6 and GE 7 to medium density soils group;
7. According to Seismicity GE-1, GE -2, GE -4, GE -5 and GE -6 soils belong to the category IV (GE -4, GE -5 and GE-6 are tend to liquefy). GE- 3 clays and GE - 7 sands belong to category III;
8. Studied area (Poti # 2633) is located in the 8-point seismic area, seismicity dimensionless coefficient of 0.15;
9. Chemical composition of water salinity type is chloride, sodium-potassium;
10. The waters are not aggressive, they only show weak aggressiveness according to hydrogen -ion indicator;
11. The level of environmental aggression on metal structures - reinforced concrete mountings is weak while being constantly in the water, while being periodically wet is strong enough;

Soils

In Poti and its surrounding area wet meadow, slimy wetland, wetland sod and alluvial wetland soils are spread:

Wet meadow soils are characterized by uneven mechanical composition. Those soils within Rioni River lowland boundary are sandy. They are formed in the initial stage through direct participation of forest cover.

Slimy wetland soils are mainly disseminated between the rivers Rioni and Khobi. Those soils are clayey, but according to the mechanical composition, they belong to dusty light loams.

Alluvial wetland soils are prevalent in inter-river lowland, where from time to time, the disperse particles of suspended sediments become of very thin layers during floods. Therefore, these soils have clayey composition. These soils have only slight carbonate content.

Wetland soils are mainly common to the western part of the territory. Such soils are originated in result of decaying of the vegetation cover developed over the old inundated areas, while deterioration of the aeration regimes facilitated accumulation of the dead vegetation layer. These processes worsen the surface runoff dynamics and support to intensification of the swamping. Natural layer of soil does not practically exist on the research territory, because a few decades ago, when the existing enterprise was being installed here, vertical planning activities were being performed and a large number of inert materials were brought in. There are prevail alluvial-wetland soils in the surrounding areas

The surface soil samples were tested in laboratory to determine the baseline pollution of the study area with hazardous substances

Soil samples were also taken during the audit of the site in order to assess the soil quality in the research area. The results of the soil samples analysis undertaken in the laboratory of Examination Center "GEOANALYTIKA" (Caucasus Alexandre Tvalchrelidze Institute of Mineral Resources of the Tbilisi State University) within the period 28.05.2015 – 05.06.2015 are presented in Table 18 below. The original reports from the laboratory are attached as Annex 1 of the study.

Table 18: Heavy metals concentration in soil samples from Terminal area (Phase-I)

#	Sample identification name according to sampling map	Cu, mg/kg	Pb mg/kg	Zn mg/kg	Ni mg/kg	Co mg/kg	Cd mg/kg	Mn mg/kg
1	**EAR1**	505	323	701	48	24	2.9	4600
2	**EAR2**	1262	929	2378	30	26	5.05	5000
3	**EAR3**	65	27	89	42	20	1.46	1000
MAC (Georgia)		132	130	220	80	-	2	-
MAC (Dutch Standard)		36	85	140	35	9	0.8	-
MAC (EU)		140	300	300	-	-	3.0	-
MAC (UK)		63	70	200	-	-	1.4	-
MAC (US)		80-200	300	200-300	-	-	3.0	-

Note: *International values are quoted from Civil and Environmental ResearchISSN 2224-5790 (Paper) ISSN 2225-0514 (Online)Vol.6, No.10, 2014 "Environmental Burden of Heavy Metal Contamination Levels in Soils…"*

Figure 13: Soil sampling locations

Note: Samples are taken from the new port area, in the vicinity of the old workshops

Conclusion: According to the results given in the table, the certain level of historical contamination with toxic metals and TPH has been observed in surface samples of the soil, taken from the research area. Removal of the contaminated layers of the exposed soil from the territory of Terminal, their adequate treatment or disposal at licensed for remediation place may be considered prior to starting the construction works..The area allocated for the Project Phase-II (shown within blue frame at the figure below) is covered by asphalt and concrete pavement. The additional soil sampling will be undertaken when the Phase-II design is completed.

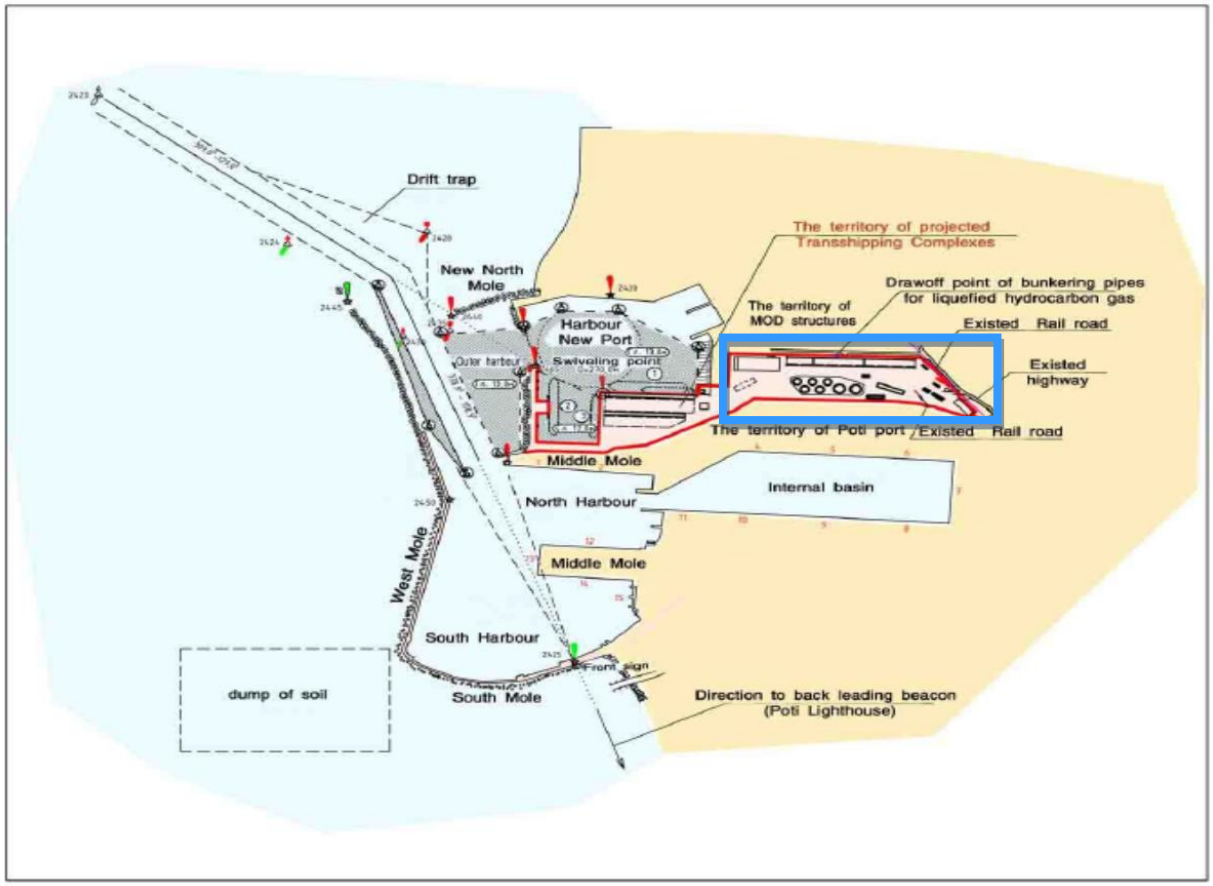


Figure 14: The area of project site allocated for the ProjectPhase-II (shown in blue frame)

Hydrogeology

The study area is located on the Black Sea coast, in the accumulation plain, in formation of which the river Rioni made a significant contribution. Close to the study area, on the eastern side about 400 m away there is the so-called "Gazkantora" lake, to the south east and south - the south branch of the river Rioni and then the Paliastomi Lake. Hydro-geological and hydrological conditions of the study area are formed under the influence of hydrological objects. Below is given the general characterization of the area.

According to the hydrological regionalization of the territory of Georgia by the academician I. Buachidze, on the territory of the western part of the Kolkheti artesian basin, River Rioni flows downstream recent alluvial sediments water containing horizon Modern Sea coastline and modern marine alluvial aquifer formations. Hydro-geological characterization of the Modern marine sediments and lake-swamp aquifer sediments are given in Table below:

Table 19: Geomorphology

#	Catchment rainfalls age and lithology	Area of dissemination	Capacity in meters	Chemical composition
1	Modern alluvial formations Aquifers (sands, shingles, clay)	Across the river Rioni, in the form of a narrow strip	10 - 15	M0.3-0.6 HCO3 Ca/Mg
2	Black Sea coast modern marine sediments and alluvial aquifers (sands, silt)	Across the Black Sea in the form of a narrow strip	5 - 10	M0.3-0.6HCO3 Ca/Mg
3	Modern water-bearing formations marsh horizon (sands, clays, peat)	Within the area of Kolkheti lowland	5 - 30	M0.3-0.6HCO3 Ca/Mg

The recent alluvial aquifer sediments horizon of the River Rioni flow downstream is built of shingles and shingles-rock material, sand, clay and sandy area filler. Ground water levels are allocated on 0.5-2 m depth, water permeability is high (1-3 m / day), the chemical composition is of calcium bicarbonate. Modern marine and alluvial aquifer formations of the Sea coastline aquifer horizon go through as a narrow strip (200-500 m) along the Black Sea coast and high filtration features. Sea coastline and alluvial sedimentary formations of the coastal dunes are several parallel series of 2-3 meters above sea level. The coastal strip is composed mainly of sandy-silt sediments with dunes.

Such formations perform the role of a significant wall between the sea waters and ground waters. Ground water level averagely varies between the ranges of 0.5 – 1.36 m. Low levels of ground water falls mainly in the summer, high - in winter and late in autumn. It is fed in the elevated parts of dunes and discharged in both marine and Kolkheti lowland side.

Modern marine-alluvial aquifer and lake-marsh sedimentary rock horizon's lithological composition is quite complicated:

There are sandy, loamy soil, wetland sapropellous silt, clay and peat layer to form a mixed alluvial and marine origin of the fine sands. All these bedrock aquifers represent a single homogeneous aqueous. Among them the water consistent are: sand and sands layers and lenses, which have a high permeability (0.1-1.0 m/day); Also marshy formations, such as the marshy clay, silt and clay sandy area with minor water permeability (0.035-0.3 m / day). Sedimentary marshy zone of the groundwater level is high (1.0- 0.5), which often reaches the earth surface and bogging is a major factor. Horizon water resources 0.1-1.0 l / s range. In addition, groundwater is characterized by a slight gradient from east to west, and their movement is very slow. Feeding of the horizon far exceeds its discharge.

8.8 Seismic Conditions

Territory of Georgia is the part of the Caucasus seismically active region and belongs to the seismic belt of the Mediterranean.Its seismic and technical movement and activity is closely connected with the movement of the flagstones of the neighboring Europe-Asia and Africa-Arabia.

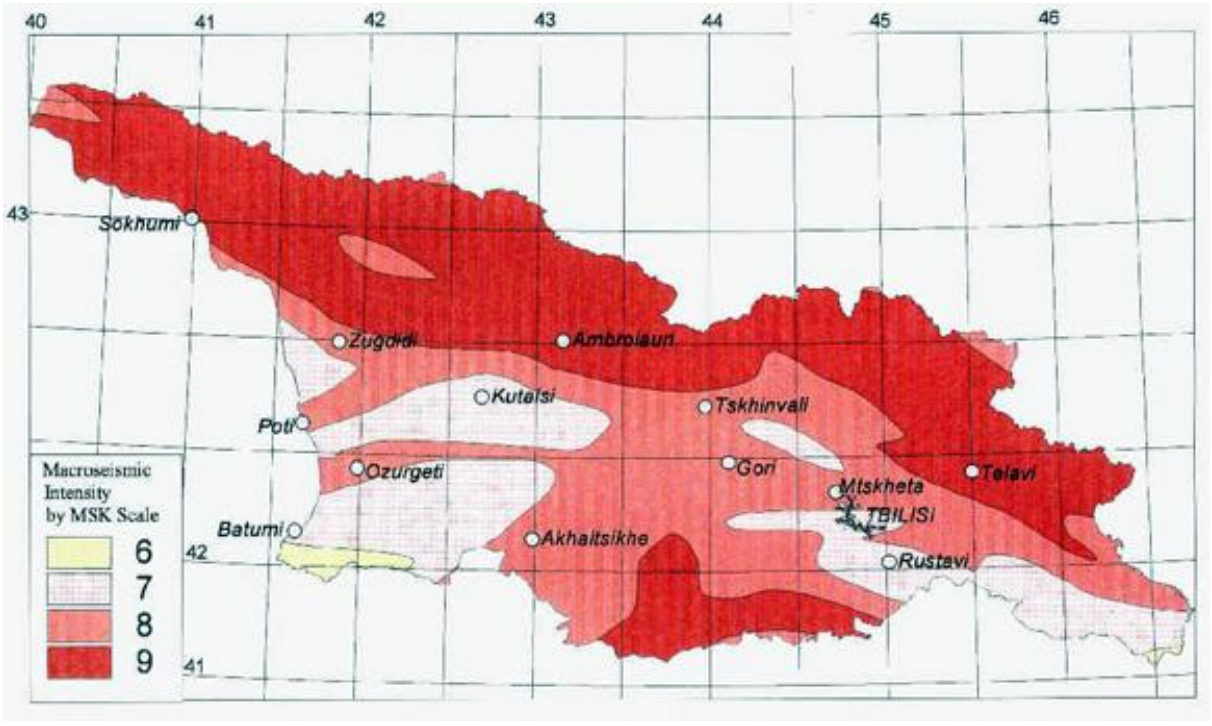


Figure 14: Georgia seismic zoning and risk assessment maps Source:

Seismicity of the soils for foundation arrangements has been defined at construction site according to seismic intensity zone 8 and soils physical-mechanical properties. (PN 01.01-09). According to Seismicity GE-1, GE-2, GE-4, GE-5 and GE-6 soils belong to the category IV (GE-4, GE-5 and GE-6 are tend to liquefy). GE-3 clays and GE-7 sands belong to category III.

It is difficult to identify the amount of the material damage caused as a result of such events. In addition, it will be difficult to assess the negative impact upon the natural and social environment. It will be dependent upon the construction quality. That is why the project stipulates that reconstruction-construction of all types of structures should be conducted in consideration of the conditions of the existing seismic risks and in full compliance with the construction norms.

According to the seism tectonic distribution map of Georgia, Samegrelo region, including city Poti, belongs to the Central Caucasus, Colchis depression and the Black Sea coastline. By tectonic development the most part of Samegrelo land is included in Colchis tectonic depression, which is bordered on the west by the Black Sea basin and to the north Panavi and Samegrelo (Egrisi) ranges, within which the deep fault is located. According to researchers and specialists the most of the earthquakes of Samegrelo zone should be linked to the boundaries of this area.

Based on historical materials, no information has yet reached associated with earthquakes in Poti. As for the recent period, on the basis of macro seismic analysis of the materials, in the list of locations where the maximum intensity of earthquakes was recorded, city Poti and its closest localities are also considered. The earthquake magnitude was observed within 4-5points, which did not cause significant damage.

8.9 Hydrological conditions

Sea level

In Poti port aquatory the sea-level variation has a periodic and non-periodical character.

Periodic variability is dependent upon fluctuations of the water balance and is of the seasonal nature. The aforementioned mostly depends on the seasonal hydrological regime of the river Rioni stream.

Non-periodical nature of the sea level is caused due to the anebarial processes and intensive movement of sea waves, which is distinguished for the significant amplitude and high intensity of the levels variation. According to perennial data, levels amplitude variation in the port water area reaches to 174 cm. As a rule, minimal amplitude of the levels variation is observed in October-November (during the period of dominant winds of eastern direction), maximal – mainly in June-July (during the period of dominant winds of western direction),

In accordance with the Baltic heights of 1950, Poti Port is adopted as minus 0.861 meters related to “0” sea level. Maximum sea level of the port related to „0“is 1.54 meters, minimal level- minus 0.20 meter. Information related to natural hazards is reflected in the following chapter on ", natural disasters, floods and coastal elution."

Sea Roughness

The situation related to the sea roughness in Poti Sea Port area is induced by the wind generated roughness and calm sea condition (hovering). According to the multiyear observation data, through average annual distribution, according to the sea storm repetition, the roughness caused by wind amounts is 44%, and the sea calm condition - 56%.

The avanport is protected from the direct exposure to the open sea waves by the West and North restrictive sea breaks. As for the new port waters, it is additionally protected by #1 and #2 sea breaks. Waves that meet the parameters of the new port area are given in the table:

Table 20: Sea Roughness

Wind (disturbance) direction	Waves height Meter	Average length of waves Meter	Average period of waves Second
N/W	1.00	85	8.0
W	1.20	90	8.3
S/W	1.00	85	8.0

Sea water salinity and currents

Poti coastline is characterized by salinity of the sea water desalination, which is caused by impact of the river Rioni. Average salinity of the sea water around the area amounts to 15.2%. In the coastal zone two main types of sea current is observed:

- Sea flow, caused by the general circulatory flow of the Black Sea waters and is directed from the south towards to the north;
- Local currents caused by a number of hydro-meteorological factors, including storm, wind, tides and other waste flows.

Wind-induced currents are formed on the horizontal surface and coincide with the wind directions.

8.10 Modeling of Wave Parameters

Modeling for Terminal project area was performed by design and scientific-research institute "Chernomorniiproject" (Odessa) in 2014. For modeling of wave parameters the design parameters of waves at Poti port approaches are used. Sea disturbance was estimated in dangerous stormy west and north-west wind directions, providing 4 % of wind velocity. Modeling was performed for two nested depth grids with spacing of 50m and 10m respectively. The electronic depth map was used for the rough calculation (coarse grid), the results of which were entered into the file of more precise calculation of characteristics (fine grid), which applied more detailed electronic map of the sea-floor relief. At the same time wave parameters at the boundaries of this aquatic area were taken from the so called rough calculation. Modeling was performed from the deep water area to the shore using command NEST.

For modeling of the wind wave as initial data there were used design parameters of the wind wave on the deep water at the end of the generation zone. Calculation of wave parameters was carried out by the detailed way (drawing seven beams from the reference point at intervals of 22.5 degree) using formulas, on the basis of which the graphs are constructed in the annex to Construction Rules and Regulations (СниП 2.6.04-82*).

Design parameters of waves are defined by using design wind velocity V.
Mean height of wave $\bar{h}$ at the depth of d > 500 m is defined by the following formula:

$$\bar{h} = 0.16\frac{V^2}{g}\left[1 - \frac{1}{\left(1 + 0.006\sqrt{gL/V^2}\right)^2}\right], \qquad (1)$$

Where: L is wind acceleration distance;
g is acceleration of gravity.

At the depth of d< 500 m the height of wave is multiplied by coefficient K_d, calculated by the following formula:

$$K_d = th\left[0.625\left(\frac{g \cdot d}{V^2}\right)^{0,8}\right] / \left[1 - \frac{1}{\left(1 + 0.006\sqrt{gL/V^2}\right)^2}\right], \quad (2)$$

Mean wave period is defined by the formula:

$$\overline{T} = \left[6.2\pi\left(\frac{g\bar{h}}{V^2}\right)^{0,625} \cdot V\right] / g, \quad (3)$$

Mean wavelength is defined by the formula:

$$\bar{\lambda} = \frac{g}{2\pi}\overline{T}^2, \quad (4)$$

Mean wavelength at the design point taking into account parameters for each of the seven beams was defined by formula (152) of Construction Rules and Regulations (СниП 2.6.04-82*) for the complex configuration of the shore line:

$$\overline{h_d} = 0.1\sqrt{25\overline{h_1^2} + 21\left(\overline{h_2^2} + \overline{h_{-2}^2}\right) + 13\left(\overline{h_3^2} + \overline{h_{-3}^2}\right) + 3{,}5\left(\overline{h_4^2} + \overline{h_{-4}^2}\right)} \quad (5)$$

Where $\overline{h_n}$, m, (when n = 1; ±2; ±3, ±4) – mean wavelengths, which must be admitted for design wind velocity and projections of L_n, m on the direction of the main beam, which coincides with the wind direction. Beams are drawn from the design point to the shore line with the interval of 22.5 degree from the main beam.

Design parameters of waves at the approaches of Poti Port (calculated according to Construction Norms and Rules 2.06.04-82*) are represented in Tables 21 and 22

Table 21: Wind of north-west direction

H, m	F%	V, m/sec	h, m	τ, sec	λ, m	$h_{2\%}$, m	$\tau_{2\%}$, sec	$\lambda_{2\%}$, m	$h_{4\%}$, m	$\tau_{4\%}$, sec	$\lambda_{4\%}$, m
60	2	20	4.51	10.03	157.09	8,47	14.86	344.97	7.84	14.17	313.56
	4	18	4.04	9.61	144.25	7.57	14.23	316.19	7.01	13.57	287.49

Table 22: Wind of the west direction

H, m	F%	V, m/sec	h, m	τ, c	λ, m	$h_{2\%}$, m	$\tau_{2\%}$, c	$\lambda_{2\%}$, m	$h_{4\%}$, m	$\tau_{4\%}$, c	$\lambda_{4\%}$, m
60	2	30	6.13	10.98	188.18	11.50	16.26	413.07	10.66	15.50	375.42
	4	28	5.88	10.88	184.74	11.02	16.10	405.11	10.21	15.36	368.31
30	2	30	3.67	7.96	99.12	6.89	11.80	217.58	6.38	11.25	197.78
	4	28	3.55	7.94	98.48	6.67	11.76	216.20	6.17	11.22	196.53

Heaving of the sea in front of the new north pier up to the depth of 2m during storms from the north-west direction with the frequency once in 25 years (4%) will have the following parameters:

Table 23: Wave elements

SURF ZONE: WAVE ELEMENTS	
Number of breakdowns	3
Depth of the 1st breakdown	7.25
Wave height in the zone of the 1stbreakdown	5.46
Depth of the 2nd breakdown	4.74
Wave height in the zone of the 2nd breakdown	3.76
Depth of the 3rdbreakdown	3.1
Wave height in the zone of the 3rd breakdown	2.45

The comparison of the obtained data with the field of wind-induced waves SWAN for the given depths and directions showed the convergence of them, that the applied model is acceptable.

Software SWAN

From the existed native and foreign methods of calculation of the field of wave heights the most representative is the method of mathematical modeling of the wind-driven wave in the coastal zone of the sea, represented in the form of the computer program SWAN, worked out by the Technological University of Delft (Holland) and published for free use. The program SWAN is based on the solution of equations considering the spectral distribution of wave energy, the sea-floor relief and the shore line. In calculating the field of wave heights the transformation, refraction and diffraction of waves (including in the presence of artificial facilities) are taken into account

Feeding of waves with wave energy in the program SWAN is defined as the resonant interactionof the surge and the wind. Besides the increase of the wave energy is defined as a sum of linear and nonlinear interactions, in which wave frequency and its direction are interacting with the wind velocity and its direction.

$$S_{in}(\sigma,\theta) = A + BE(\sigma,\theta) \qquad (6)$$

Effects A and B in the program SWAN are defined in compliance with the local velocities and directions. In the calculation the velocity and its direction is admitted to be at the height of 10 m above the sea surface using the research results of Janssen, published in 1991.

The process of increase of the wave energy is described by the equation:

$$S_{in}(\sigma,\theta) = A + BE(\sigma,\theta)$$

In this equation parameter A implies linear interactions and BE – nonlinear interactions. It should be noted that in the present program the wind velocity at altitude of 10 m is used as a design velocity and the velocity at the surface of the sea is calculated by the following equation:

$$U_*^2 = C_D U_{10}^2, \qquad (7)$$

Where

C_D is a drag coefficient, defined from the following interrelations:

$$C_D(U_{10}) = \begin{cases} 1.2875\times10^{-3} & for \quad U_{10} \prec 7.5\ m/s \\ (0.8+0.065s/m\times U_{10})\times10^{-3} & for \quad U_{10} \geq 7.5\ m/s \end{cases}$$

Linear component of equation (6) A – is defined from the following expression:

$$A = \frac{1.5\times10^{-3}}{g^2 2\pi}\left[U_* \max\left[0,\ \cos(\theta-\theta_w)\right]\right]^4 H$$

$$H = \exp(-(\sigma/\ \sigma^*_{pm})^{-4}) \qquad with \quad \sigma^*_{pm} = \frac{0.13g}{28U_*}2\pi \tag{8}$$

Where

θ_w is a wind direction,

H is a filter with peak frequency σ_{pm}

For defining exponential effects of the wind to the water surface two types of equations can be used. The first equation is the following:

$$B = \max\left[0,\ \ 0.25\frac{P_a}{P_w}\left[28\frac{U_*}{C_{ph}}\cos(\theta-\theta_w)-1\right]\right]\sigma \ , \tag{9}$$

Where: C_{ph} is a phase velocity; P_a and P_w- density of air and density of water respectively.
The second equation takes the following form:

$$B = \beta\frac{p_a}{p_w}\left(\frac{U_*}{C_{ph}}\right)^2 \max\left[0,\ \ \cos(\theta-\theta_w\right]^2\sigma \ , \tag{10}$$

β isa Mills constant, depending on no dimensional height λ :

$$\beta = \frac{1.2}{k^2}\lambda\ln^4\lambda, \qquad \lambda \le 1$$

$$\lambda = \frac{gz_e}{C^2_{ph}}e^r, \qquad r = kc/\left|U_*\cos(\theta-\theta_w)\right| \tag{11}$$

k is a Karman constant, equal to 0.41;

z_e *is a* coefficient characterizing effective roughness of the water surface. In the case when the no dimensional height λ >1, constant β is taken equal to 0.

Janssen (1991) considers that vertical profile of velocities is given by the following equation:

$$U(z) = \frac{U_*}{k}\ln\left(\frac{z+z_e-z_0}{z_e}\right) \tag{12}$$

Where U (z) is a wind velocity at elevation Z (in SWAN it is taken to be 10 m) above sea level, z_0 are the roughness sizes.
Effective size of roughness z_e depending on z_0 and wavy water surface, affected by T_w and the value of *T,* is defined by the following equations:

$$z_e = \frac{z_0}{\sqrt{1-T_w/T}} \qquad \text{and} \qquad z_0 = \hat{\alpha}\frac{U_*^2}{g} \tag{13}$$

The second equation includes constant $\hat{\alpha}$, which = 0.01.

Effect upon sea disturbance is given by vector $\underline{T}_w$, which is defined by the following equation:

$$\underline{T}_w = \rho_w \int_0^{2\pi} \int_0^{\infty} \sigma B E(\sigma,\theta) \frac{\underline{k}}{k} d_\varsigma d_\theta \tag{14}$$

U_* Can be defined from the wind velocity - U_{10} and seaway spectrum data $E(\sigma,\theta)$ from the above represented equations.

Wave energy losses, which are due to three reasons,*are also taken into account*. These are disruption (dispersion) of storm wave crests $S_{ds,w}(\sigma,\theta)$, breaking (surf) waves, caused by the influence of critical depths $S_{ds,br}(\sigma,\theta)$ and the roughness of the seabottom $S_{ds,b}(\sigma,\theta)$.

Energy losses caused by disruption (dispersion) of wave crests are defined by the following equation:

$$S_{ds,w}(\sigma,\theta) = -\Gamma \tilde{\sigma} \frac{k}{\tilde{k}} E(\sigma,\theta) \tag{15}$$

Where *Γ*is a coefficient considering wave steepness; *k*is a wave number; $\tilde{k}$ is a considering relationship between wave frequency and its wave number.
On certain conditions for defining energy losses caused by dispersion of wave crests alternative formula are used:

$$S_{st}(\sigma,\theta) = \int_0^{\sigma} \int_0^{2n} k^2 \left|\cos(\theta - \theta')\right|^m E(\sigma,\theta) \tag{16}$$

In this equation the value of coefficient *m* according to the results of various researches is changing from 1 to 10 (in SWAN it is admitted equal to 2) or by the formulae:

$$S_{wk}^{st}(\sigma,\theta) = -C_{wc}^{st} S_{wc}^{st} E(\sigma,\theta) \tag{17}$$

using its appropriate coefficient C_{wc}^{st}.

Wave energy losses in the surf zone, due to the influence of the sea bottom, depends on the roughness of the sea bottom, mobility of the soil covering the sea bottom floor and its filtering property. For the shelf of continental seas with sandy bottom the predominant mechanism of influence is the roughness of the sea bottom. For this case the losses caused by the influence of the bottom are defined by the following equation:

$$S_{ds,b}(\sigma,\theta) = -C_{bottom} \frac{\sigma^2}{g^2 \sinh(kd)} E(\sigma,\theta) \tag{18}$$

Where: C_{bottom} is a friction coefficient of the sea bottom.
Hence in the present program of calculation of the wave field the following formula is used:

$$S_{ds,br}(\sigma,\theta) = \frac{D_{tot}}{E_{tot}} E(\sigma,\theta) \tag{19}$$

where E tot is a total wave energy; *D tot*– total losses of wave energy.

The value of *D tot* depends on the ratio of the maximal height of the breaking wave to the depth of its breakdown. In the present program this ratio is admitted to be 0.73.

The influence of such hindrances as water breakers and moles upon the wave parameters is also consideredin program SWAN. Such types of facilities are considered if calculation steps are significantly less than extensions of water breakers and moles. We observe this condition, as the admitted step of calculation is 10m.

Besides, the changes in wave parameters on the front side of the hindrance (wave height increase due to refection) are calculated as well as their diffraction in the rear of this facility. Formulae similar to those calculations, on which design charts in 2.06.04-82* are based are usedfor calculations

$$K_{\partial u\phi} = 0.5\left[1-\sin\left(\frac{\pi}{2\alpha}\left(\frac{F}{H_i}+\beta\right)\right)\right] \quad -\beta-\alpha<\frac{F}{H_i}<\alpha-\beta$$

where $K_{\partial u\phi}$ is diffraction coefficient; H_i is a height of incoming (significant) wave;
$F = h - d$ is an elevation of the mole crest above the sea level.

On defining calculation opportunities the values of α and β are taken according to the construction of the facility and the steepness of the frontal slope of the filling facility:

Facility type	α	β
Thin vertical wall	1.8	0.1
Solid masonry	2.2	0.4
Filling with gradient 1: 3.2	2.6	0.15

SWAN has an option sharply estimating nonlinear interactions of waves in the wave system by using Boltzmann integral and the program FD-RIAM, offered by Hashimoto in 1998.

The above presented equations are solved in each nodal point of the investigated water area. The results of the calculations are presented in the form of tables, which have information on coordinates of each nodal point and parameters of wind-driven waves calculated for it. Tables, on the basis of which plans of the fields of wave heights are built, are recorded on a magnetic carrier and can be sent to the customer at request.

Analysis of the results of model calculations

According to the results received from the calculations, there are modulation of the fields of wave heights of 4% provision in the system of waves running one after another under storms of 4% provision from hazardous wave directions presented in Tables 3.1 and 3.2 below.

Storm of the west direction

The results of calculation of the heights of wind-driven waves under the effect of the west wind of 4% provision in the regime when the wind velocity is 18 m/sec performed based on *Combined Refraction/Diffraction Model REF/DIF 1 version 2.5. Documentation and User's Manual. CARC Report № 94-22. -17 p. and the SWAN. User Manual SWAN Cycle III version 40.51Delft University of Technology. 2006. 129p* showed that as a result of transformation and refraction of waves over the underwater slope from the deep water to the entrance of Poti port height is decreasing from 6m to 1.2m.

At the north extreme end of the old north mole at the entrance to the harbor a wavefield of 0.8m height is formed as a result of diffraction.

The further transformation of waves in the port water area, including diffraction, leads to gradual decreasing of the height of waves up to 0.4m at the entrance to the water area of the New Port harbor. In the water area of new port harbor itself under the conditions of roughness and west wind of 4% provision, the calculated wave height does not exceed 0.2m.

The waves of more than 6m are spread under the effect of storm waves of the north-west direction from the deep areas. Their height is decreasing to 1.6m as a result of transformation and refraction at the entrance to the port (calculated height according to СниП – 1.72м).

The wave height at the north extreme end of the old north mole is 1.2m as a result of diffraction and formation of a field of high waves.
At the entrance to the water area of new port harbor the height of waves is decreasing to 0.6-0.4м. Transformed waves of 0.2-0.4m height are getting into the water area of the New Port harbor.

The points of the wave height monitoring are chosen in the water area of Poti port and the New Port harbor. Results of modeling are summarized in Tables 24 and 25

Table 24: Storm of west direction of 4% provision, wind velocity 28 m/sec

Points #	h, м	$h_{4\%}$, м
1	0.69	1.29
2	0.20	0.38
3	0.10	0.18
4	0.12	0.23
5	0.06	0.11

Table 25: Storm of north-west direction of 4% provision, wind velocity 18 m/sec

Points #	h, м	$h_{4\%}$, м
1	1.24	2.47
2	0.31	0.62
3	0.16	0.31
4	0.21	0.42
5	0.09	0.18

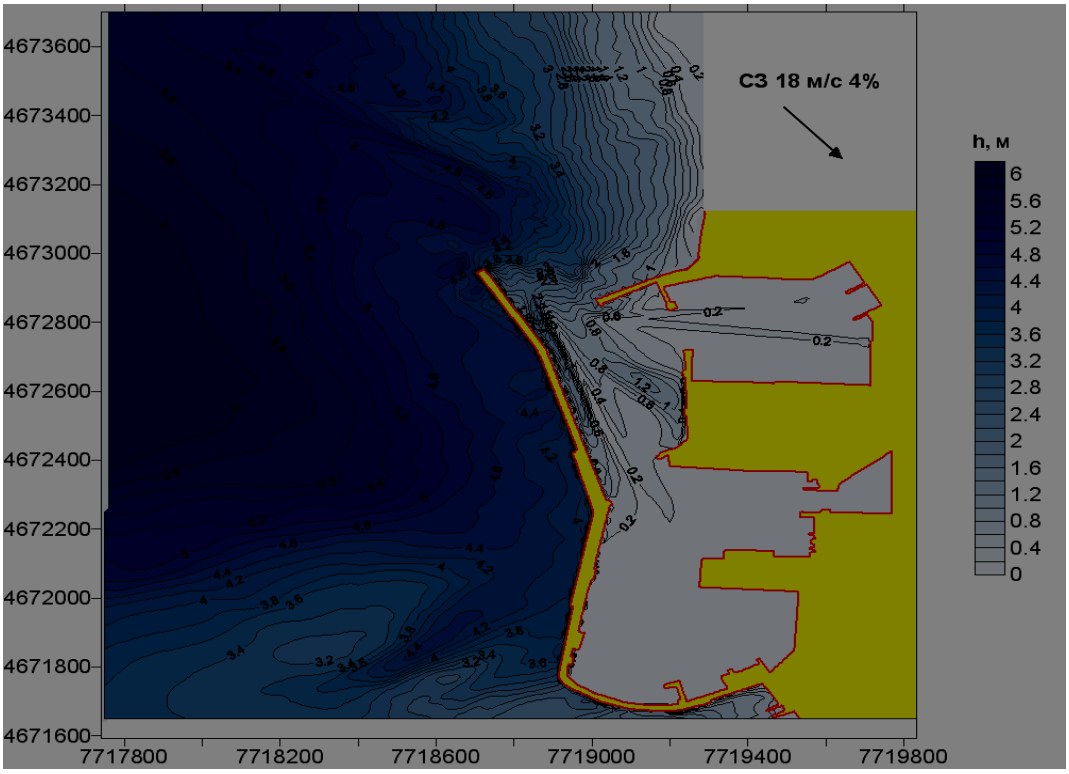


Figure 15: Field of wave heights 4% of the west direction, wind velocity 18 m/sec

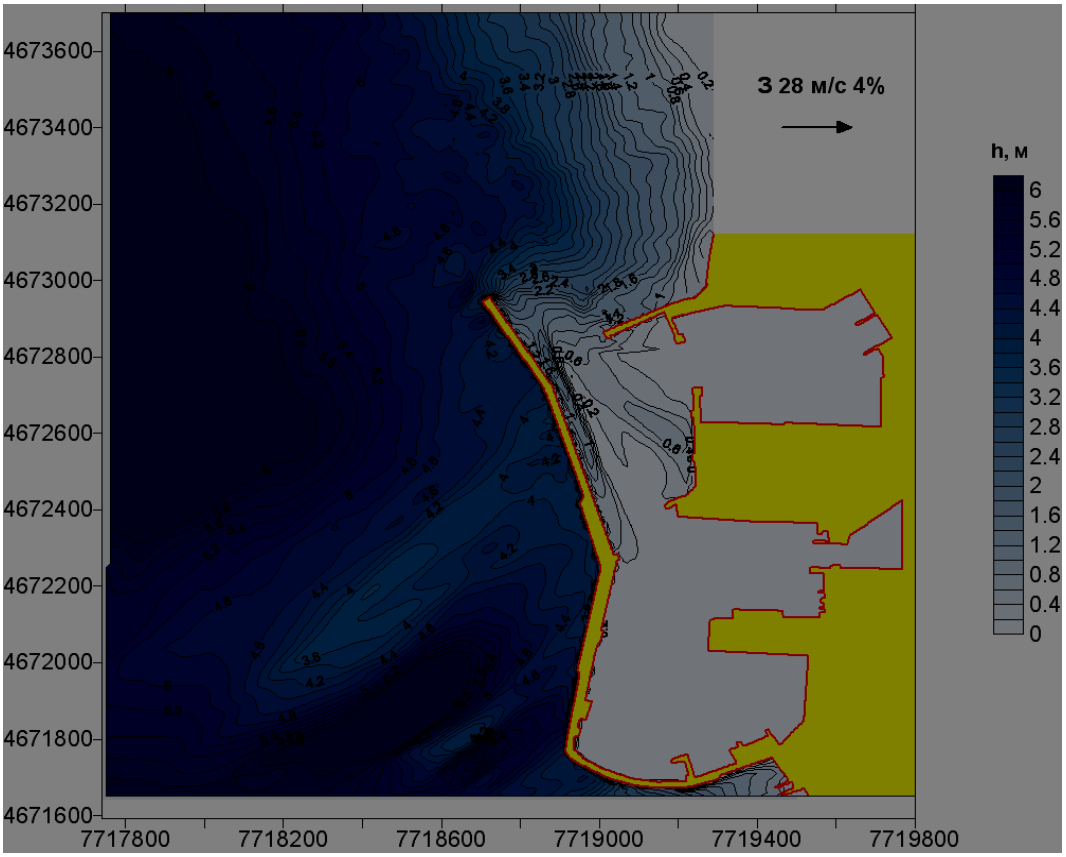


Figure 16: Field of wave heights 4% of the north-west direction, wind velocity 18 m/sec

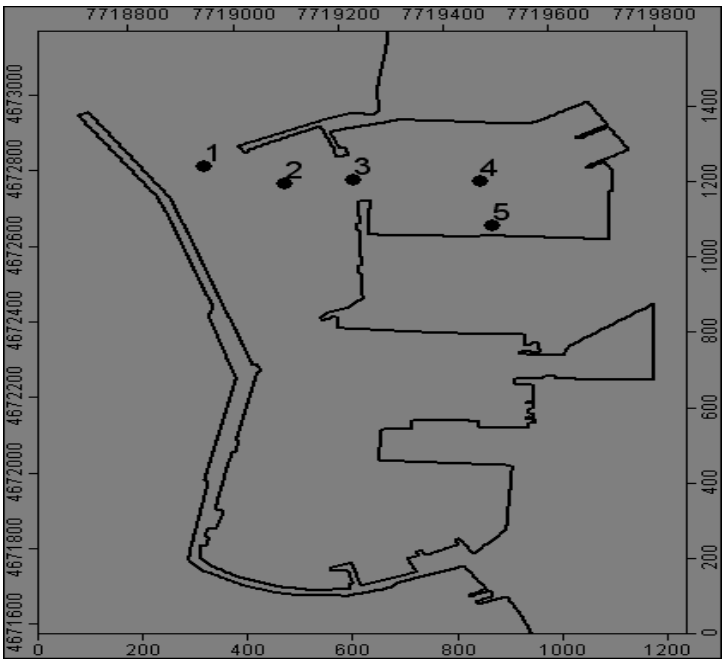


Figure 17: Location of the wave heights monitoring points.

As it is seen from the tables higher waves are coming more in case of the storm of the north-west direction to the port (point 1) than in case of the west direction – 1.24m and 0.69m accordingly ($h_{4\%}$:2.47m and 1.29m).

When going through the system of two moles at the entrance to Poti port the waves are influenced by the complicated topography of the bottom of the water area (navigational canal and a canal joining the New Port harbor) with the result that their height is reduced (point 2) to 0.2m and 0.31m accordingly ($h_{4\%}$:0.38m and 0.62m). But the transformation process of storm waves from the north-west sector are much more than from the west sector. The further refraction, diffraction and transformation of the waves moving along the water area of the port cause the decrease of their height (point 3) to 0.1-0.16 m ($h_{4\%}$:0.18m and 0.31m).

Too weakened waves of the height of 0.2m ($h_{4\%}$:0.23m and 0.42m)are getting into the water area of the New Port harbor, while the height and wave propagation are more in case of the storms of the north-west direction (point 4).

According to the calculation results the average height of waves at the projected facility will not be more than 0.2m ($h_{4\%}$:0.42m and 0.11m).

We have applied a phase permissive model REF/DIF for modeling the wave front propagation for different storm directions. The main distinguishing feature of this model is the use of a combined refraction-diffraction equation of waves over the arbitrary relief of the underwater slope.

The wave front under the NW storm is gradually spreading out and propagating along the New Port harbor without disturbances. The outsized waves are observed in the NW corner there but in the SE corner the front is turning perpendicularly to the shore horizon causing formation of frontal impact of waves. These peculiarities must be taken into account in designing and exploiting the harbor.

The waves are moving under the W storm along the water area of Poti port because of the front transformation in the same way as the waves from NW. The N part will be exposed to frontal impact in the water area of the New Port harbor. The outsized waves are observed in the NW part.

Harbor seiche

Calculations of the wave field parameters at the entrance to the New Port harbor in accordance with СНиП 2.6.04-82 (Construction Rules and Regulations) and РД 31.33.02-81 (Guideline Document) showed a complicated pattern of formation of low-frequency oscillations at the approach and the water area of New Port harbor.

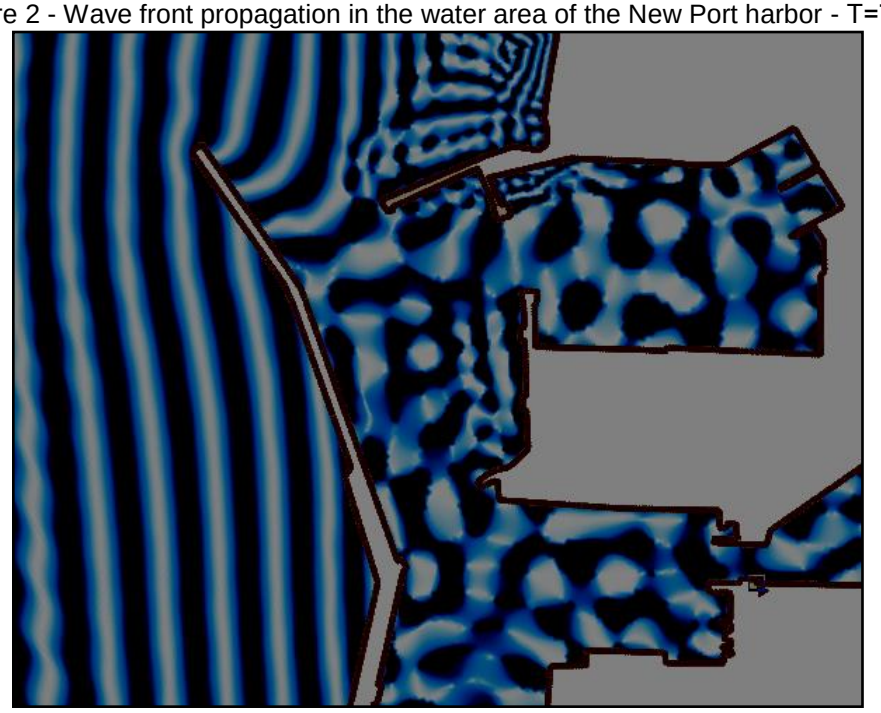
The configuration of the water area of New Port harbor makes the resonance period for the design configuration and depth in the range of 0.5-2.5 min, which testifies that the New Port harbor is not sufficiently protected from harbor seiches.

Additional calculations, modeling of the field of wind-generated winds and wavefront propagation in the water areas of Poti port and the New Port harbor showed that low-frequency oscillations (including outsized waves) are arising when the waves are propagating with the period of more than 5 sec (Pictures 1 - 3) and the wavelength is 7-10m.

Such situation is not typical for storms of 4% provision. Calculations of low-frequency oscillations for storms of 4% provision showed that low-frequency oscillations (characteristic for harbor seiche) are near zero.

Picture 1 - Wave front propagation in the water area of the New Port harbor - T=5sec.

Picture 2 - Wave front propagation in the water area of the New Port harbor - T=7sec.



Picture 3 - Wave front propagation in the water area of the New Port harbor - T=10sec.

Figure 18: Wave front propagation diagrams

Conclusions

The following conclusions can be made basing on the results of mathematical modeling done for the solution of the task:

- The configuration of the moles of Poti port and the New Port harbor, considering its planned reconstruction, secures the approach to the harbor of the waves of N and NW storms of the height of 0.4-0.2m. In the water area of the harbor waves of the height of 0.21-0.06m (0.42-0.11m of 4% provision).
- Considering the planned reconstruction of Poti port and the New Port harbor the configuration of the moles there will secure the approach of the waves of N and NW storms of the height of 0.4-0.2mto the harbor.

- The biggest parameters of waves are observed under the NW storms, at the same time the wave height at the designed facility in the New Port harbor will not exceed 0.2m (0.42m of 4% provision).
- The changes of configuration of water area and new port harbor depth doesn't influence on the origin of harbor seiche.
- The average period of seiche oscillation for the configuration of New Port harbor (width, length, width of the entrance) makes 0.5-2.5 minutes and the origin of harbor seiche is possible.
- The harbor seiche is possible at the joint origin of the following factor combinations: the height of the waves at the entrance of harbor – 0.8-1.2 m; period – 5-10 sec; wave length –20-40 m, which is not characteristic for storm situations and rarely enough at ordinary sea roughness
- The following parameters of the indirect waves are observed on the outer side of mole N 2, height 0.8-1.2 m; period 6-10 sec; length 30-60 m. (they are close to parameters indicated in article 5) in the process of modeling.
- For the reduction of the parameters of wave face it is recommended to place existing big stones from the outer side of mole N 2.

8.11 River Rioni Silts Dynamics

River Rioni mainly brings the beach-forming solid material to the coastal zone and the channel entering the port. **310,000 m^3** of solid material averagely flows into Poti Sea Port per annum according to the data presented in the previous years.

River Rioni is the biggest river of the West Georgia. It originates from the southern slopes of the Greater Caucasus watershed glaciers, at an altitude of 2620 meters above sea level. Upper part is flowing in a narrow deep gorge, between the ridges Lechkhumi and Racha – on vast lowland, and again enters into a narrow valley. Downstream of Kutaisi it reaches Kolkheti lowland, where it is divided into branches. Bed of the Rioni River is a bit elevated and meandering. It forms the delta, where it joins with Black Sea, near Poti. Rioni length is 327 km, catchment basin area – 13,400 km^2 at the mouth the average flow of water - 405 m^3 / s. The average flow depth of the water in the river is 635 cm, and the maximum depth amounts to 745 cm (hydro station at Sakochako - 1956). The maximum recorded water flow in the north branch of the river is 1,400 m^3 / sec. Rioni is fed in a mixed manner: it is mainly fed by precipitation, in the upper watershed glacier. The river is navigable along its 95 km long section upstream of the mouth. River Rioni is characterized by large amount of sediment - its overall average annual solid sediment load amounts to 5 million m^3, respectively. 10% of them represent the bottom sediments. Volume of beach-generating 0.1 mm diameter fraction amounts to 1.2-1.4 million m^3. Present coast of central Kolkheti was mainly formed through the sediment carried by Rioni River flow. The transportation is made through river flow across the coast, as well as at the cost of the Rioni sediment. The hydrological observations are underway at Rioni northern branch during the recent years. According to the data of National Environmental Monitoring Centre of the Ministry of Environment Protection and Natural Resources of Georgia, the average annual flow in the north branch of the river Rioni Delta, where high levels of spring flooding and autumn flash floods are obvious amounts to 305 m^3 / sec (Table 26)

Table 26: River Rioni monthly flow

Average monthly flow of the north branch of river Rioni (1971-97 years)													
month	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**	**XII**	**avg**
m3 / s	257	261	346	467	421	403	300	245	185	220	292	270	305
%	7.0	7.2	9.5	12.8	11.5	11.0	8.3	6.7	5.0	6.0	7.6	7.4	100
Average monthly levels of the north branch of river Rioni (1971-97 years)													
month	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**	**IX**	**X**	**XI**	**XII**	**avg**
H cm	498	497	509	529	529	523	508	494	482	485	494	499	504

Erosion and accretion processes[7]

In contrast to the rivers which form a broad and extensive delta, the Black Sea Rivers which flow down from the Caucasus create large delta bars due to the transverse attack of the waves. In such cases a promontory accumulating coarse discharge loads begin to extend in the prevailing wave direction; this is in effect similar to the formation of a delta but the sediment is transported alongshore. The only river on the Caucasus coast to carve out a double-branched delta is the Rioni River delta, where wave processes are dominant and wave attack is at right angles to the shore. The interplay of natural conditions in the new mouth of the Rioni has in less than 10 years produced a delta similar to the older one in shape and size.

The large river loads contribute to eight independent littoral (longshore) drifts along the Georgian coast which move towards the center of Colchis where the Rioni delta spreads out. At maximum spring high water levels, the fine dispersion component of the suspended load in the rivers is here dispersed over large areas. The suspended matter may be carried as much as 15-20 km from the shore. The turbidity In Colchis (where the Rioni flows into the sea) varies between 1,000 g/m^3 and 1,500 g/m^3. A major counterbalance to sediment loads from rivers in the Georgian sector of the sea, are the submarine canyons along which around 2,000,000 m^3 large particle size loads are carried to great depths***. The greatest amount of beach-forming sediment is swallowed up by the Chorokhi canyon, and under natural conditions losses could be as much as 1,800,000 m^3 a year, while 100,000 m^3 is lost to the Kodori canyon. Smaller amounts disappear into the Bzyb, Rioni and Supsa canyons. In addition to these estuarine canyons, loads also disappear into lateral canyons. Where there is excess of river alluvium and weak littoral (longshore) drift the canyons capture part of the beach-forming material.*** When the reverse holds and when the amount of alluvium is reduced and littoral drift is more active the canyons play a lesser role.

The erosion processes south of the Port of Poti till Grigoleti (including City of Poti shoreline) are recently accelerated due to human interference: mining of sediments along Supsa and Rioni rivers (50 km from the mouth of the Rioni up to 500,000 m^3 sand and gravel are extracted annually); unregulated resort development along the coast during three recent decades, resulted in destruction of natural dunes and construction of unprofessionally designed embankment retaining walls and beaches; climate change and increase of storms. More permanent and professionally engineered protective measures should be installed in order to prevent further erosion and high maintenance costs. The mouth of the Rioni was diverted north of the town in 1939 in order to protect Poti from flooding. As a result a heavily populated urban area of around 300 hectares was washed away while to the north, over a period of 30 years, a new delta formed and the landmass was extended by 800 hectares. By the 1980s the shore had grown to such an extent that the shoreline azimuth had changed, the coastal dynamic had been restructured and discharge from the Rioni had begun to travel north. At present, there is an

[7]*Source – "The rivers of the Black Sea" by Shalva Jaoshvili, Technical Report #71, European Environment Agency, 2002*

accumulation process taking place along the stretch of coastline between the mouths of the Rioni and Khobi and the shore is increasing fast.

The accretion process has started in the central Colchis zone where the recently built Kulevi Terminal at the mouth of the Khobi River will lead to the coastline reshaping itself. Between the encircling installations of Poti and Kulevi ports, for a length of 8 km, there will be rapid accretion of sediment brought down by the Rioni. The sudden excess of sediment will enable the landmass to extend itself even in case of the possible sea level increase. The particle size of beach deposits is usually entirely dependent on the type of bed load contributed by the rivers. In the areas where the Inguri, Rioni and Supsa reach the sea, river load forms gently sloping, sandy beaches.

The proposed Terminal development doesn't consider any major reconstruction of the Port of Poti breakwaters, the Project will not affect any coastal dynamics (including littoral drift), it will not change the sediments distribution patterns (increase erosion or reduce accretion). So no impact on coastal dynamics is expected either to the North, or to the South of Poti Port.

8.12 Vulnerability of Poti Coast and Rioni Delta to Climate Change

It is agreed with "Chernomorniiproject" (Odessa) that detailed design of Port of Poti new Terminal will take into account the expected chance of increasing of sea level and intensity of storms that are climate change related. Below is presented the analysis of the Poti coast vulnerability to these issues.

Georgian coastal zone includes 350km long eastern coast of the Black Sea (Fig.19). The study area is located in Caucasus tectonic zone, which is characterized by high activity, lines of meridian fault, high speed of secular shaking and volatility of the trend of vertical movement along the coast-line. According to these peculiarities coast-line is divided into three main parts. Marginal north and south parts are sinking by 1.5 – 5.6 mm in a year between riv. Inguri and riv. Natanebi. It should be mentioned, that Poti-Supsa coast of the central part is sinking most rapidly by 4.0 – 5.6 mm in a year.

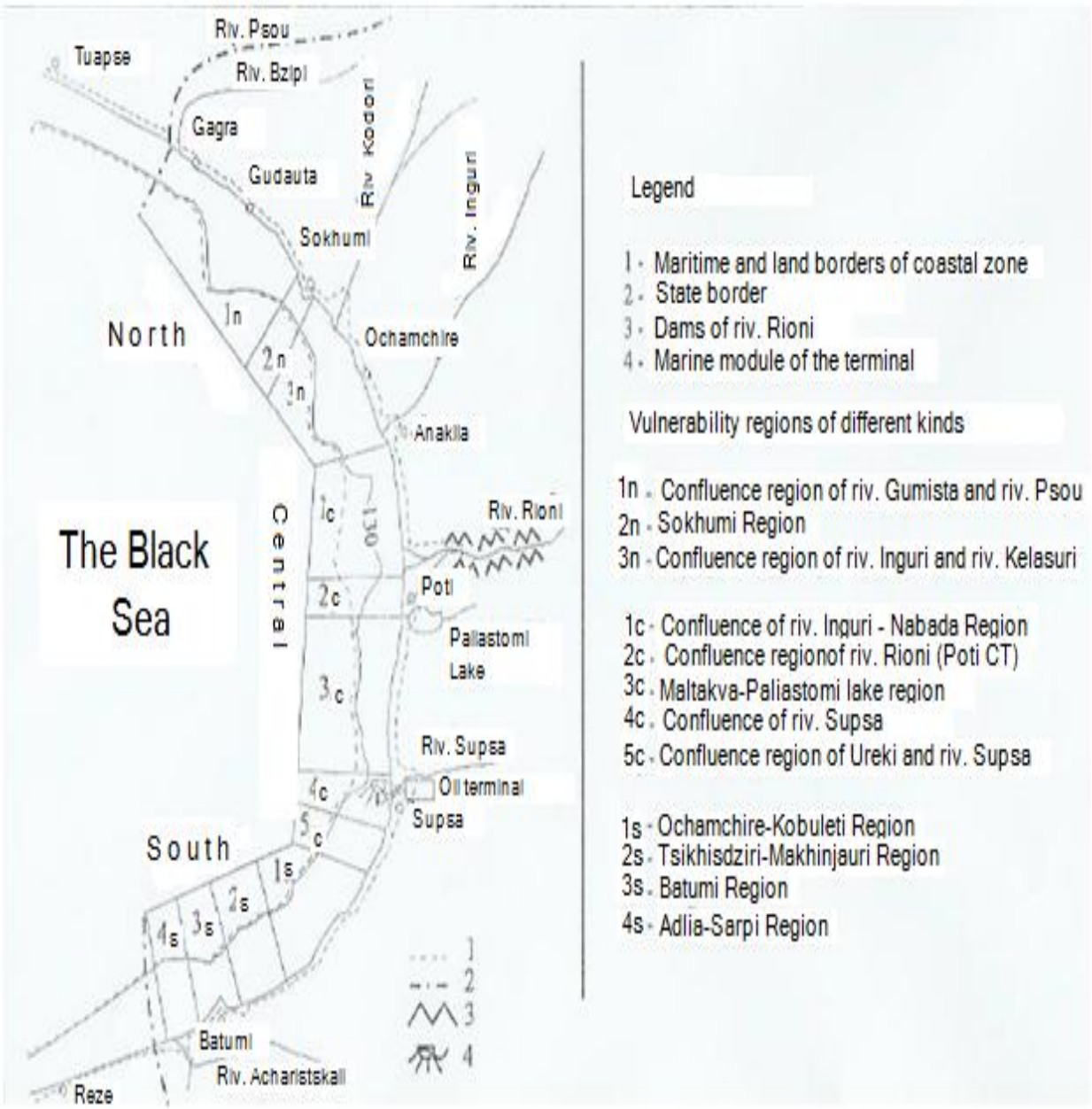


Figure 19: Vulnerability regions of Georgian Black Sea Cost

Source: Georgia's Second National Communication to the UNFCCC (2009) by the Ministry of Environment Protection and Natural Resources of Georgia and United Nation Development Program

Divergent-convergent dynamics of the Black Sea together with drift and river flows stipulates vertical four-circular water circulation system, of which marginal circulars include coastal zone and the central circulars – the rest parts of the sea. (Fig. 20)

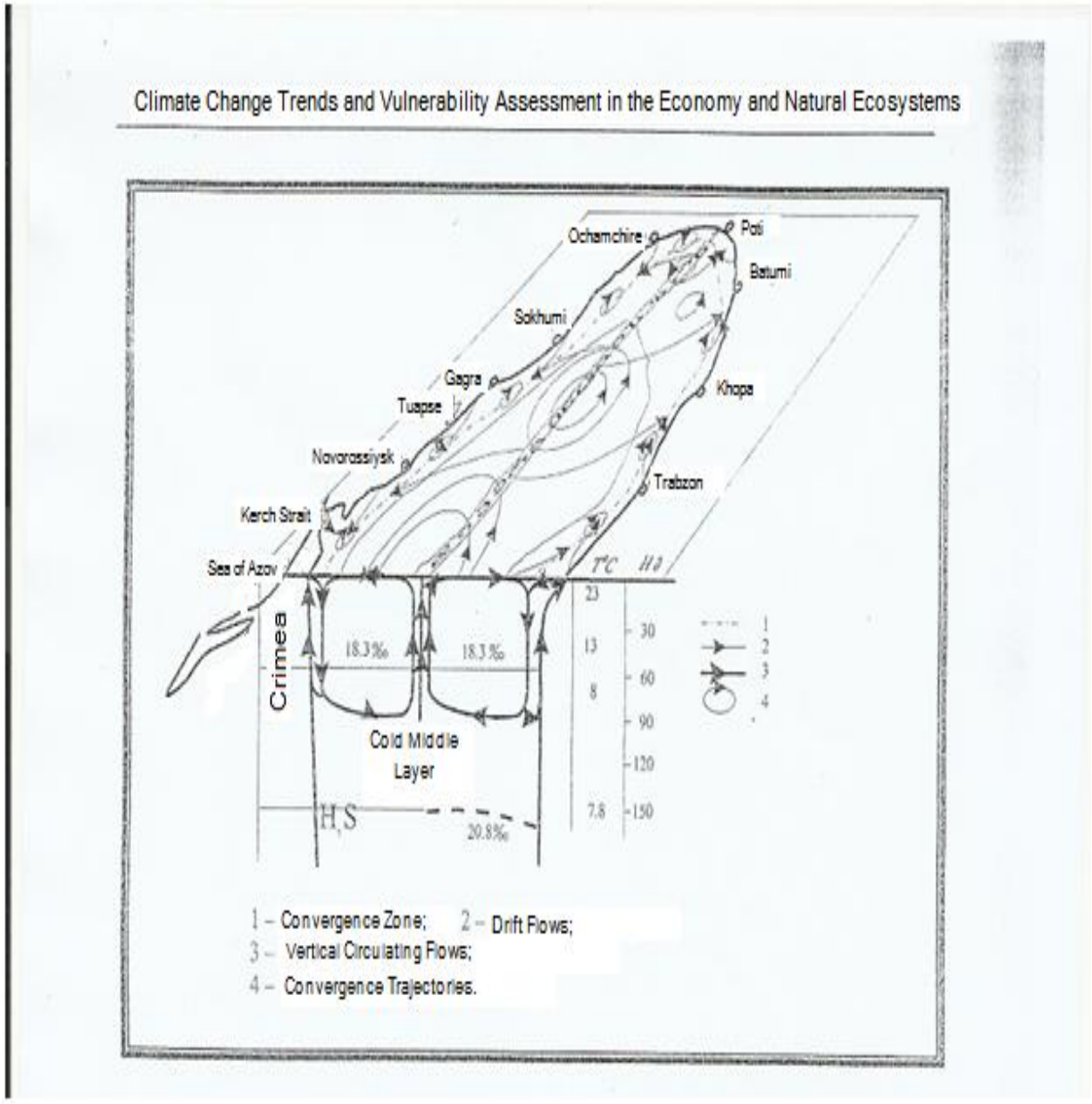


Figure 20: Climate change trends and vulnerability assessment

Source: Georgia's Second National Communication to the UNFCCC (2009) by the Ministry of Environment Protection and Natural Resources of Georgia and United Nation Development Program

One of the main energetic sources of the sea dynamic system is the wind. Its direction depends on the orography of the sea basin and the movement trajectory of air masses. Due to this, the main winds on the sea aquatory area are winds of northern, south-eastern and eastern directions. Each of them has certain angle to the sea, but so that the direction of their vector sum stipulates the movement of water masses from west to east and on the several closed cyclonic circle, which are moving inside of the main stream. In terms of the sea dynamic, storm winds have a serious meaning, which cause storms and movement of the water to the coast, therefore along the coast, especially in the gulfs and confluence of the rivers, the sea level rises by 0.6-1.0 meters during 6-8 hours, the height of storm waves reaches 4.5-5.0 meters.

The circulation wave on the Black Sea is relatively weak (8-10 cm), but it will become a critical factor, if it coincide with storm wave model. Circulation events play an important role in the rare providing systems of the sea dynamic.

Hydro-meteorological, geological and geodetic systematic observations have been conducted for many years in Georgian coastal zone. There were functioning 7 oceanographic stations on this territory, where the sea level, salinity and temperature have been measured regularly. Unfortunately, due to the known reasons, in the 90s of the 20th century everything was collapsed and measures are made permanently during different expeditions in the sections of Poti and the Rioni delta.

According to the observations on the Black Sea level, rising of the water level was started in 1923-1925 and its average speed is 1.5 mm in a year. Absolute growth of the sea level reached 21 cm in 2006. Reason of this fact is that sinking speed of the coastal area is 0.56 m in a century.

Water level rise is much larger in the Rioni delta, where river flow compared to the coastal reaches 0.7 m during a century.

Sea Level [8], [9]*:*

In the water area of the seaport of Poti fluctuations of the sea level have periodical and non-periodical character. Periodical fluctuations depend on variation of water balance components in time and have a seasonal character. The seasonal hydraulic regime of the Rioni River estuary is of the defining importance. Non-periodical fluctuations of the level are due to anemobaric processes, surging events, which are distinguished by their considerable amplitude and high intensity of water level difference. The long-term amplitude of fluctuation of sea level in the water area of the port comes up to 174 cm. Minimal levels are observed, as a rule, in October-November (rundown east winds). Rise of level is observed in the period of winter-autumn. Maximal levels are mainly observed in June-July (period of prevailing winds of west bearings) Poti port is meant as the "0" sea level, provided at 99, 7 % and having mark 0.861 m in Baltic system of 1950 (the scheme of height control is given in Appendix 4).The average long-term value of the level (service level) comes up to plus 0.50 m from "0" of the port. The maximum level of the sea is fixed at the mark plus 1.54 m from "0" of the port, and minimal level- at minus 0.20 m from "0" of the port.

It should be noted that relative eustasy reaches especially dangerous values in the Black Sea hollow along the tectonic break-line, which connects the Rioni and Danube Deltas. For this reason, relative eustasy in the deltas of these rivers is the highest and reaches 70 cm and 76 cm. Due to this fact, since 2006 sea transgression has lengthened to 300-330 km at the Danube and up to 40-45 km in the Rioni riverbed. These processes have sharply increased the probability of catastrophic floods at these rivers.

Poti city area is vulnerable to natural hazards. In particular, it is characterized by storms, floods and coastal elution. Coastal elution is the result of anthropogenic impact. In particular, in the middle of the 20th century, with regard to protect city from flood, a large part of Rioni River was thrown into north. Although this reduced the risk of flooding, but intensified the wash-out of city's southern coastal line, as sufficient amount of sediments has not been delivered. On the other hand, intensive growth and siltation of the town north coast line takes place and, that is why the siltation of Poti port. (Source – USAID study)more and more intensively occurs

The increase of storms intensity is observed since the last century which enhances the risk of damaging and flooding the coast adjacent infrastructure. A noticeable rise in the sea level, which is linked to climate change and natural sinking characteristic of this coast, is also observed. According to estimations, in 20th century sea level has been raised 0.7 m to the coast resulting from the relative eustasy and it continues progressing. As a result, Poti coastline

[8] *Source: MEASUREMENTS AND TECHNICAL SOLUTIONS TO ADMISSION OF LARGE-TONNAGE VESSELS TO AQUATORY AND FITTING-OUT WHARF JSC "SHIPYARD of POTI" "CHERNOMORNIIPROEKT", 2013*

[9] *Source: Georgia's Second National Communication to the UNFCCC (2009) by the Ministry of Environment Protection and Natural Resources of Georgia and United Nation Development Program*

becomes more vulnerable, as the potential danger coming from storm surges and intrusion of sea waters drastically has increased. This poses a threat to the local population and infrastructure. In addition, seawater intrusion would pose a threat of salinization of groundwater and the future availability of water resources can be displayed.

Poti city is significantly affected by the disaster. However, damage prevention measures are taken less, although measures are mainly directed at the damage eradication. For example, reinforcing of south coast with sediments does not take place since 1990s, coastal monitoring has irregular nature. The potential natural hazards risk assessment studies were not provided during planning and development of infrastructure projects in Poti area.

9 Climate change issues in Georgia as per the UNFCCC[10]

"A statistical analysis of the long-term observational studies of Black Sea levels has shown that eustasy is highest on its western coast, where it reaches 3.0 mm annually, on the eastern coast it reaches 2.6 mm and at the northern coast 2.4 mm, on the southern coast it doesn't exceed 2.0 mm/yr. For the sea as a whole, eustasy until the 1990s equaled 2.5 mm/yr, on average, though up to the present decade it has accelerated to 2.6 mm/yr.As a result the absolute value of eustasy on the above-mentioned coasts amounted to 24 cm, 21 cm, 19 cm and 16cm up to 2006 respectively. A relative eustasy, indicating a sea level rise compared to the land, exceeded by twice or more the above-mentioned values along the sinking coastal areas. A relative eustasy reaches especially dangerous values along the tectonic break line, stretching through the Black Sea hollow, which connects the Rioni and Danube Deltas. For this reason, relative eustasy in the deltas of these rivers is highest when it reaches, correspondingly, 64 cm, 70 cm and 76 cm. Due to this fact, since 2006, eustatic blocking up of, or sea transgression has lengthened to 300-330 km at the Danube and up to 40-45 km in the Rioni River bed. These processes have sharply increased the probability of catastrophic floods at the affected portions of these rivers.

Storms surges: The increase in the frequency and force of storm surges is a second indicator of the sea coastline's vulnerability. Storm surges have inflicted heavy losses on the seashore countries, especially in tropical and sub-tropical zones. Hydro-meteorological observations carried out in these countries demonstrate that the force and frequency of storms for the last 20-30 years has increased almost by 50-70%. During these same years the phenomenon was more active in the cold period of the year, for about 70-75% of the most severe storms occurred in this winter period. As the power (destructive action) of storm surges is determined by the height of storm waves, which are a function of the location of the wave impact line and the depth of water in this zone, the value of this indicator increases according to the value of eustasy. Hence, it is anticipated that as s background of current climate change, the increase in the frequency and force of storms will continue in the near future."

Georgia has been a Party to the United Nations Framework Convention on Climate Change (UNFCCC) since 29 October 1994, and it accessed the Kyoto Protocol on 16 June 1999. Georgia has the status of a non-Annex I country, although a specific COP Decision has been issued (Decision 35/CP.7, a request from a group of countries of Central Asia and the Caucasus, Albania and Moldova regarding their status under the Convention). Georgia submitted its Initial National Communication to the UNFCCC in 1999, and its Second National Communication to the UNFCCC in October 2009.

On 1 February 2010 Georgia has acceded to Copenhagen Accord, according to which it undertook the following obligations:

1. To establish Nationally Appropriate Mitigation Actions (NAMAs) in the context of sustainable development, supported and enabled by technology and capacity-building, in a measurable, reportable and verifiable manner;

[10] Source: The second UNFCCC communication of Georgia

2. To achieve a measurable, reportable and verifiable deviation from the baseline (below business as usual levels) supported and enabled by technology and capacity-building;

3. To establish the baseline or reference case against which the action shall be measured, reported and verified;

4. That all mitigation actions by Georgia will be voluntary and nationally appropriate actions supported and enabled by technology, financing, and capacity-building, through existing mechanisms, the technology Mechanism and other mechanisms established by the Copenhagen Accord;

5. To support the implementation of the mechanisms mentioned in the Copenhagen Accord, in particular the Technology Mechanism, Copenhagen Green Climate Fund and the High Level Panel;

6. To support the Clean Development Mechanism (CDM) as one of the most important means for further cooperation in the field of NAMAs since CDM holds the potential to lead to significant investments, better environmental performance, job creation and poverty alleviation;

7. To develop a low carbon growth plan and low carbon strategy, in particular through the use of renewable energy investments and global cooperation.

92% of power of Georgia is generated through ecologically clean hydro-power stations. 40-% of the territory of Georgia is covered with woods, due to which (UN Cooperation Program REDD+ bonuses) CO2 emission per capita is lower than 2.5 tons per annum and current greenhouse effect is less by 75%, that in 1990. Emissions in Georgia have been reduced from 46,363 mt CO2 equivalent in 1990 to - 12,218 mt CO2 equivalents in 2006.

Georgia is making great strides in developing its renewable energy program, establishing a friendly investment environment that has led to billions being poured into renewable energy sources, especially hydropower. As a result of Georgia's rapid progress, more than 90 percent of electricity production in Georgia already comes from renewable resources. Georgia exports renewable energy to neighboring countries and will eventually transmit electric power through Turkey to the European Union. Georgian renewable energy initiatives could be enhanced by complementary, large-scale initiatives to grow its forests and advance carbon sequestration activities. In addition to this progress, Georgia has launched several programs that will lead to a cleaner transport industry.

"Transford" LLC as project developer for new Multifunctional Transshipping Terminal is committed to consider climate change issues in detailed design, as well as during construction and operations, including support and participation in any measures undertaken by Port Administration, Poti Municipality or Government of Georgia to protect Poti coastline from risks and hazards related to climate change issues.

10 Baseline conditions for Biological Environment

Given the specific nature of the production activity, vegetation is virtually absent. The situation with the micro-district territory is similar, the western and southern parts of which is the industrial zone and to the east and north it borders with Megobroba and Samegrelo streets.

In general, the Georgia coastal area is diverse in floristic composition, relict, and endemic species– sandy dunes located along the wetlands, Colkhic forests.

Local forest plants are adapted with surplus moisture, warm climate, and frequent floods. In the peat-boggy wetland conditions and on the sandy swampy soils forests are developed, where human access is often impossible. Ordinary Alder dominates in the forests and along wetland plain-valleys.

10.1 Forest and secondary meadow

A typical representative is the alder fern *(Matteucia struthiopteris)*, the height of which sometimes reaches to180cm. We can also see the fern Chaduna *(Dryopteris filix mas)*; dense area of the fern *(Pteridium tauricum)*is typical to the perimeter of the lake. Here wetland ecosystems are well preserved. This mass is represented by rush- sandy, herbaceous-mossy, and partly presented by the scrub-grass marshes. Reed bed sand rush plants are partially repeated on swampy ecotypes and alder wet lands.

Swampy plants are far more diverse than welt and vegetation. Swampy plant species composition is as follows: Common Rush *(Juncus effuses)*, water chestnuts *(Scirpus lakustrum)*, Endronika *(Galium palustre)*, Horse-toothed *(Leucojium aestvum)*, Tsalika *(Polygunium hidropiper)*, water iris *(Iris pseudocorus).* It grows in the lake Nabada Colchi shemp *(Cannabis colchicum)*. We have also recorded the rare plant Sweet flag - Kotkhoji *(Acorus calamus)* on Nabada territory, in the swampy zone.

From aquatic vegetation, swamps and reservoirs are covered with a thin, water floating or dipped plants, such as waternut *(Trapa colchida)*, water Perry *(Lemna minor)*, water Strawberry grass *(Comarum palustre)*, water star *(Callitriche cophocarpa)*, yellow *(Nufar luteum)* and White Colchis water lily *(Nymphaea alba)*. Despite the diversity of vegetation, it should be said, that the project activity despite of its location cannot have any direct or indirect impact on their species.

10.2 Terrestrial and aquatic fauna

Kolkheti low land, with rivers and lakes (Lake Paliastomi, Churia, Nabada swamps) on it, is a reliable shelter for rare and endangered aquatic-earthy and aquatic animals, as well as a number of invertebrate animal groups. Significance of those wetlands is huge for local and migratory birds.

From among the inhabitants of Kolkheti National Park, birds are the most easily noticeable. They can be seen at every step, because that the area falls within the Asia-Africa migratory route of birds so it's not just a nesting territory, but you can meet enormous flocks of birds started off distant journey in the spring and autumn. The multiplicity of birds is observed seasonally characteristic for Polar-North. Ducks, geese and swans are flying from North in winter.

From big mammals the jackals are most well adapted to the swampy areas, forests and thorny shrubs, which are distinguished by multiplicity. In the surrounding areas of Poti rarely, but it is still possible to see a fox and reed cat. In the lakes and nearby wetlands nutria and otter can be seen. European tree frog, pond frog, toad, small Asian newt can be found among the amphibian inhabitants of Kolkheti.

The area is not rich with the diversity of reptile species, due to the excessive humidity. That is why found species are mostly associated with water (marsh turtle, the ordinary and aquatic snake). Out of 53 reptile species identified in Georgia, 9 species are found here. The surrounding water area of Poti is characterized by a wide diversity of ichthyofauna. Here the freshwater, as well as the salty water species are widespread: (Silver Carp, carp, grey mukket, bitterling, catfish, herring Caucasus, Colchis Toby and other). Among the above mentioned ecosystems and bio-types the following groups of the invertebrate animals are represented: nematodes, leeches, mollusks, crustaceans, spider-like (mites, scorpions, spiders) and insects. Here we should mention the type of endemic forms of Arthropod Closing Scorpio (*Euscorpius Migrelikus*), as well as scorpions Migrant form - Italian Scorpio (*Euscorpius italikus*), which is only prevalent in a narrow coastal strip of the Black Sea.

Wetlands and wetland forests are extremely rich in the representatives of the double-wing variety, particularly blood-sucking insects-mosquitoes and the carrion and faecal flies. Colchis relic forests, peat bogs, with its flora and fauna are well preserved. So as the project area is allocated in the industrial zone as mentioned above, the synanthropic species of animals have been only recorded during the audit.

10.3 Marine biota

The Black Sea faces four main problems: (i) decline in commercial marine living resources, (ii) degradation of the Black Sea marine and coastal biodiversity and habitats, (iii) eutrophication (11) and (iv) poor water quality not only for human health but also for recreational use and aquatic biota.

According to Georgia National Environmental Action Plan (NEAP 2012-2016) 26 commercial fish species were registered in the Black Sea in 1960, and today there are only 3 to 4. Due to over fishing in the early 1970s and 1980s, the structure of catches has shifted significantly. Overfishing, invasion of alien species and degradation of the aquatic environment are the primary causes of this decline. Decreased amounts of sediment flushed to the coast in the Chorokhi River coupled with intensive sediment extraction from the coast for construction purposes have caused erosion and degradation of the coastal zone. Coastal erosion due to wave action is noticeable. Georgia introduced and implemented significant coastal conservation measures both in coastal wetlands and in marine ecosystems (Kolkheti National Park), considering the importance of the coastal biodiversity and habitats.

About 186 species of fish are commonly distributed in the Black Sea, which contains both indigenous and introduced species. As for the fish species in the Georgian territorial waters only few of them may be housing in small quantities in the inner waters of the new port, such as: Anchovy (*Engraulis encrassicholus*); Black Sea Sprat (*Sprattus sprattus*); Black Sea Kilka (*Clupeonella delicotula*); Black back Herring (*Caspialasa kessleri*); Starry Stergeon (*Acipenser stellatus*) and etc.

The coastal shelf zone of the Black Sea provides favorable conditions for fish, among which worthy to note are sturgeon and Black Sea salmon *(Salmo trutta latrix*) (protected species). Schools of these fish often gather at river estuaries.At present the Black Sea is inhabited with 5 species of sturgeon: stellate sturgeon (*Asipenser stellatus Palla*s); Kolkhian sturgeon (*Asipenser persicus cocjicus V. Marti*) the most numerous aboriginal species of sturgeon and endangered with extinction; beluga (*Huso linne*); ship sturgeon (*Acipenser nudiventris*) is entered as endangered in the Red List of International Union for Conservation of Nature (IUCN). Their small schools are preserved only in the coastal zone of Georgia; Atlantic sturgeon (Asipenser sturio linne) is endangered not only in Georgia but everywhere in the world. At present a small schools of Atlantic sturgeon is preserved at the Black Sea coast of Georgia. It spawns in Rioni River, from Samtredia to Abasha. Sprat (*Sprattus sprattus phalericus*), plaice (*Platictus flesus lucsus)*, whiting (*Odontogdus merlangus euxinis*), spiny dogfish (*Squalus acantis*), anchovy

[11] The gradual increase in the concentration of phosphorus, nitrogen, and other plant nutrients in an aquatic ecosystem that promote a proliferation of plant life, especially algae, which reduces the dissolved oxygen content and often causes the extinction of other organisms.

(*Engrulis engracicholus*), red mullet (*Mullus barbatus*), etc. are also found in the Black Sea. The Black Sea is inhabited by three species of dolphins: bottle-nosed dolphin (Tursiops truncates), white-sided bottlenose (*Delphinus delphis* or *Legenorhynchus acutus*) and cavy (*Phocoena phocoena*) All three species are enlisted in International Red book; they have IUCN status "Insufficient". In recent years dolphins gathering sites are found north to Poti, at super-humid territories of Churia and in the Supsa canyon.[12]

Increased concentration of nutrients has caused ***eutrophication*** of the Black Sea that creates a significant risk not only for the biodiversity of the Black Sea, but also for human health and can seriously damage the tourism sector. Municipal waste water discharge is a major source of nutrients to the Black Sea. From the 19Waste Water Treatment Plants (WWTPs) in the Black Sea basin, only few are operational. The vast majority of the waste water discharges into the Black Sea without even primary treatment. Runoff from agricultural fields is another major source of nutrients pollution of the Black Sea. Inadequate monitoring and assessment of major rivers and straits of the Black Sea basin makes determining and implementing the necessary measures difficult. This is the reason why marine biota in shallow waters along the coast and especially at rivers estuaries (including Rioni River) is declined dramatically and/or extremely degraded.

Considering that the entrance of the Port of Poti is subject to routine/maintenance dredging and the dredge disposal traditionally and legally designated area is "alluvium-swallowing" Canyon (see Subsection 8.11 River Rioni Silt Dynamics – Erosion and accretion processes") with constantly dynamic/eroding bottom - no endangered or threatened species (not represented in other/neighboring coastal waters) nor unique sensitive habitats are identified by ESIA team' marine biologists in dredging or dredge disposal areas. However, to minimize impact of dredging works on marine biota the mitigation measures will be implemented when/where necessary following and based on the additional detailed survey of marine habitats (sensitive/ endangered/threatened species, if any discovered) as part of Dredging and Dredge Disposal EHS Management Plan preparation process.

Georgia is a Party to the International Convention for the Prevention of Pollution from Ships (MARPOL). Obligations of the convention are not fully met especially in the main Port of Georgia – Poti where there are no disposal and treatment facilities for waste waters that pollute the Sea. Transford LLC is committed to participate in any improvements proposed or developed by the Poti Port Authority and Poti Municipality to comply with MARPOL requirements (construct municipal treatment facility, purchase waste transfer vessel, manage ballast waters, etc.), but at the moment cannot address the national level issues within subject terminal development. The specific mitigation measures related to other MARPOL requirements are presented in Subsection 12.6 "Impact on water quality at O&M phase". The Black Sea is also polluted from the numerous dumping sites that are mainly located at the banks of the rivers in the proximity of the Sea and from the discharge of untreated municipal waste water. Permanent monitoring of bathing water quality is conducted by the National Environmental Agency (NEA) under the Ministry of Environment and Natural Resources Protection of Georgia.

10.4 Protected Areas

Kolkheti National Park is located on the adjacent territory of Poti, which partly covers the Ramsar #893 section. Here Kolkheti National Park, as well as Ramsar section is represented by two territories - one of them – Nabada section is away from the ESstudy area by 5,000 meters and second one – Imnati section to the south by 2,350 m.

[12]*Source: GAMA 2010 EIA for car terminal);*

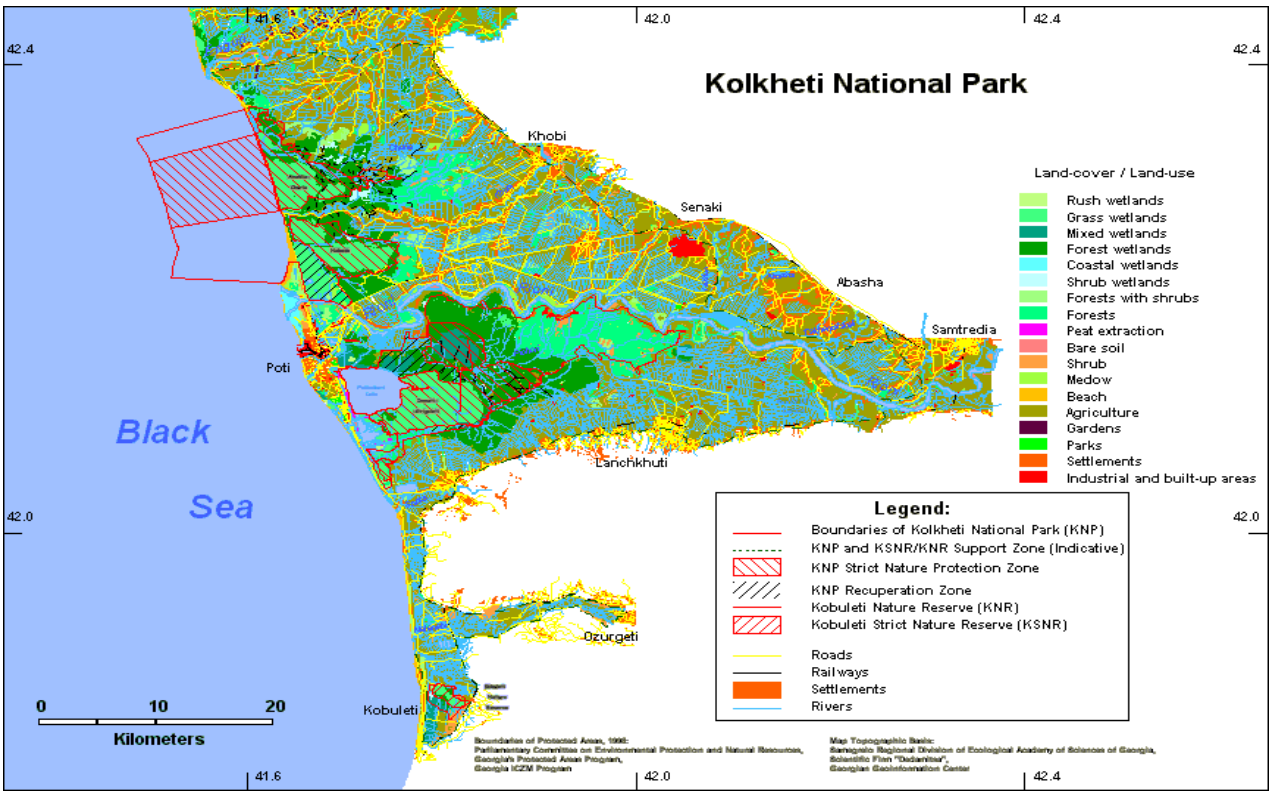


Figure 21: Protected areas – location of the Kolkheti National Park

Considering the significant distance from the project site, nature and extent of project generated impacts, the construction and operation of the Terminal cannot have any noticeable impact on the Kolkheti National Park territory. For this reason the detailed information on the Kolkheti National Park is not presented in this report.

11 Socio-Economic Baseline Conditions

11.1 Poti Municipality

Poti is a city and port on the Black Sea, in Samegrelo and Zemo Svaneti region, located in Kolkheti lowland, in the delta of the river Rioni, 0.8-2.0 meters above sea level. The city covers the area of 69 sq. km, population – 47,700 people. The population density is 724 people/ square km, which is 10 times above the national average (67 people / square kilometers). The area represents humid subtropical climate zone, with warm, dry winters and hot humid summers. The average annual temperature 14.4°C, the coldest month, January, the average temperature of 5.7 ° C, and the hottest month, August - 23.5°C. Precipitation per year amounts to 1,809 mm, while the average annual number of days with precipitation reaches 173. Snow rarely falls and melts quickly. Sea breezes are well expressed in the coastal area, that is why the heat is felt less. The city is situated in the Rioni River delta, which represents a big part of the peat swamps and the shoreline built with sandy dunes. From North and South Poti is bordering the Kolkheti National Park, where the wetland habitats of Kolkheti lowland are protected. It's total area of 44,600 ha. To the south of Poti the natural Lake Paliastomi (also part of Kolkheti National Park) is located, having surface area about 18 km^2.

11.2 Poti Population Demography and ethnical composition

Table 27: Poti population by years (2002-2010)

Years	2002	2003	2004	2005	2006	2007	2008	2009	2010
Poti	47.1	46.7	46.5	46.7	47.3	47.3	47.4	47.5	47.7

Source: National Service of Statistics of Georgia.

Table 28: Poti population by ethnic composition

Nation	Number Thousand men	% composition
Georgian	44,934	94.2
Abkhaz	48	0.1
Osetian	48	0.1
Armenian	194	0.4
Russian	1,908	4.0
Azeri	48	0.1
Greek	48	0.1
Ukrainian	286	0.6
Kist	-	0.0
Kurdish	-	0.0
Other	186	0.4

Figure 22: Map of Poti

Since 1989 the growth of the population of Georgia has been considerably decreased, due the population outflow/migration from the country in large numbers, after collapse of the Soviet Union and reduction of the natural/demographic growth. According to the UN “Human

Development Report"(2010), in 1990-1995 the average natural growth of population was about 1.5%. In 2010-2015 decrease in population is forecasted by 0.7%.

11.3 Employment and Economy

Poti is considered to be one of the fundamental regions of Georgia. Poti sea port is one of the largest sea ports in the Black Sea basin. It is located on the TRACECA (Transport Corridor Europe – Central Asia) route and represents the largest segment of transit and transport network of the Caucasus. A significant function has been assigned to Poti in the Europe-Asia corridor. In April 2008 presentation of free economic zone was held in Poti. Opening the free economic zone in Poti is a new wave for the economy of Georgia. Great importance is assigned to the railway-ferry complex, which connects Poti to the ports of Ukraine, Turkey, Romania, Russia. In January 2010, the line Poti-Varna (Bulgaria) was added to the complex. It should be mentioned, that the port is one of the largest employers in the region: 1309 persons have been employed which is 3.1% of the local labor market.

Recent researches have proved that despite the existing economic growth in the country, growth of unemployment still cannot be massively reduced. According to the data of the Statistics Department of 2009-2011, unemployment ratio in Samegrelo region (Poti is considered within its boundaries) is 24.7%, which is one of the highest throughout Georgia. It is noteworthy that unemployment was increased in 2010, compared to 2009.

The year of 2011was also vulnerable for Poti from the point of view of workplaces, because the reforms carried out in many companies, including the port terminals, caused reduction of workplaces. According to various sources, 600-800 persons, who worked at the harbor, met 2012 unemployed. This is rather critical indicator for Poti employment market.

In 2012-13 according to the research conducted in Georgia by "Caucasus Research Resources Center", only 15% is employed, 68% is unemployed. In this respect, the displaced people are in the extremely difficult conditions, which remain unemployed due to the displacement. According to the data of the self-governing town of Poti, 222 persons are employed in the public sector, the average monthly income of which amounts to GEL 300(approximately USD180).

As per the unemployment rate in the Samegrelo region, rate of unemployment in Poti exceeds the rate of unemployment in the other municipalities approximately twice and equals to 59%. The key branches of the economy in Poti are:

- Transport and communications, in which 3410 persons are employed;
- Industry, in which 1,100 persons are employed and the products/service are sold at the local market
- Trade and service – 1,050 persons are employed and the products/service are sold at the local market

It is not known, how many persons are employed in the service sphere related to the port, including the external container terminal and the land transportation companies. Officially, 114 such companies are registered and, proceeding from their number, it can be said that the number of the persons employed in it doubles and even triples the number of the people employed in the port.

Proceeding from the aforementioned, it can be said that relatively high indicator of the employed in the region, is caused due to the port and the business related thereto. As we mentioned above, absolute majority of the population capable of labor, have been employed in the sea port and the infrastructure entities related to the port.

From the other sectors, from the point of view of the population employment, the trade and service spheres are important.

Local self-government and central authorities expect that 2014-15 will be the years of new perspectives from the point of view of the workplaces in Poti. According to the information available for the local self-government, the whole number of the workplaces is expected to be

formed at the construction sites. In particular, 250 workplaces on the territory of the existing mill, up to 200 persons at the construction of the metallurgical factory, 50-60 persons at the logistics base being under construction, in the refrigerator facility, 50-50 workplaces will additionally appear in three various companies.

11.4 Infrastructure

Energy

Georgian Oil and Gas Corporation have been cooperating with USAID in the frames of a Power and Gas Infrastructure Program (PGIP 2010-2012). Under the program a 30-km gas pipeline (700mm) from Senaki to Poti has been constructed to provide natural gas to improve energy supply to Poti population, Port of Poti and the first in Caucasus region *Poti Free Industrial Zone (FIZ)* established on the basis of Port of Poti operations.

Under the PGIP also the Replacement of 58 km of 220 kiloVolt (kV) transmission lines (Senaki I and II, dismantled in 1992 during Georgia's civil war) by Georgia State Electro system (GSE) – to improve power supply in Western Georgia, including city of Poti and Poti Free Industrial Zone.

In 2013-2014 EBRD has acted as GSE lender for Jvari-Khorga Interconnection Project, which includes: 1) double-circuit 500 kV OHL tied-in to 500 kV OHL Kavkasioni as well as approximately 60 km long double circuit 220 kV OHL from Jvari to Khorga tied-in to 220 kV Khorga and 500 kV Jvari substations; and 2) Construction of the new 500/220 kV substation in Jvari. One of the Project goals is to improve reliability of 220 kV transmission network and diversify power supply sources in the West Georgia, ensuring transmission capacities of 450 MW to City of Poti and the Poti Free Industrial Zone ("FIZ").

Roads

European Investment Bank is financing the construction of Poti-Grigoleti-Kobuleti bypass section of international Senaki-Poti–Sarpi (Turkish border) road. One of the prime objectives of road construction-rehabilitation is to upgrade the E-60 and E-70 highways, to involve *Port of Poti and Poti Free Industrial Zone (FIZ)*in Georgia's transport network at the most, connect the road with Kobuleti-Batumi bypass (connected to Turkish border) and Samtredia-Lanchkhuti-Grigoleti road under construction so that to consider the prospects for construction of new ports in the Black Sea and arrangement of complete interchanges to link access roads with ports. Length of the project road section is about 40 km and starts from Poti City, the right riverbank of Rioni, and continues till Kobuleti bypass (which is already constructed under the ADB financing).

Water and sewage

Drinking and industrial water supply of Poti is carried out through the city's central water supply pipeline, the main source of water supply of which is the ground water. The water supply headworks are located on the territories adjacent to the municipalities of Senaki and Martvili districts. Nowadays, the city is supplied with a sufficient amount of water (400 l / day per capita). However due to unsatisfactory technical condition of the distribution network part of the population is under the scheduled water supply. City water distribution network rehabilitation works are in the process of completion, after which the population will have a 24-hour water supply.Still a significant problem is the extraction and cleaning of waste water generated in the city area. Sewage and pumping stations are old and damaged, while treatment facilities are dead over the years and out of order.

Deterioration of the sewage system occurred after completion of the reconstruction of the water supply systems; in particular, amount of the waste water will be increased in parallel to the increase of the amount of water supplied by the population. Sewage collectors are not designed for such a load and therefore, there will be many damages. A critical problem is malfunctioning

of the sewage and drainage networks, due to heavy rains, some places of the city are flooded. Now the city's sewage system (collectors and pumping stations) rehabilitation work has started, as well as a new biological treatment plant is being built.Based on information, provided by the city administration, completion of the work is envisaged in the first half of 2016.

Waste

The cleaning and waste management responsibilities within Poti area are assigned to the municipal waste management company. It carries out domestic waste collection/disposal and streets (and parks) cleaning based on existing contracts. This entity has sufficient garbage trucks and other required equipment. The waste collecting containers are installed around the city area, but the segregated waste collection practices are not employed. The industries operating in the city area (including Poti Sea Port Corporation) have contracts with the municipal waste management company for the removal and disposal of domestic wastes. The management of hazardous wastes from the industrial enterprises is subject to the exclusive contracts with the companies licensed to handle and dispose hazardous wastes at specially arranged locations.

The Poti municipal landfill is located north-east of Nabada Settlement, at the south bank of Rioni River, 600-650 m apart from the closest residential building. Previously, the landfill was not fenced, and the wastes were not covered with soil, resulting in high environmental contamination risks. In June 2014 the landfill has been transferred to "Solid Waste Management Company of Georgia" (under the Ministry of Regional Development and Infrastructure - MRDI).
The Company has prepared the landfill rehabilitation plan and detailed design approved by MRDI, based on which the amount of 539 700 GEL have been allocated from the state budget for rehabilitation and improvements of Poti landfill. Based on approved design the following works have been undertaken at Poti landfill and completed by February 2015: rehabilitation of internal roadways, storm-water and leachate drainage systems, fencing the entire territory of landfill, covering the disposed waste by isolating layers of soil, installing guard booths and firefighting stand, lighting, planting trees, etc. The new Landfill Management Plan considers disposal of waste at designated cells with proper compaction and cover with soil, according to management scheme. [13]

11.5 Vulnerable Population

The following categories of vulnerable population has been identified in Poti

- Pensioners – their number in the town amounts to 8822;
- Veterans of the 2nd World War and the veterans of recent armed conflicts occurred in Georgia - 148 persons (disabled persons, whose incomes are below the minimum subsidence);
- Poor households - 266 families, whose per capita income is less than the fixed survival minimum); and
- Internally displaced persons – more than 6000 persons, from which 2235 persons are registered in Nabada Settlement and 319 are residing in two-apartment building located on the road to the new port.

11.6 Education

On the territory of Poti municipality 11 public schools are functioning (689 teachers, 6867 pupils). 5 vocational schools, 17 kindergartens, one university, network of libraries, and art exhibition hall. One theatre and up to 15 sport facilities are also operating in the city. According to the information of the city educational service center, no illiterate persons are registered on the territory of the municipality.

[13] *Source: Official website of the "Solid Waste Management Company of Georgia" (under the Ministry of Regional Development and Infrastructure - MRDI)*

11.7 Cultural Heritage

Poti Light House located at the south branch mouth of River Rioni, south of the port. This building was constructed in 1864.
Several buildings in Poti may be attained to the cultural heritage, such as:

- Cathedral of Nativity of the Holy Virgin – built in the center of the town in 1906-1907.The cathedral is the analogue of the existing Hagia Sophia Cathedral in Istanbul. Now the restoration works are underway in it.
- The Church of St. Nicholas located at the territory of former cemetery of the town. The cathedral was built with wooden material in1892 and in 1904 the wooden walls were replaced with brick walls. Since then in 1990 it was reconstructed.
- Niko Nikoladze Tower is a five-stored structure and located near to the central park of the town and the cathedral. The tower was built several times during 16-18 centuries, which was subsequently reconstructed several times.
- Poti light-house is located near to the south tributary to the river Rioni, which flows to the south of the existing port in the sea. It was built in 1864. In addition, several buildings are of the architectural value for the town. Among them is the building built in 1909, in which the children's library is located, the building of the first public school (built in 1902), second public school building (built in 1906).
- The church built in the 90-ies of the last century and the cemetery is located on the territory of Nabada Settlement.

11.8 Information Availability

There are two TV companies (9th channel and cable television), one local radio station "Harmony" and four newspapers issued ("Head news in Samegrelo", "Nikolozis Gazeti", "and Tavisupali Sitkhva"" and "Resume")in Poti: In addition to the aforementioned, on the entire territory of the region, as well as in Poti all the central printing media is disseminated in Poti (up to 35 newspapers and magazines) and the central televisions (Public Television, Rustavi 2, Imedi etc.) and the radio broadcasts.

There are several NGOs in the town. They are mainly involved with the human rights protection, information availability, youth etc. However, due to small finances, those organizations are underdeveloped.

11.9 Public Healthcare[14]

There are 10 medical institutions in Poti, including the hospitals (including 1 maternity hospital), clinics, laboratory and ambulance; 2 clinics are located in Nabada settlement. By the end of 2009, in total 107 hospital beds and 160 doctors were in the town. There are 33.7 doctors for 10,000 persons, which is the highest indicator in the region. (Reference: Statistical Directory "Health Care"" of the NCDC (National Center for Disease Control) of the Ministry of Labor, Health and Social Affairs, 2008. Tbilisi).

The level of the population sickness in country, as well as in the Samegrelo-Zemo Svaneti region, is mainly determined by the Respiratory and cardiovascular system. According to the data of 2011, their percentage ratio throughout the country amounts to 47% of diseases and in the region -45%. Such categories of the diseases as infectious, endocrinology, digestion system, eye and nervous systems diseases vary within the framework of 4-9% of total cases of the diseases.

[14]*Reference: National Service of Statistics. As of 1 January 2010.*

For Samegrelo-Zemo Svaneti region population and in particular, for Poti, the endemic diseases are not characteristic.

Universal State Healthcare Program

The universal healthcare program started on February 28, 2013. It guarantees health insurance for all non-insured individuals living in the country. As of April 2014, all Georgian citizens are covered for basic health insurance services. Up to 3.4 million people among them are covered by the Universal State Healthcare Program, 560 thousand people are the users of other state health insurance programs (such as: mental & behavioral disorders, diabetes, infections, specific medicines, etc.), while 546 thousand people have corporate or voluntary personal (among them individual beneficiaries form a very small portion) insurance.

Table 29: Georgian Population by Insurance Types

Insurance Type	Population
Universal State Healthcare Program	3,384,500
Other State Health Insurance Programs	560,000
Corporate or individual Insurance	546,000
Total Population	**4,490,500**

Source: USAID report - Universal Healthcare Program Summary, April, 2014.

Opinion polls (according to USAID report, April 2014) demonstrated that the enforcement of universal healthcare program resulted in increased financial access to healthcare services. The extent of the decline in the financial burden on the public is yet unknown. However, as a matter of fact as of May 5, 2014, 2.3 million beneficiaries are already registered for the universal healthcare program. Overall, there were 383,707 registered universal state insurance cases since it was introduced.

Universal State Insurance Program is designed to provide the following services:

1. For receiving **scheduled outpatient services** universal state insurance beneficiary should call the hot line of Social Service Agency (the Agency is launched by the MoLHSA) and find out information about service provider - medical institutions participating in the program. After choosing the respective service provider he/she can directly contact/visit the institution, register and fill the registration document of Social Service Agency (the Agency is launched by the MoLHSA) on place. After the registration procedure, client can get desirable services. Importantly, the registration may be changed every two months among different service providers. A beneficiary cannot register in more than one service provider institution at the same time. Scheduled outpatient services are covered in cases when it comes to the examinations for obtaining the status of disabled person, except of high-tech examinations; The same takes place for the issuance of medical certificates and receipts, except the situations when the medical certificate is required to be provided for the following reasons: to start a new job, to obtain a drivers' license and to buy a weapon.

2. In case of **scheduled inpatient services**, the beneficiary needs to select the preferred service provider and register on place. After the registration, selected medical institution should provide beneficiary with the following documents:
   - A copy of the identification (residence) certificate or the passport of the citizen of Georgia, and if the person is minor - a copy of the birth certificate (if not having the ID card)
   - Form # 100 (patient's diagnosis, interventions and investigations must be indicated in accordance with the classifiers established in the country)
   - Calculation of the cost of the needed inpatient services.

With those documents on hand, the beneficiary should apply to the Social Service Agency's service centers in order to get a letter of guarantee.

Scheduled inpatient services (GEL 15,000 equivalent to c. USD 8,500 annual limit) – with 70% covered by the state insurance, 30% to be co-financed by the beneficiary, but for the population < 18, the scheduled operations and examinations in cardiac and oncology are fully covered.

3. In case of **emergency inpatient or outpatient services**[15], the beneficiary can refer to any hospital/clinic without registration.
    - Emergency outpatient services are fully covered by the state insurance without co-financing of the beneficiary; Urgent outpatient services include all the medical services which doesn't require 24 hour stay of patient in the hospital, like: injuries, fractures, wounds, thermal injury (burn/freeze), poisoning/intoxication, nose bleeding, allergy management over anaphylactic shock, the risk of urinary retention, acute laryngitis, cardio-vascular deceases (hypertensive crisis, cardiac arrhythmias) and different kind of acute pain.
    - Urgent inpatient care services (limit GEL 15,000 equivalent to c. USD 8,500 per case) are fully covered for the following cases:
        - Intensive therapy and the management of critical conditions;
        - Selected urgent operations (provided as a list of 450 such cases) are 100% covered (including cardiac and neurosurgery operations) and all other urgent cases are 70% covered.

The payment for the medical services rendered is carried out directly by the government (in full or in form of co-financing, according to the service rendered).

Other State Healthcare Programs[15]

Other state healthcare programs aim to increase availability of expensive medical services for Georgian Population. Such programs are aimed to treat the patients with:

- Mental and behavior disorders – 70-100% coverage by the state;
- Child and adult diabetes – 100% coverage by the state;
- HIV-infection – 100% coverage by the state;
- Sepsis and parasitic diseases – 50-100% coverage based on age, limited total amount.
- Tuberculosis – 100% coverage by the state;
- Dialysis and kidney transplantation – 100% coverage by the state;
- Drug-addiction – co-payment of GEL 150 by patient a month;
- Immunization – 100% coverage by the state;
- Rare diseases – 100% coverage by the state;
- Palliative care for incurable patients – 100% coverage by the state; limited total amount;
- others.

Programs also ensure the provision of population with specific medicines – 100% coverage by the state.Referral services are among the other state healthcare programs. The beneficiaries of the program include the population injured during natural disasters, calamities, emergency situations; the citizens of Georgia living on "occupied territories" and socially vulnerable families.

[15] *Source: Social Service Agency, http://ssa.gov.ge/*

12 Prediction and Assessment of Impacts, Suggestion for Mitigation

12.1 Climate change impacts for Construction Phase

Climate change issue remains a serious problem, especially in the city of Poti, where the magnitude of cargo transportation has been considerably increased. None of the current infrastructure development projects are adequately assessing the situation. The impacts caused due to climate changes, might be followed by the floods caused due to flooding of the Rioni River in Poti and its suburbs, which will be related to the storm inflow. Now the beaches are being washed off and will be washed off in the future by the sea (which has already taken 600 hectares of Kolkheti coastal zone). Recreational and resort sector will be limited due to cooling the sea surface and shortening the touristic season. Fishery is under the danger of being damaged, due to the change of thermal conditions of the sea, the survival environment will be deteriorated for some fish and planktons species. The conditions in Kolkheti National Park will be worsened for some endemic fish and land animals, due to the increase of the water salinity.

Proceeding from the above listed issues, mentioned changes cause serious problem to Poti and its infrastructure, including Port of Poti. In order to prevent these climate change impacts, it is necessary to elaborate and implement the adaptation measures. The bank dykes of the river Rioni must be repaired, the channel headwork should be properly rehabilitated and moreover, permanent monitoring must be applied for controlling the locks. This work will be especially important in the case of real danger to the timely warning of population.

In order to combat against the washing out of the banks in the southern sector of the city, several projects have been elaborated, which offered artificial supply (re-fill) of sand in large amounts to the emergency areas of the banks (several tens of million cubic meters per annum) and constructing the bank protection engineering structures.

The climate change related issues (sea level rise, intensity of storms, etc.) will be considered in the detailed design of the Terminal prepared by “Chernomorniiproject” (Odessa). The construction phase itself will not contribute Poti coast into risks, related to climate change issues, due to the fact that the scale of reconstruction of existing harbor (New Port) facilities, as well as of dredging – is not significant. In terms of preventing construction site from storms and flooding (at Construction Phase) – the relevant protection measures are considered in outline emergency preparedness and response plan presented in Section 17

12.2 Climate change impacts for O&M Phase

At the Operation and Maintenance Phase of the Terminal project the Operator will be committed to consider climate change issues during operations, including proper planning for routine (maintenance) dredging and constant improvements to emergency preparedness and response plans related to flooding and storm risks. The operation phase of the Terminal will not contribute significantly in climate change issues. The mitigation at operation stage will be limited to measures for reducing the emissions and greenhouse gases (when/where possible) during the cargo handling and storing activities, as well as reducing waste generation and proper housekeeping; Providing power source to ships to reduce run of engines and ship generators when possible during loading/unloading at berth as well as the following measures to reduce emissions:

- Ensuring proper technical functioning of the machinery and vehicles;
- Selection of the optimal route and speed when the vehicles are moving;
- Stopping the vehicle engines or operating on the minimal turnover, when they are not used;
- Providing the instructions for personnel;
- Identification/registration of the complaints and proper response to it.
- Low sulfur content diesel will be used as fuel for generator sets to control emission of CO2;
- Any vehicle or machinery whose exhaust exceeds 5000 ppm of CO2 shall be refused.

All these measures are proposed within mitigation framework and various outline management plans presented in this report.

12.3 Impacts of dredging works at Construction Phase

Dredging works are required to be conducted within the internal waters of the new port for functioning of the harbors stipulated by the project of Multifunctional Transshipment Terminal, the purpose of which is to increase the existing 4.0 meters depth to 13 meters depth for full and safe sailing of vessels with high displacement.

Dredging works required for the project will be performed on 17.0 hectares. At the stage of deepening works approximately 1.5 million m^3 of sediments has to be dredged and transported for disposal in the special area earmarked for it,in particular, outside of the moll of the existing harbor to the south-west of Poti Sea Port, to the existing canyon in the open sea (figure 24 below). The permit for disposal of the dredge material in this canyon has been issued by the Ministry of Environmental Protection and Natural Resources of Georgia to Port of Poti in 2003 for the port maintenance dredging works (Conclusion #57 of State Ecological Expertise, dated 30 June 2003 and the Environmental Permit #0065 issued on 18 July 2003). The disposal of the dredge material in the subject Canyon is ongoing since 1930-ies. The Table 27 below presents volumes of dredged material disposed in the subject canyon from 1987 to 2015.

Table 30: Port of Poti dredging and dredge disposal volumes by year (1987-2015)

No.	Year	Volume of dredge material disposed in the Canyon (thousand m^3)
1	1987	513.6
2	1988	879.4
3	1989	786.9
4	1990	1,385.5
5	1991	957.1
6	1992	1,189.3
7	1993	623.6
8	1994	-
9	1995	1005.7
10	1996	32.1
11	1997	1,336.3
12	1998	451.4
13	1999	-
14	2000	961.3
15	2001	-
16	2002	262.9
17	2003	618.9
18	2004	1225.5
19	2005	949.8
20	2006	1247.1
21	2007	1364.6
22	2008	583.0
23	2009	1605.8
24	2010	760.8
25	2011	281.6
26	2012	509.8
27	2013	498.9
28	2014	388.8
29	2015	

Source: Statement from Port of Poti authority received by "Transford LLC" on 02 June 2015;

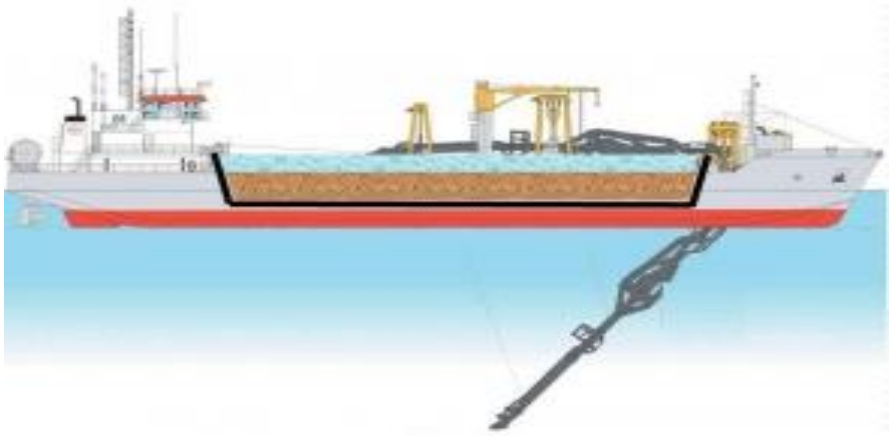


Figure 23: Sample view of self-loading/unloading (hopper trailer) dredging vessel (with suction pipe, pump and active drag head).

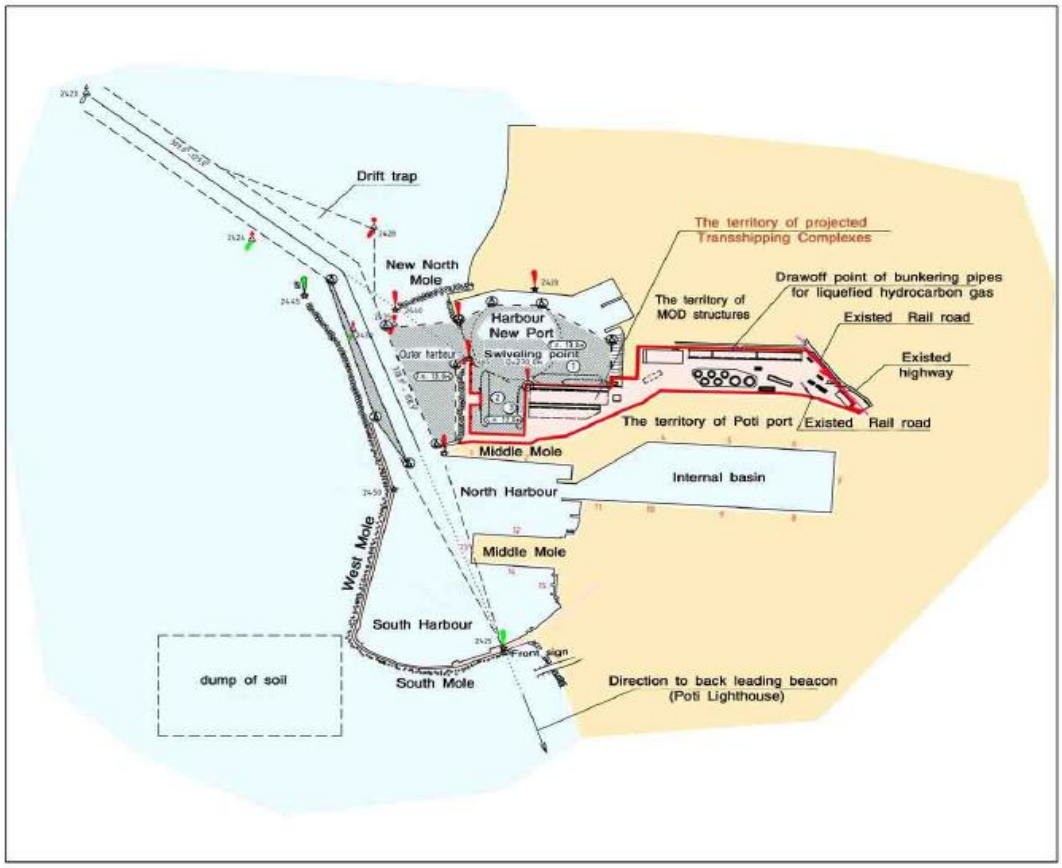


Figure 24: Layout of dredging area (shown as shaded)

(The Canyon area on the map is shown as a "dump of soil")

According to the project preliminary design documents the dredging operations should be undertaken by the self-loading/unloading dredging vessel (trailing suction hopper dredger) which will be transporting dredge material to the disposal site and dumping it under water. For the clean (not polluted) dredge material disposal there is also another optional location

proposed by the Ministry of Environment and Natural Resources Protection of Georgia (MoENRP) in the formal permit to Port of Poti (Letter #645 to APM TERMINALS, dated 18 June 2013) to dispose dredge material from APM TERMINALS at the location near the Poti Lighthouse (about half mile to the South of the Canyon and about 450m from shoreline).
The difference between two dredged material disposal locations is as follows:

The "Canyon" location is at the natural depression of the sea bed. Based on monitoring data of the Port of Poti and the former Coast Protection Department of Georgia (dismissed/revoked in 2004) the material disposed/dumped in the Canyon is not transported/distributed towards the coast and is rapidly covered by other sediments from the eroded steep slopes of the canyon (which is positive process if the disposed dredge material is polluted, to create a "natural capping"). This effect is described in assessment undertaken in 2008 by G.Lominadze, I.Papashvili, S.Khorava "Contemporary dynamics of Black Sea coast between Supsa and Rioni Rivers" based on bathymetry study results provided by Port of Poti. This effect is also described in the EIA prepared by ENVIRON and GAMMA for Port of Poti in 2010. The natural capping effect of the Canyon disposal site is described in the study *"The rivers of the Black Sea"* [16]": "…*The greatest amount of beach-forming sediment is swallowed up by the Chorokhi canyon, and under natural conditions losses could be as much as 1,800,000 m^3 a year, while 100,000 m^3 is lost to the Kodori canyon. Smaller amounts disappear into the Bzyb, Rioni and Supsa canyons. In addition to these estuarine canyons, loads also disappear into lateral canyons. Where there is excess of river alluvium and weak littoral (long shore) drift the canyons capture part of the beach-forming material…".*Initially this effect was described by Shalva Jaoshvili in 1986 in his work: Sh.Jaoshvili: "Accumulation of river born alluvium and beach forming at the Georgia Black Sea coast" Tbilisi, Georgia, 1986

The "Lighthouse" dredged material disposal location is at the small depth of flat seabed area, from which the disposed material is transported/distributed by waves/currents towards the coast and fills the eroded beaches of Poti coastline - which is positive process in case if disposed dredge material is clean/ not polluted.

In Government of Georgia (GoG) Decree #57 dated 15 January 2014 "On ships movement schemes, corridors and special zones within Georgia territorial waters of the Black Sea", the Canyon location is mentioned in Chapter 17 of the Decree as designated area #42 (with exact indication of coordinates) for any dredge material disposal in Poti area. It is GOG's and MENRP's (Ministry of Environment and Natural Resources of Georgia) as well as Poti Port Administration's responsibility to undertake the monitoring of the dumpsite/canyon for pollutant levels and distribution, impact on biodiversity, impacts on human health (e.g. from fish caught near the dump site area), as well as to estimate the carrying capacity for the dump site, that may result in restrictions on the volume of material permitted to be dumped in the future. At the moment there are no such restrictions. No monitoring is being undertaken from governmental (ministerial) part due to lack of funds. No data available.

Heavy metals in sediment samples from port and dredge disposal area "Canyon"(2003)

	Cu		**Zn**		**Pb**		**Mn**		**Fe**		**Cr**	
NN	mg/ kg	**%**	mg/ kg	**%**	mg/ kg	**%**	mg/ kg	**%**	mg/ kg	**%**	mg/ kg	**%**
1 external	28	0.0028	115	0,0115	41	0,0041	3300	3,30	3450	3,45	33	0,0033
2 internal	29	0,0029	110	0,0110	39	0,0039	2880	2,88	3280	3,28	30	0,0030
3 canyon	29	0,0029	100	0,0100	40	0,0040	2900	2,90	1200	3,45	32	0.0032
4 canyon	30	0,0030	100	0,0100	41	0,0041	2900	2,90	2000	2,00	33	0,0033
average	29	0,0029	106	0,0106	40	0,0040	3000	3,00	2500	2,50	32	0,0032

Source: Environmental Impact Assessment of Port Maintenance Dredging Works" prepared by the laboratory of the Department of Mineralogy and Petrology of the Technical University of Georgia (led by I. Paradashvili) and Gamma Ltd (Conclusion #57 of State Ecological Expertise, dated 30 June 2003).

Since 2003 about 10 million m3 of dredged material was disposed at the Canyon site, therefore results about sediment quality from this table (above) should be taken with some reserve and are shown for indicative/illustrative purposes only.

[16]*The rivers of the Black Sea" by Shalva Jaoshvili, Technical Report #71, European Environment Agency, 2002)* referred in Subsection 8.11 of our EIA page 68.

The presence of heavy metals traces in sediments is not only an indication of pollution from ships, but mainly the silt brought by River Rioni from Chiatura area where there are a manganese and other heavy metals ore deposits. So the concentrations of Manganese (Mn) or Ferrum (Fe) are similar in neighboring areas of sea bed, where Rioni River influence is spread. This is very important argument directly discarding the alternative of on-shore disposal of the dredged material “due to high concentrations of heavy metals”.

Transford LLC shall commission a third party consultant to perform pre-dredging environmental impact assessment of capital dredging against Terms of Reference agreed by Landers that should integrate information on the characteristics of the dredged material and proposed deposit site conditions. It should comprise a summary of the potential effects on human health, living resources, amenities and other legitimate uses of the sea and should define the nature, temporal and spatial scales and duration of expected impacts. The assessment shall be based on the performed supplemental survey of the area to be dredged. The survey shall be composed of the adequate number of samples required to obtain representative results and physical, chemical and biological characterization of dredged material.

Considering that the bottom sediment samples, obtained from the projectdredging area, indicate certain level of contamination with the heavy metals and hydrocarbons, it was proposed (in Georgian EIA) to use “Canyon” location for dredge disposal in order to avoid distribution of the contaminated sediments along the Poti beach (that may happen if dredge is dumped at “Lighthouse” location).

Poti Port Administration and (MoENRP) will be informed and agreed about the sediment quality and the dredge disposal in the Canyon. The option of dredge disposal at the “Canyon” is confirmed by the GoG Decree #57 and the “Permit for disposal of the dredge material” issued by the Ministry of Environmental Protection and Natural Resources of Georgia to Port of Poti in 2003 for the “Environmental Impact Assessment of Port Maintenance Dredging Works” prepared by the laboratory of the Department of Mineralogy and Petrology of the Technical University of Georgia (led by I. Paradashvili) and Gamma Ltd (Conclusion #57 of State Ecological Expertise, dated 30 June 2003 and the Environmental Permit #0065 issued on 18 July 2003). The positive conclusion of the Ecological Expertise issued by the Ministry of Environment for the Terminal EIA (prepared under Georgian legislation) will become the part of the Construction Permit for the entire Terminal Project, issued by the Ministry of Economy. This permit will cover the disposal of dredge material in the Canyon, as discussed in the EIA and approved by Ecological Expertise procedure. No any additional EIA (for dredging, or for any other component of the Terminal project) is legally required to dispose dredge material in the Canyon, as it is discussed in EIA and approved by Ecological Expertise procedure.

In accordance with the outcomes of the pre-dredging assessment the Dredging and Dredge Disposal Method Statement and the EHS Management Plan (DDDMS and DDDEHS-MP) will be developed before the start of dredging. The DDDMS will include additional “pre-dredging” environmental study of marine biota, preliminary biological and chemical analysis of the dredging and dredge disposal areas, dredging methods, schemes and schedules, methods for analyzing the dredged materials for contaminants, how contaminated vs. non-contaminated dredged material will be disposed of differently. The DDDEHS-MP will include the following components: contaminated dredged material disposal, minimization of impact on marine biota, oil and fuel management, waste management, etc., also training, emergency preparedness and response procedures, dredging and dredge disposal Monitoring Program.

Analysis of Impacts

In general, the main impacts associated with dredging and disposal activities relate to direct loss of habitat of aquatic biota. Secondary effects are related to the formation of sediment plumes, which may affect fish or benthos because of the smothering and clogging effect of highly turbid waters on the gills of bivalves or fish, or the limiting of the photosynthetic process in plants. Nets placed in very silty areas tend to accumulate fine mud particles on their weave, and fish can see the net and avoid it or they slide easily off the net instead of becoming entangled in its mesh.

The rotary action of the dredger and the dragging of the suction pipe along the bottom may disturb the substrate placing sediments into suspension. These suspended sediments may then (when settle) smother nearby bottom-living flora and fauna. The effect may be significant in areas with fine sediments, which are more easily placed into suspension. The suspension of sediments should be minimized to the extent that the powerful suction pump on the dredger should be able to suck up these materials out of the water column.

Water Turbidity: The suspension of fine sediments in the water column creates turbidity, which scatters and attenuates light levels and potentially affects the growth of plants indirectly by reducing the availability of light and consequently the photosynthetic process in plants. Certain level of localized turbidity can be expected during proposed dredging works. At the same time, due to the weak water currents in this protected part of the port, the turbidity is not expected to move very far. From the desk studies and observations (undertaken by the ESIA team biologists) presented in Subsection 10.3, there is no sensitive or endangered biota in the inner port area to be adversely affected by light attenuation, due to more than century of port operations, continuous/permanent dredging of the port access and consequences of Black Sea eutrophication. For the dredge disposal area (Canyon) it should be noted that the turbidity regularly occurring after prolonged rainfalls, and subsequent powerful shots of suspended solids from Rioni and Supsa Rivers would potentially have a much more deleterious effect than that caused by the proposed short-duration dredging works.

Dredger Spillage and Leakage:

i. Deliberate spillages: It is a practice in some dredging operations to maximize the amount of solid material in the hopper hold by allowing the slurry water mixed with the dredged material to overflow from the vessel. In the case where fine sediments are being dredged, this results in high turbidity of the water surrounding the vessel, which could then be transported by surface water currents. A second means of deliberate spillage occurs when the bottom gates of the hopper hold are opened slightly so as to release sediments while the vessel is on route to the reclamation site. However, in Port of Poti case as the dredging and dredge disposal site are very close to each other, this potential impact is not expected to occur. All the above issues should be considered and covered within Dredging and Dredge Disposal Method Statement and HSE Management Plan.

ii. Accidental spillages: The amount of material leaking from the bottom gates of a dredger would normally be insignificant. However, if a hard object or rock becomes lodged between the gates, then material will steadily spill out of the holder into the water column. In some cases measures can be taken to avoid or reduce the severity of the impact, and the appropriate mitigation measures are identified. In other cases the impacts cannot be avoided or successfully mitigated if the project is implemented and these represent irreversible impacts.

Summary of Potential Impact: The potential impacts related to dredging operations at Port of Poti are summarized below. In some cases some measures can be taken to avoid or reduce the severity of the impact and to identify the appropriate mitigation measures. In other cases the impacts cannot be avoided or successfully mitigated if the project is implemented and these represent irreversible impacts. The major potential impacts relevant to the proposed project are:

Positive Impact

- Improved capacity of entrance channel and helps harbor to receive vessels
- Improved navigational safety in entrance channel
- Increased employment opportunities, earnings and economic activity related to increased vessel movement.

Negative Impact

- Sedimentation and turbidity affecting benthic communities along approach channel and at Port basin due to suspension and dispersal of fine sediments.
- Medium term loss of biota at dredge disposal site.
- Hindered boat/ship traffic and fishing during the dredging operations.

Noise Pollution: Given the proximity of the dredging operation to residential areas, the noise generated by the dredging vessels may cause a level of auditory discomfort, especially at night, which is difficult to evaluate in the absence of any noise measurements for dredging operations. However, given the very short-term nature of the dredging works, and restriction to working during the daytime only, it is not expected to be intolerable. However, the dredging vessels being employed to carry out the dredging works should be modern vessels fitted out with noise abatement equipment.

Visual / Seascape Impacts: The presence of the dredging vessels possibly could appear as a visual intrusion on the normal seascape to some individuals. However, given the normal nature of shipping activity in this area, and the short-term nature of the proposed dredging operation, this potential impact is not considered to be intolerable or significant.

The Effect on the Recreational Use: is, in general, one of the important effects to be considered during the expansion or reconstruction of a port facility. However, as far as dredging and dredge disposal activities are concerned, the impact is not of major significance since works are performed in a short time period and in areas located at the sufficient distance from the recreational beaches (about 1.7 km and more).

Impairment to Fishing Activities: The generation of turbidity and dispersed sediments by dredging prevents fishermen from being able to see and find their fish pots, clog gill nets, and cause suffocation of fish caught in traps. The additional study to be undertaken within preparation of Dredging and Dredge Disposal method statement and management plan will show if there is any seasonal migration of these limited fish species in the Port of Poti area and if dumping of dredged materials needs to be regulated to mitigate against this at certain times of year. Also there will be clear distinction between:

- Impacts in the port area (where there is no commercial fishing operations)
- Impacts from dredging the access channel (where there is no commercial fishing operations and/or other livelihoods)
- Impacts from dumping dredged materials at the dump site (Canyon) - which could affect commercial fishing operations or other livelihoods.

However, as the local fishermen of Poti offers full support for the port construction, there is no need to consider the impairment to fishing activities.

Modification of Wave and Current Pattern inside Port: The minor modifications of the bathymetry of the Port of Poti inner aquatory will not in any way change or modify the existing pattern of currents and waves in the open sea.

Dredge/Spoil Disposal: The potential impact would be dependent on the economic value assessed on the ecosystem. From the environmental point of view, it is very difficult to assess the economic value of the Canyon area especially the ecological function that it offers. However, from various marine biota studies,(GEF BSEP “Marine Biological Diversity in the Black Sea - A study of Change and Decline” UN Publications 2009) (WB ICZM Project for Georgia by Halcrow, 2005) no endangered or endemic species of flora or fauna are revealed in the Canyon area. All

seldom species noted here are very common and hence, the proposed reclamation could have only limited short-term impact on inshore biological resources and ecosystems.

Table 31: Summary of potential adverse impacts of dredging

Activity/Impacts	Potential negative impacts	Impact significance	Mitigation possible	Duration	Magnitude	Extent
Dredging	Loss of benthic biota	Low	No	Long	Small	Local
	Modification of currents and waves patterns	Low	No	Long	Small	Local
Sediment disturbance and overfilling of dredger	Settlement of suspended solids	Moderate	Yes	Short	Small	Local
	Attenuation of light in water column	Low	Yes	Short	Small	Local
	Dispersion of contaminated sediments	Low	Yes	Short	Small	Local
	Degradation of pelagic habitat	Low	Yes	Short	Small	Local
	Damage to fishing gear	Low	Yes	Short	Small	Local
Presence/location of dredgers	Increased ambient noise level	Low	Yes	Short	Small	Local
	Impaired visual aesthetics/seascape	Low	Yes	Short	Small	Local
	Hindrance to other boat traffic	Moderate	Yes	Short	Small	Local
Leakage of sediments during transportation	Increased turbidity over sensitive inshore habitats	Low	Yes	Short	Small	Local
Dredge disposal	Sedimentation of deep-water benthic habitat	Low	No	Short	Small	Local
	Degradation of pelagic habitat	Low	No	Short	Small	Local

There are usually some uncertainties in predicting the potential impacts at the EIA stageduring its preparation. Key components of the dredging program such as the dredge methodology, dredge schedule, sediment spill sources and climatic conditions encountered during dredging may not be well defined, and this will typically be reflected in the accuracy of the predictions and potentially also in the choice of mitigation measures. Prior to the commencement of the dredging works Contractor will perform a pre-dredge survey. This will be executed to verify the actual depth and the total volumes to be dredged, to verify ESIA data on marine biota, to identify/confirm actual need for specific mitigation measures such as use of silt screens. (The purpose of the silt screens is reducing of the area where suspended sediments are visible. This effect is achieved by creating a screen of geo textile that is suspended from floaters at the water surface down to a specific water depth). The intermediate surveys will also be performed to monitor the production volumes, turbidity, and other effects during the dredging works. Proposed mitigation is presented in Section 14 “Environmental and Social Mitigation Framework”, Table 47.

12.4 Impacts of dredging works at O&M Phase

Routine dredging at O&M phase in terms of scope and types of impacts doesn’t differ much from the initial dredging at construction phase. Considering the volumes and intensity of maintenance dredging – the scale of impact will be less significant and limited in time. The

dredging contractor will prepare the detailed dredging plan including the EHS component and all relevant mitigation measures – subject to approval by Terminal Operator responsible for the overseeing the proper implementation of the Plan. Plan should be agreed with the Port administration and the Ministry of Environmental and Natural Resources Protection. The mitigation of dredging impact at O&M phase is presented in Section 14 “Environmental and Social Mitigation Framework”, Table 48

Additional sediment assessments should be performed:

The next steps within the additional assessments of the dredging should be:

- This concentrations of identified contaminants should be compared with the baseline levels for sediments
- Samples containing the contaminants of potential concerns should be further processed by both elutriate and bioavaibility tests
- Finally for any of contaminants of potential concerns have been found to be bioavalble toxicity test is required

12.5 Impact on water quality at Construction Phase

During the course of the construction work the risk of pollution of groundwater as well as sea waters is possible. The risk of groundwater pollution is essential taking the high and close to ground surface into account. In order to minimize the risk of water pollution, the construction contractor shall take the following measures:

- Installation of storm water collecting channels throughout the perimeter of the construction site;
- Storage of the construction materials (cement, paints etc.) in a special storage facilities;
- Installation of the gravel layer on the site for parking of the vehicles and construction machinery, where the section will be separated for technical service and filling with fuel;
- Equipping technique with dripping devices to prevent the risk of oil and oil products leakage from the construction machinery;
- Segregated collection of the construction and domestic wastes, allocation of the facilities for temporary disposal of the hazardous wastes, acceptable from the point of view of the environmental protection and withdrawal-decontamination of such wastes through the contractor having the relevant permit for such activity.

12.6 Impact on water quality at O&M Phase

At the operation phase of Multifunctional Transshipment Terminal, domestic/faecal waste water will be connected to Poti sewer collector and treated at Poti WWTP. Currently the city's sewage system (collectors and pumping stations) rehabilitation works are ongoing, as well as a new biological treatment plant is under construction. According to information provided by the city administration, the work will be completed in the first half of 2016.

The Terminal design considers construction and regular maintenance of the storm water system at Berth-1 (dry cargo) with pre-treatment before discharge into marine water. Installation of the settlement and separation tanks equipped with sand filter is considered at the end of stormwater collecting channels for treatment of the collected stormwater prior to its discharge to the sea waters;

All storm waters from paved surface of the berth at the territory of Terminal as well as industrial/wash waters that may be potentially (“conditionally”) polluted by dust and particles from dry/bulk cargo, are directed to the stormwater collecting and treatment system with sand filter and sedimentation chamber. Water is pumped from the collectors to the sand trap facility, from which the treated water is flowing by gravity flow to the internal waters of the port- please see figure below.

Based on design solutions for stormwater collection and treatment provided by the design institute “Chernomorniiproject” (Odessa) for the Phase-I (dry cargo at Berth #1) the installation of so-cold “sand catcher” is considered at the end of collecting system. For the Berth #2 (oil and liquid gas products) and Berth #3 (dry cargo), where reconstruction is subject of future Phase-II, the design solutions have not been provided. It is envisaged that the oil-water separator will be installed at the end of storm/flash water collecting system for Berth #2.,

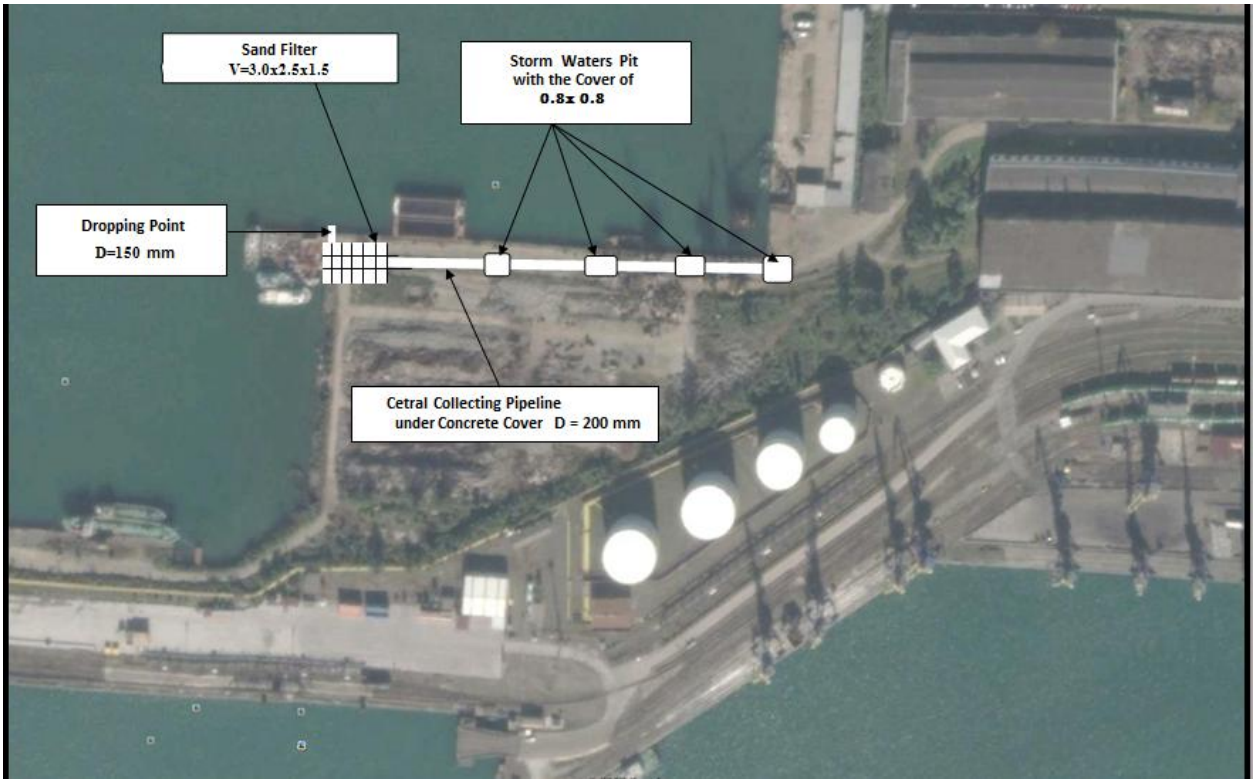


Figure 25: Schematic plan for stormwater collector and sand filter

(for the Phase I of the Project for reconstruction of the Berth-1,prepared by Universal Company based on Chernomorniiproject preliminary design)

The impact of the stormwater on marine water quality will be reduced through the use of separators and proper maintenance of the filters. Additional monitoring of discharged water quality from treatment facility will be performed to ensure that the discharge water quality is acceptable. The impact of dredging on marine water quality and biota is discussed in previous subsection.

Volume of the storm waters is calculated according to following standard formula:

$$\mathbf{Q = 10 \times F \times H \times K}$$

Where:

Q is a volume of storm water, m^3/daily (m^3/annual.);
F is an area of the reporting territory (in hectares, ha);
K is a surface coefficient (for solid cover/pavement 0.23, for open ground 0.064);
His an amount of rainfall taken as per the hydro-meteorological data (mm/day or mm/year) (According to „Construction Climatology“) in particular, amount of rainfall in Poti is:

Table 32: Rainfall data for Poti

N	Items	Amount of rainfall Annual. mm	Day/high minimum of rainfall. mm
138	Poti	1720	268

The project territory that has a total area of 2.2 hectares, out of which area 1.05 ha of the berth #1, which is mostly covered/paved with solid cover (concrete) can be potentially ("conditionally") polluted with industrial dust or oily dust. Using the mentioned data, the maximum daily and average annual volume for conditionally (potentially) contaminated waters is:

Conditionally (potentially) contaminated storm waters:

Q/day and night=10 x 268 x 1.05 x 0.23 = **647.2 m^3/day/night;**

Q/annual = 10 x 1720 x 1.05 x 0.23 = **4,153.8 m^3/annually.**

Calculations show that the during the heavy rains, maximum of **647.2** m3 storm water may occur overnight, and per year on average –**4,153.8** m3 of storm water. Mentioned amount of water is considered conventionally contaminated and has to be treated. Proceeding from the aforementioned, amount of storm water subject to treatment, i.e. **920.0 + 4,153.8 = 5,073.8 m^3/per year.**

All other industrial waters from the territory of the Terminal, will also be pumped from the receiving collector reservoirs to the sand trap facility, from which the treated water will flow through gravitation to the internal waters of the port. Domestic sewage system will be connected to the city of Poti sewage system.

For the construction works it will be necessary to provide certain quantity of inert materials – mainly gravel, which will be implemented from the gorge of the river Rioni River Khobistskhali. The process of the inert materials mining and crushing-grading is related to deterioration of the rivers' water quality. Only the licensed quarries should be selected for supplying with the inert materials and in case of utilization of the new quarries, it will be necessary to license them under the established rule.

Considering that Georgia is signatory to MARPOL Convention, Transford LLC, is committed Terminal operator to implement measures for compliance with the specific requirements of the convention, to prevent pollution from ships berthing (loading/unloading) at the Terminal. Transford LLC and the Terminal Operator will work closely with Poti Port Authority and Poti Municipality to facilitate and support developments and improvements towards compliance with MARPOL requirements on prevention of pollution by oil & oily water, control of pollution by noxious liquid substances in bulk, prevention of pollution by harmful substances carried by sea in packaged form, prevention of pollution by sewage from ship, prevention of pollution by sewage from ship, prevention of pollution by garbage from ships, prevention of air pollution from ships. The mitigation measures are presented in Section 14 "Environmental and Social Mitigation Framework" and Section 17 "Outline Environmental and Social management plans".

Specific measures to prevent impact on marine water quality during the dredging operations are discussed in Subsections 12.3 and 12.4

12.7 Impact of Berth-1 demolition and impact on soil at Construction Phase

Demolition works at the existing Berth-1 may cause short-term adverse impact during the demolition (dust, noise, debris) and the long-term adverse impact in case of improper disposal of demolition waste. The mitigation measures for these short term impacts are presented in Section 14, Table 47 “Mitigation Measures at Construction Phase” (items related to dust, noise and waste). In terms of disposal - according to Paragraph 12 “Wastes” of IFC PS3, - the developer Transford LLC will avoid generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, Transford LLC will reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment. In order to reduce the volume of concrete waste transportation for disposal, it is proposed by Transford LLC to reuse the crushed concrete waste generated from demolition of the existing structures of Berth-1 (concrete foundations, concrete sleepers, concrete covers and bases, monolithic concrete top-coat, precast concrete slabs, concrete arrays rear coupling, concrete piles, etc.) for the backfilling behind the sheet piles to be installed along the entire reconstructed Berth-1 (so about 80% of the demolished concrete can be re-used). Where waste cannot be recovered or reused, Transford will obtain all necessary permits and will dispose waste at the locations officially designated (and provided to Construction Contractor) by the Poti Municipality, following the standard procedure. The Transford will oblige licensed Contractor to dispose demolition waste in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the construction waste material.

During the course of the construction work soil and ground contamination may be expected in case of the accidental spillage of oil products from the vehicles, or violation of the rules for the domestic and construction wastes management and disposal, or storm waters spillage without treatment, other. In order to minimize the mentioned negative impact at construction phase, it is necessary to perform the mitigation measures described further in Sections 14 and 17 of this report. As it has been mentioned in Subsection 8.7, the removal of the contaminated layers of the exposed soil at the territory of Terminal prior to starting the construction works and disposal at licensed quarry is considered. Supplemental soil contamination assessment will be undertaken to cover total area of new port (including Project Phase-II area) and the management plan for all contaminated soil removal and adequate treatment/disposal will be developed.

12.8 Impact on soil quality at O&M Phase

Considering the concrete lining/pavement of the most of terminal surface area, the major soil contamination during the operations is not expected. The contamination of soil will also be prevented through proper waste and spill control management planning.

12.9 Noise impact analysis for Construction Phase

The impact caused due to noise dissemination, is expected during the process of the construction works, as well as during the operation of the terminal.

During the Construction Phase, noise dissemination will be related to performance of the following works:

- Transportation of materials, waste, labor by vehicles;
- Materials loading/unloading with support of the machinery;
- Various works related to the infrastructure arrangement, which are performed through the special machinery, e.g. cranes, dozers etc.

Aim of conducting the ***noise modeling*** was an assessment of the expected environmental impact of unwanted sounds and mechanical vibrations (noise and vibration) generated during construction and operational stages of the new Multifunctional Transshipment Terminal at Port of Poti.

The following works were conducted according to the action plan of modeling: the study of the existing data (project reports, schemes, maps, published materials, legislative acts and others), selection of the control points and defining of natural (baseline) noise levels, in the conditions of construction and operation, finding the relevant noise features for the machineries and equipment which may be used, performance of calculation and assessment of the expected acoustic situation for the construction and operational stages, also identification of relevant mitigation measures and proposed monitoring.

Georgian regulation "On approval of environmental quality standards" in the form of sanitary norms (Sn 2.2.4/2.1.8.000-00) sets the permitted levels of sound for residential and public buildings, as well as for residential areas. Extract from this document is presented in the Table 33. The table shows that noise at the residential buildings (dwellings) should not exceed permitted values of equivalent and maximum sound levels, or both of requirement should be met.

Table 33: Permitted values of equivalent and maximum noise levels

Site designation, daytime and night	Equivalent sound level, dbA	Maximum sound level, dbA
Territories adjacent to residential houses, schools and other educational buildings		
From 07:00 till 23:00 (daytime)	**55**	**70**
From 23:00 till 07:00 (night time)	**45**	**60**

Source: Sanitary Norms Sn 2.2.4/2.1.8.000-00

Determination of the baseline noise

Natural (baseline) noise levels are established at the territory adjacent to the new berth and at the nearest marginal residential area (control-measuring points 1 and 2). Measurements were conducted in March 2015, during daytime, by using acoustic tract complied for analyzes and exact integrative noise level meter of 00026 type. During the study process there was calm weather (wind speed did not exceed 3 m/s), in the daytime the temperature was 18-21 ^{0}C. Results are presented in the Table 34, control-measuring points are marked on the maps (Figures 26-28). Study of equivalent sound level in the control-measuring points during construction and operational phases, and the comparison of these data with the baseline values allows to determine the actual changes in noise levels. Based on conducted study and calculation, it is possible to assess the expected changes.

Table 34: Baseline noise levels at measuring points

Measurement points	Measurement location	Equivalent noise levels $L_{Aekv(0,25h)}$, dbA
Point 1.	Project territory (north.42^{0}09'32~,east.41^{0}39'28~)	**33**
Point 2.	Nearest residential area, at the distance 700m (from the Point 1) (north.42^{0}09'24~,east.43^{0}39'57~)	**35**

Assessment of the noise impact during construction

The main sources of the noise during the construction process are represented by operating construction machinery and vehicles. List of machineries and equipment commonly used during construction, and their corresponding noise features are presented in the Table 35. Data on noise features are published in different sources or are adopted as a result of previously performed measurements.

Table 35: Construction machinery and their output sound

Name of the car (Equipment)	Quantity, piece	Sound level *L_{Aekv}, dbA
bulldozer	1	65-70
excavator	1	60-67
mining trucks	4	53-59
mobile crane	1	51-57
concrete pump	2	60
concrete mixer	1	61
dredger	1	67

* ***Note:*** *at 20 m distance from the machinery*

Considering that construction area will be located in the zone of new Berth-1 (in 100-meter coastal zone), the expected equivalent noise levels at the different distances from the center of this zone will be as presented in the Table 36 below

Table 36: Equivalent noise levels

Distance from the middle part of the construction area, m	Equivalent sound level L_{Aekv}, dbA
100	60
200	54
400	48
650	42

Calculation was done for adverse conditions. It means that long-acting construction machinery and vehicles are working at the same time and around the geometric center of the same construction area. In reality, one group of the vehicles will act periodically or during the short periods of time. Machinery will be distributed around the entire construction area. Subsequently, the total impact of the noise on environment will be less than it was calculated by this study.

Except the machineries mentioned in the table there will be dredging vessel/equipment working within New Port aquatory during the entire construction phase. According to the preliminary data this equipment will be hopper trailer dredging vessel with suction pipe, pump and active drag head. Noise generated by such machineries during operation is measured as the sound level at 25 m distance from the ship board. According to the existing data, sound level generated by dredgers at this distance is 66 dbA. If such noise source operates in the port aquatory at minimum 700 m distance from the nearest residential area, its noise level at the residential houses will be 42dbA. This value does not exceed the permitted night-time level for the residential buildings (45dbA). So it can be concluded that the expected sound level at the nearest residential buildings will be within the permitted values in the daytime as well as at night in case of simultaneous operation of construction machinery and the dredging vessel. Expected area of the noise spread in the form of contours of the equal sound level is presented on Fig.26 and 27).

Assessment is applied assuming that transport operations and short noisy operations are performed in the evening and at night. Also it was considered that construction works at the initial stage of the development of Terminal will be performed within the coastal zone (at the 600-700 m distance from the nearest residential areas). At the later stages (Phase-II), when construction covers the rest of project territory (within less distance from the residential buildings/houses), new assessment of an acoustic situation and the relevant correction of mitigation measures may be required.

Vibration

Vibration norms in the residential and public buildings are established by Georgian legislation (sanitary norms Sn 2.2.4/2.1.8.000-00), which establishes permitted vibration values for the people's health. Spread of vibration in the ground depends on geology characteristics. It is estimated that vibration impact on people in the buildings should be excluded if the distance between the building and vibration generating machinery exceeds 100 m. Results of the survey of Transport Research Laboratory (TRL), 2000: "Ground borne vibration caused by mechanized construction works" (TRL Research Report) are published. According to these results, considering distance 700m to the nearest Poti residents, vibration during construction works is negligible. Accordingly, it is expected that there will not be any vibration impact on population.

Noise Mitigation Measures

During work planning stage

- To consider use of less noisy construction equipment, trucks, small ships (barges, lighters), dredger and port machinery; to consider using of noise and vibration reduction equipment recommended by producer;
- Using acoustic screens to protect population from transport noise, if necessary;

During construction stage

- Using less noisy construction cars and technologies;
- Performing noisy operations only daytime;
- Equipping workers with individual protective equipment from noise and vibration.

12.10 Noise impact analysis for O&M Phase

Assessment of the noise impact on population during operational phase

According to the preliminary data the following equipment will be used within New Port aquatory and at the Terminal territory (Berth-1) during the Operation and Maintenance Phase: small ships, maneuvering and pilot tugs, motor boats, port crane, and trucks. Besides, the routine dredging works will be conducted using dredging vessel. The noise from large cargo ships entering the harbor is very short-term and thus not considered. Relevant noise features are presented in table 37.

Table 37: Main noise sources

Source of the noise	Quantity	Sound level, dbA
Dredging vessel, at 25m distance	**1**	**67**
Maneuvering tugs, lighters, motor boats	**3**	**65-70**
Pilot tugs, on 25m distance	**1**	**63-70**
Port crane, on 10m distance	**1**	**66-73**
Trucks, on 20m distance	**10**	**53-60**

Vessels functioning aquatory is minimum 700 m away from the nearest residential areas, port crane – 600-650 m. Trucks will move at the territory of Terminal, as well as using city streets near to the residential houses. Data presented in the Tables 34 and 36 have formed noise spread picture on project territory during working of named machineries and vessels at construction and operation phases. The results of assessment are presented on Figures 26-28 (the assessment of noise level and modeling have been undertaken by Universal Company in December 2014).

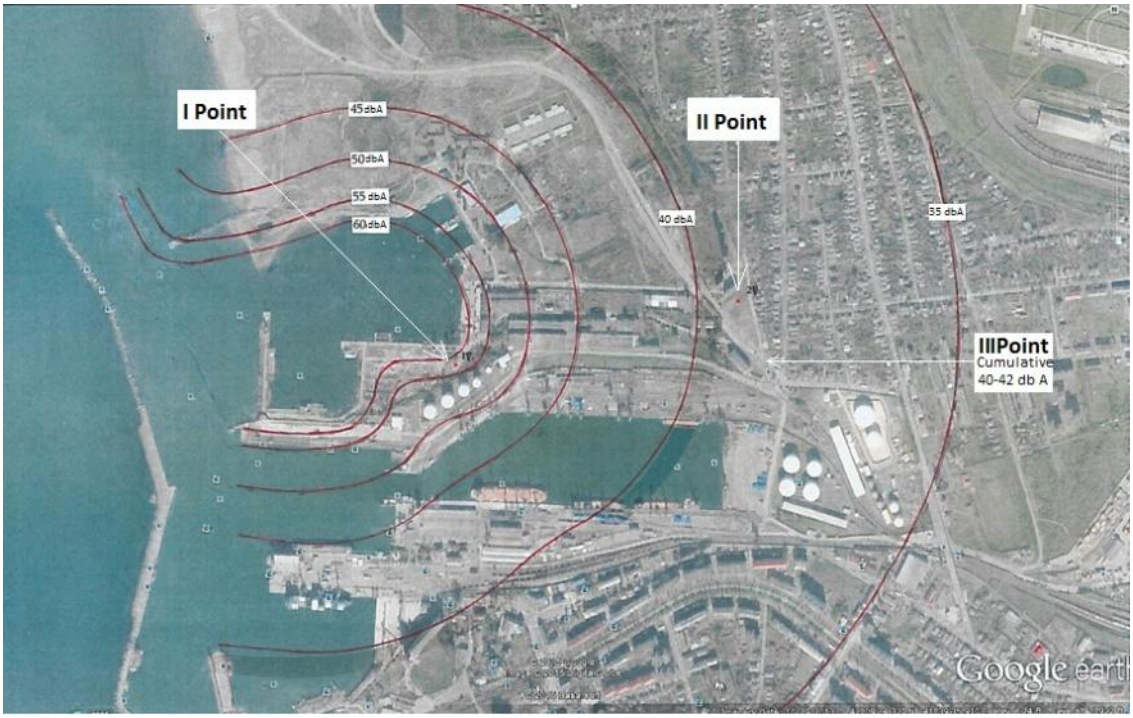


Figure 26: Location of noise measurement points

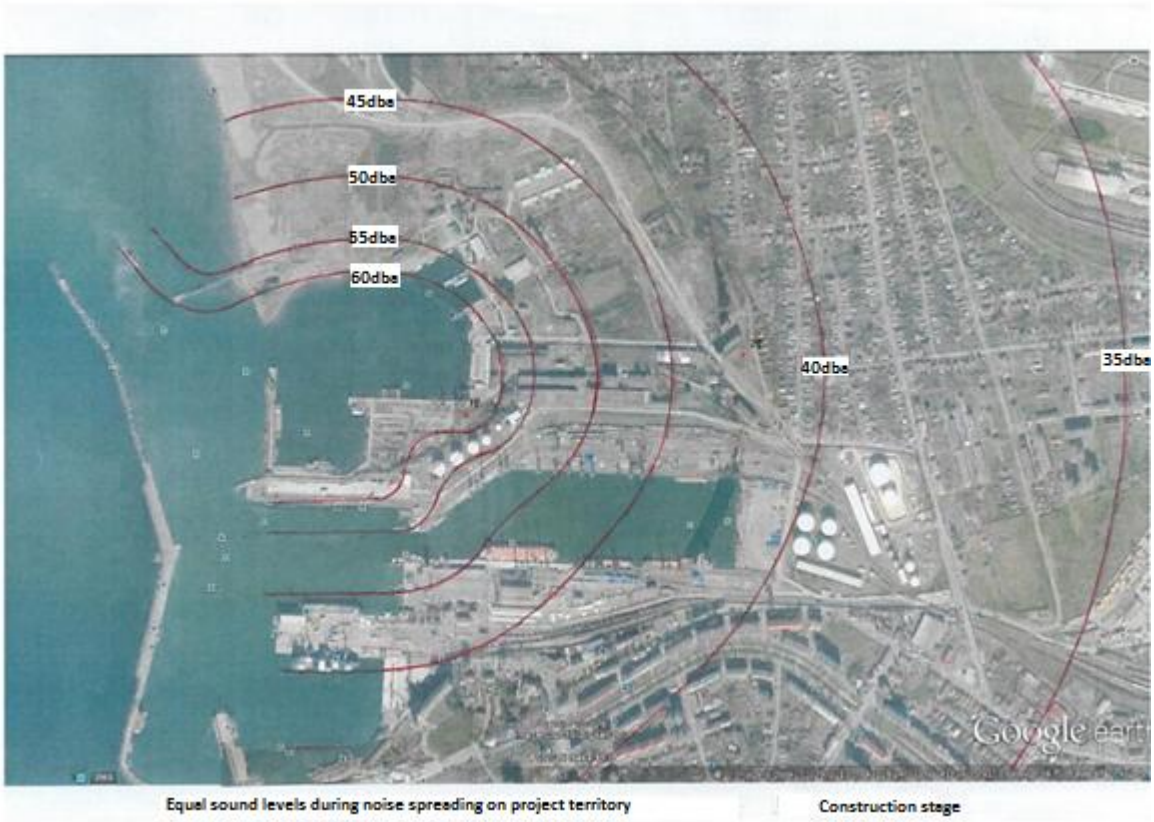


Figure 27: Noise dissemination at construction phase

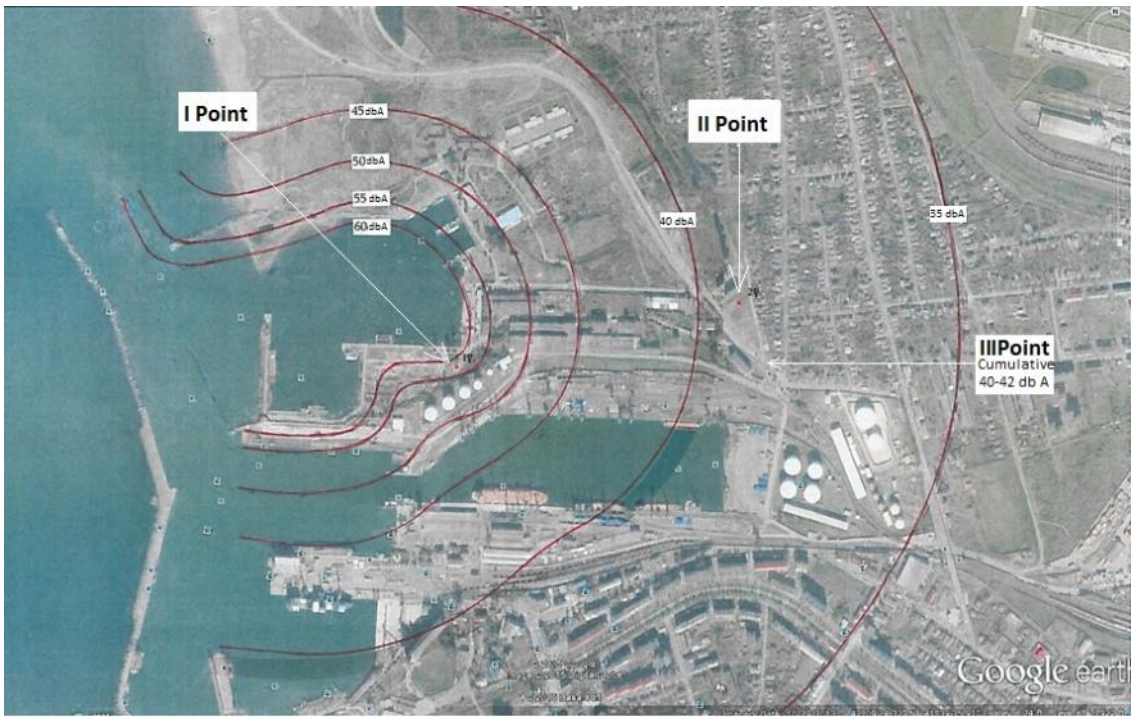


Figure 28: Noise dissemination at operation phase

According to preliminary estimates it is not expected to exceed the permissible noise level at the operation phase during daytime and at night. It should be mentioned that construction of any new infrastructure or buildings/facilities at the project territory reduces the possibility of noise spread to the direction of residential area, considering these buildings will perform the role of acoustic shields.

Noise mitigation measures during operational stage

- Implementing of regulated technical services and preventative measures of machineries, towing vessels, lighters, draglines and noisy equipment according to the defined rules;
- Performing noise monitoring and implementing of additive noise protective measures if necessary;
- Providing, buying and using of hearing protective individual equipment (headsets) for the staff;
- Using acoustic screens to protect population from transport noise, if/where necessary;
- Implementing of effective measures in case of receiving plaints/grievances about noise.

It is also conceivable that the noise levels dissemination is dependent upon such features of the physical environment, as: the atmospheric air density, atmospheric flows, local topography, natural or artificial barriers (green plants, premises, fences etc.), which will additionally enhance the limitation of the noise dissemination, accordingly, the noise dissemination levels' normed indicators are not expected to be exceeded.

12.11 Impact on landscape and visual impact at Construction Phase

A ship-building factory has been functioning for decades at the territory now allocated for the projected Terminal. Construction of the Terminal within existing industrial zone of the Port of Poti will not cause any significant impact on the landscape as well as on visual environment.

12.12 Impact on landscape and visual impact at O&M Phase

No impacts on landscape are expected at O&M phase.
In terms of visual impacts – considering the distance from the population and traditional (historical) industrial zone –only lighting impact during the night shifts for loading/unloading operations may create certain visual impact. The mitigation measures are considered to reduce visual effects fromlighting and presented in section “Mitigation Framework, as well as in “Outline Community H&S Plan”

12.13 Impact on flora and fauna at Construction Phase

a) Impact of the Flora

As mentioned above, the project area is located in traditional industrial zone (under historical anthropogenic impact) which is very poor in terms of vegetation, represented only by the herbaceous vegetation. Among the herbaceous vegetation, the protected species have not been recorded. During the Terminal construction the risk of direct significant impact on vegetation is minimized. Consideration significant distance (more than 2.5 km) of the project site from Imnati station of Kolkheti National Park, the negative impact on the vegetation of this protected area during the construction works is not expected.

b) Impact on the Fauna and Avifauna

The impact on aquatic flora and fauna (marine biota and habitats) during the dredging at construction phase of the project are discussed in Subsection 12.3. No endangered or threatened species or any significant habitats are present within new port area where Terminal is located and dredging operations are planned. None of trophic species were identified and the risk of direct exposure on the fauna is minimal during the audit process in terms of terrestrial fauna due to significant anthropogenic loading of the project area

During the course of the construction works and at the operation phase no significant impacts are expected on the terrestrial fauna species inhabiting the Kolkheti National Park (KNP) due to location of the Terminal within the traditional industrial zone with high level historical anthropogenic disturbance (about a century), which on its part is also separated from natural habitats of KNP recuperation zone by 4-9 km of Poti urban/residential areas.. The disturbance of the birds due to some noise and light may be only noticeable.

These birds may be accidentally found in the project area or in the vicinity of it due to proximity of the wetlands rich in species (Ramsar site and Colchis Imnati District National Park). In addition, it is expected that the wintering birds’ migration ways might be passing through the vicinity of the study area within the part of Kolkheti National Park / Ramsar section. No significant impact is expected during the daytime. During the night operations - appropriate lighting design will be implemented to ensure the site is not over-lit;
– Use of specifically design lighting that minimizes the spread of light and glare.
– Specify appropriate luminaries to reduce light spill, sky glow and glare;
– Sensitive placement and specification of lighting to minimize any potential increase in light pollution within the natural environment.

12.14 Impact on flora and fauna at O&M Phase

The impact on aquatic flora and fauna (marine biota and habitats) during the dredging at operation phase of the project are discussed in Subsection 12.4. No endangered or threatened species or any significant habitats are present within new port area where Terminal is located and routine dredging operations (maintenance dredging) planned.

No impact on terrestrial flora or fauna is expected during the O&M phase of the Terminal Project due to location within traditional/historical industrial zone.

The impact on avifauna and migratory birds during the O&M Phase of the project may be expected, but to minor/insignificant extent, considering the already disturbed area of Port of Poti and industrial zone. No significant impact is expected during the daytime. During the night operations - appropriate lighting design will be implemented to ensure the site is not over-lit;
– Use of specifically design lighting that minimizes the spread of light and glare.
– Specify appropriate luminaries to reduce light spill, sky glow and glare;
– Sensitive placement and specification of lighting to minimize any potential increase in light pollution within the natural environment.

12.15 Impact on the atmospheric air at Construction Phase

During the construction works such as demolition, construction and reconstruction of berths, supply and temporary storage of materials, waste removal - the generation of inorganic dust is expected. Dusting will also be caused by traffic and loading-unloading works.

Relevant construction infrastructure will be used for construction services. Infrastructure development is planned during construction mobilization phase. Construction infrastructure includes: small capacity (5 m^3/h) concrete unit, belt conveyor, auto transport, excavator and others.

According to the mentioned, sources of ambient air pollution will be presented in the form of organized and unorganized emission sources, namely: organized source – cement silos. Unorganized – belt conveyor and road cars.

Concrete batch plant

Concrete batch plant includes: concrete mixer, inert materials supply system, pneumo system, automatic control system and operator's cabin.

-Concrete mixer consists of internal crane equipment, as well as transporters and belt conveyors, which provides automatic supply of inert materials.

-System of inert materials dosing consists of collector tanker and automatic dosage apparatus, which is equipped with system of exact dosage and supply that provides automatic correction of concrete mass.

-Water and additive (in the liquid condition) supply system consists of camera for balancing, which provides the exact dilution. System is equipped with anticorrosive pumping device.

Control system is automatic. It has modern computer controller, which provides automatic control during process of concrete preparation, as well as automatic correction of water quantity.

Cement loading in silos (it is equipped with fabric filters), transportation and preparing of cement mass will be implemented in hermetically protected conditions, which will reduce pollution of atmosphere.

Batching factories (concrete unit) are distinguished by low air pollution, because technological process of concrete after mixing of naturally moist inert materials and the concrete is undertaken by "wet method".

The technology considers supply of inert materials using belt conveyors and concrete silos.

Gravel actual humidity ranges of 9-10 %, sand actual humidity - >10 %

2 cement silos with the total capacity of 50 t will be equipped with the relevant filter. Two open warehouses (300 m^2 each) for sand and gravel will be installed at the batch plant.

Total length of the belt conveyor – 10m; width – 1.0 m.

Calculation of emission was done for maximum values of consumables. A recipe for concrete (for 1m^3) is the following: sand – 650 kg; gravel – 1,100 kg; cement – 420 kg;

Maximum passport productivity of the concrete mixer is 5 m^3/h. Maximum annual estimated productivity during three-shift working (24 h) is evaluated for 8760 h/YEAR. Accordingly, annual output will be: 5 m^3/h * 8,760 h/YEAR =43.8 m^3/YEAR.

Cement will be supplied directly from the suppliers. Inert materials will be supplied from the licensed quarries. Based on the annual productivity the maximum annual consumption of materials is determined:

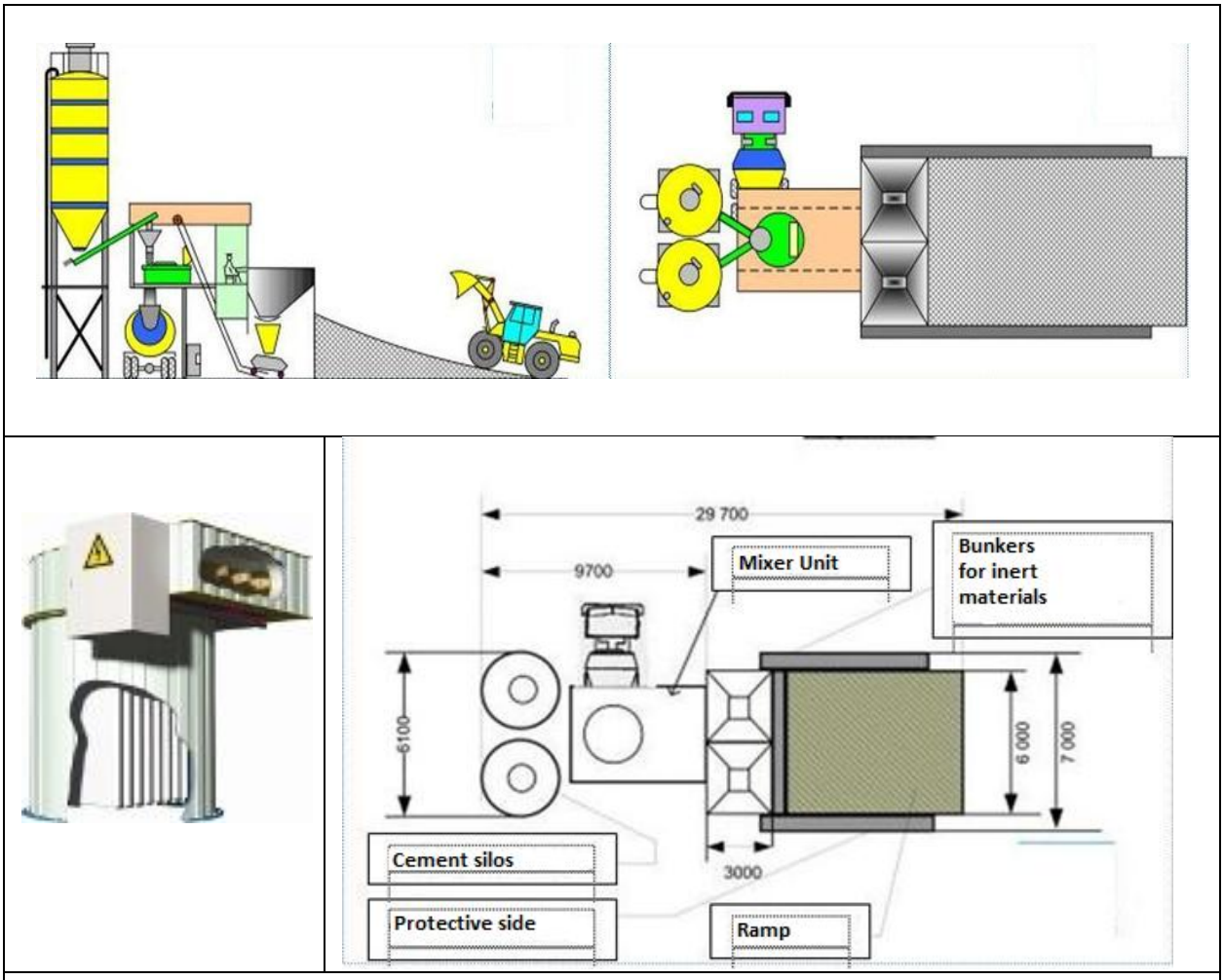
Sand – 0.65t * 5 m^3/h * 8760 h/YEAR = 28.4 t/ YEAR.

Sand humidity exceeds 3 %, so according to the "Regulation on calculation of maximum allowable emissions of pollutants to ambient air" (approved by MENRP decree #56 dated 8 August 2013) emission is not calculated.

Gravel -1.10 t * 5 m^3/h * 8,760 h/YEAR = 48.1 t/ YEAR. [5.5 t/h]

Cement – 0.420t * 5 m^3/h * 8,760 h/YEAR = 18.4 t/YEAR. [2.1 t/h]

According to the typical basic technological scheme, autoloader with the help of the ramp will deliver sand and gravel to the consumable bunkers (2 bunkers of the sizes – 3 x3 m). After that it will be supplied to the concrete unit via dosing system through the belt conveyor. Simultaneously, depending on required quality of concrete, computer system is regulating an appropriate proportion of ingredients (sand, gravel, and cement) and sending to the mixer unit. Hourly productivity – 5 m^3/h. The produced concrete goes to the final users by concrete mixers/trucks.



Technological process of supplying inert materials and cement to the concrete unit

Figure 29: Layout scheme of mobile concrete batch plant (Source: Universal Company)

Calculation of emission from the cement receiver (emission source 1)

Technological process of concrete production: cement is loaded into the silo from the cement lorry by pneumatic method. Then it is supplied by doses to the mixer through the scale via auger method. According to the relevant recipe, sand, gravel, water and components of the chemical additive (plasticizer) are added in the mixer previously.

According to the data of factory during a year 18,400 tons of cement should be supplied to the silo. Silo is equipped with the standard fabric filter, passport efficiency – 99.8 %. (Sleeved small fabric filter, mark - КФЕ-С, so-called filters for silo, are for the aspiration of overpressure and regeneration by compressed air). Filtered dust returns back to the silo. Length of the filter – 1m. Range of the air consumption – 300-1,000 m^3/h. Area of the filtration – 5-200 m^2.

According to the "Regulation on the methodology for calculation of annual emission of pollutants and emission limits" (MENRP, 2000) annual emission of cement dust will be 18,400 t * 0.8kg/t * 10-3 = 14.7168 t/YEAR. Considering passport efficiency of fabric filter emission will be: 14.7168 t/YEAR * (1-0.998) = 0.0294336 t/YEAR ≈ 0.03t/YEAR.

Calculation of maximum annual emission:

Average lifting capacity of one concrete lorry is 30 t, emptying time – 1h. (3600s); Momentary emission of cement dust will be 30 t * 0.8 kg/t * 10^3/3600 s = 6.667 g/s

Considering efficiency of fabric filter it is: 6.667 g/s * (1-0.998) = 0.014 g/s.

Concrete mixer is a closed system (from all sides) and it does not have a connection to the ambient air, so, dust emission into the atmosphere does not happen.

(A flexible tube installed on the concrete mixer is connected to the upper bunker and the dust which is arising at the moment of loading of materials, goes back to bunker).

Table 38: Calculated emissions

Code	Name of the substance	%	Mass (g/s)	Mass (t/YEAR)
2908	Inorganic (cement) dust	100	0.014	0.0294336

Calculation of emission during dredging operations (emission source 2)

Power – 55 KW. Fuel consumption – 55 KW/h * 0.25kg/KW= 13.75 kg/h.

Productivity 7,570 l/min * 60 min * 10^{-3} ≈ 450 m3/h. 1,500,000 m^3should be dredged annually. Loading time: 1,500,000 m^3/YEAR: 450 m^3/h. = 3,334 h/YEAR.

Annual fuel consumption – 13.75kg/h. * 3,334 h/YEAR. = 45,842.5kg/YEAR * 10^{-3} ≈ 46 t/YEAR;

Table 39: Specific emission factors for various fuels

Name of the harmful substances	Specific emission coefficients of the following types of fuel combustion			
	Petrol	Diesel	Liquid gas	Compressed air
Carbon monoxide, CO	0.44	0.125	0.44	0.22
Nitrogen dioxide, NO_2	0.025	0.035	0.025	0.025
Sulfur dioxide, SO_2	0.002	0.02	-	-
Hydrocarbons, C_xH_y	0.080	0.055	0.08	0.05
Soot, C	0.0006	0.015	-	-
Benzo(a)pyrene, $C_{20}H_{12}$	0.23g	0.31g	-	-
Carbon dioxide, CO_2	3.180	3.140	3.017	2.750

Table 40: Momentary emission

Name of the harmful substances	Specific emission coefficients	Calculation formula	Momentary emission, g/s.
Carbon monoxide, CO	0.125	13.75 * 0.125 * 1,000/3,600	0.477
Nitrogen dioxide, NO_2	0.035	13.75 * 0.035* 1,000/3600	0.133
Sulfur dioxide, SO_2	0.02	13.75 * 0.02* 1,000/3,600	0.076
Hydrocarbons, C_xH_y	0.055	13.75 * 0.055* 1,000/3,600	0.21
Soot, C	0.015	13.75 * 0.015* 1,000/3,600	0.057
Benzo(a)pyrene, $C_{20}H_{12}$	0.00031	13.75 * 0.00000031* 1,000/3,600	0.00000118
Carbon dioxide, CO_2	3.14	13.75 * 3.14 * 1,000/3,600	11.993

Table 41: Annual emissions

Name of the harmful substances	Specific emission coefficients	Calculation formula	Annual emission t/YEAR
Carbon monoxide, CO	0.125	46 * 0.125	5.75
Nitrogen Dioxide, NO_2	0.035	46 * 0.035	1.61
Sulfur dioxide, SO_2	0.02	46 * 0.02	0.92
Hydrocarbons, C_xH_y	0.055	46 * 0.055	2.53
Soot, C	0.015	46 * 0.015	0.69
Benzo(a)pyrene, $C_{20}H_{12}$	0.00031	46 * 0.00000031	0.000014
Carbon dioxide CO_2	3.14	46 * 3.14	144.5

Calculation of emission during working of machinery/excavator (emission source 3)

Engines of road construction cars are source of emission of pollutants while they are working in the regime of loading and idle movement.

Calculation was done according to the following instructions:

- "Regulation on calculation of maximum allowable emissions of pollutants to ambient air" (approved by MENRP decree #56 dated 8 August 2013)
- "Decree on approval of norms for qualitative condition of environment" (Issued by Ministry of Labor, Health and Social Security, decree #297-n dated 16 August 2001 (amended in 2003, 2006, 2013)
- Government of Georgia Decree #17 dated 03 January 2014 "On the adoption of environmental technical regulations" Emission of pollutants to the ambient air.

Quantitative and qualitative characteristics of emissions of pollutants from road construction machinery are presented in the Table 42

Table 42: Quantitative and qualitative characteristics of emissions from machinery

Pollutant		Maximum emission g/s	Annual emission t/YEAR
Code	Name		
301	Nitrogen dioxide (Nitrogen (IV) oxide)	0.019584	0.617601
304	Nitrogen (II) oxide	0.0031824	0.1003602
328	Soot	0.0028122	0.0886862
330	Sulfur dioxide	0.0020678	0.0652094
337	Carbon monoxide	0.0162344	0.511969
2732	Hydrocarbon kerosene fraction	0.0046311	0.1460467

Baseline data for calculation of emission of pollutants

Car on a regime of idle movement, min;	Number	Working time of one car							Simultaneousness
		in a day, h				in 30 minutes, min.			
		Total	without loading	with loading	Idle movement	without loading	with loading	idle movement	
Wheeled road construction car with the power of 36-60 KW (49-82 horse-power)	1 (1)	24	10.4	9.6	4	13	12	5	1

Note: Calculation was done in the conditions of natural temperature. Number of working days – 365.

Conventional signs, calculation formulas, reporting parameters and their substantiation are presented below:

Maximum single emission of ***i***-group substances is implementing by the formula:

$$G_i = \sum_{k=1}^{k}(m_{ДВ\,ik} \cdot t_{ДВ} + 1,3 \cdot m_{ДВ\,ik} \cdot t_{НАГР.} + m_{XX\,ik} \cdot t_{XX}) \cdot N_k / 1,800 \text{ g/min};$$

Where $m_{ДВ\,ik}$ – specific emission of ***i***-group substances for k-group during movement of car without loading, g/min;
$1,3 \cdot m_{ДВ\,ik}$ – specific emission of ***i***-group substances for k-group during movement of car with loading, g/min;
$m_{ДВ\,ik}$ – specific emission of ***i***-group substances for k-group during movement of car on a regime of idle movement, g/min;
$t_{ДВ}$ -Car movement time in 30 min interval without loading, min;
$t_{НАГР.}$ -Car movement time in 30 min interval with loading, min;
t_{XX} - Car movement time in 30 min interval on a regime of idle movement, min;
N_k – Number of the cars of ***k***-group which are working simultaneously in 30 min interval.

Total emission of ***i***-group substances from the road cars is calculating by the formula:

$$M_i = \sum_{k=1}^{k}(m_{ДВ\,ik} \cdot t'_{ДВ} + 1,3 \cdot m_{ДВ\,ik} \cdot t'_{НАГР.} + m_{XX\,ik} \cdot t'_{XX}) \cdot 10^{-6}, \text{ t/YEAR};$$

Where $t'_{ДВ}$ – total time of the movement of ***k***-group cars without loading, min;
$t'_{НАГР.}$ – total time of the movement of ***k***-group cars with loading, min;
t'_{XX} – total time of the movement of ***k***-group cars on a regime of idle movement, min.

Specific emission of pollutants during working of road construction cars is presented in the Table 43.

Table 43: Specific emission of pollutants during working of road construction cars, g/min

Type of road construction cars	Pollutant	Movement	Idle movement
wheeled road construction car with the power of 36-60 KW (49-82 horse-power)	Nitrogen dioxide (Nitrogen (IV) oxide)	1.192	0.232
	Nitrogen (II) oxide	0.1937	0.0377
	Soot	0.17	0.04
	Sulfur dioxide	0.12	0.058
	Carbon monoxide	0.77	1.44
	Hydrocarbon kerosene fraction	0.26	0.18

Calculation of annual and maximum single emission of pollutants is presented below.

G301 = (1.192•13+1.3•1,192•12+0,232•5)•1/1,800 = 0.019584 g/s;
M301 = (1.192•1•365•10.4•60+1.3•1,192•1•365•9.6•60+0.232•1•365•4•60)•10-6 = 0.617601 t/YEAR;
G304 = (0.1937•13+1.3•0.1937•12+0.0377•5)•1/1,800 = 0.0031824 g/s;
M304 = (0.1937•1•365•10.4•60+1.3•0,1,937•1•365•9.6•60+0.0377•1•365•4•60)•10-6=0.1003602 t/YEAR;
G328 = (0.17•13+1.3•0.17•12+0.04•5)•1/1,800 = 0.0028122 g/s;
M328 = (0.17•1•365•10.4•60+1,3•0.17•1•365•9,6•60+0,04•1•365•4•60)•10-6 = 0.0886862 t/YEAR;
G330 = (0.12•13+1.3•0.12•12+0.058•5)•1/1,800 = 0.0020678 g/s;
M330 = (0.12•1•365•10.4•60+1.3•0.12•1•365•9,6•60+0,058•1•365•4•60)•10-6 = 0.0652094 t/YEAR;
G337 = (0.77•13+1.3•0.77•12+1.44•5)•1/1,800 = 0.0162344 g/s;
M337 = (0.77•1•365•10.4•60+1.3•0.77•1•365•9.6•60+1.44•1•365•4•60)•10-6 = 0.511969 t/YEAR;
G2732 = (0.26•13+1.3•0.26•12+0.18•5)•1/1,800 = 0.0046311 g/s;
M2732 = (0.26•1•365•10.4•60+1.3•0.26•1•365•9.6•60+0.18•1•365•4•60)•10-6 = 0.1460467 t/YEAR;

Total emission of dust during working of excavator with one shovel is determined by formula:
$M = (3.6 \times Q_{exc.} \times E \times K_{exc.} \times K1 \times K2 \times T \times Nr \times N)/(1000 \times T_{exc.\ Cycle})$, t/YEAR;

$Q_{exc.}$ - dust specific emission from $1m^3$ overloaded material, g/m^3
E - shovel capacity, m^3 (0,7-1)
$K_{exc.}$- excavation coefficient. (0,91)
$T_{exc.\ cycle}$ - excavator cycle time, s. (30)

Maximum single emission of dust during working of excavator with one shovel:
$G = Q_{exc.} \times E \times K_{0} \times K1 \times K2 \times N/T_{exc.\ cycle}$, g/s =4.8*1*0.91*1.2*0.2*1/30=0.035g/s;
M =0.035g/s * 3,600 * 8,760 /10^6 = 1.104 t/YEAR;
Fuel consumption = 60 KW/h * 0.25 kg/KW * 8h/DAY * 365 DAY * 10^{-3} = 43.8 t/YEAR;
Emission of CO_2 : CO_2 = 43.8 t/YEAR * 3.14 = 137.532t/YEAR

Calculation of emission on the line during working of auto transport (emission source 4)

Pollutant emission source is car engine during its movement at the site. Calculation was done according to the following methodic instructions

- "Regulation on calculation of maximum allowable emissions of pollutants to ambient air" (approved by MENRP decree #56 dated 8 August 2013)
- "Decree on approval of norms for qualitative condition of environment" (Issued by Ministry of Labor, Health and Social Security, decree #297-n dated 16 August 2001 (amended in 2003, 2006, 2013)
- Government of Georgia Decree #17 dated 03 January 2014 "On the adoption of environmental technical regulations" Emission of pollutants to the ambient air.

Quantitative and qualitative characteristics of emissions of pollutants during movement of auto transport are presented in the Table 44.

Table 44: Quantitative and qualitative characteristics of emissions from trucks

Pollutant		Maximum emission g/s	Annual emission, t/YEAR
Code	**Name**		
301	Nitrogen dioxide (Nitrogen (IV) oxide)	0.0017778	0.056064
304	Nitrogen (II) oxide	0.0002889	0.0091104
328	Soot	0.0001667	0.005256
330	Sulfur dioxide	0.0003	0.0094608
337	Carbon monoxide	0.0033889	0.106872
2732	Hydrocarbon kerosene fraction	0.0005556	0.01752

Baseline data for calculation:

Name	Type of the car	Number of cars		Simultaneousness
		Average during a day	Maximum number in 1 hour	
Trucks	Load capacity – 8-16 t. Diesel.	96	4	+

Conventional signs, calculation formulas, reporting parameters and their substantiation are presented below:

Emission of ***i***-group substances during movement of ***k***-group car $M_{ПР\ ik}$ is implementing by the formulas: $M_{ПР\ i} = \sum_{k=1}^{k} m_{L\ ik} \cdot L \cdot N_k \cdot D_P \cdot 10^{-6}$, t/YEAR;

where

$m_{L\ ik}$ – specific emission of ***i***-group substances, movement of ***k***-group car at speed 10-20 km/h

L - Calculation distance, km;

N_k - Average number of the ***k***-group cars during a day;

D_P - Number of working days in a year.

Maximum single emission of ***i***-group pollutants G_i is calculating by the formula:

$$G_i = \sum_{k=1}^{k} m_{L\ ik} \cdot L \cdot N'_k / 3{,}600, \text{ g/s};$$

Where N'_k – number ofthe cars of ***k***-group, which are moving on the calculation distance in 1 hour that characterizes maximum intensity of the movement.

Specific emission of the harmful substances from the trucks during the process of movement at the speed of 10-20 km/h is presented in the table below

Specific emission of the harmful substances during the process of trucks movement at the speed of 10-20 km/h

Type	Pollutant	Mileage, g/km	
Truck, load capacity – 8-16t, Diesel engine.	Nitrogen dioxide (Nitrogen (IV) oxide)	3.2	3.2
	Nitrogen (II) oxide	0.52	0.52
	Soot	0.3	0.3
	Sulfur dioxide	0.54	0.54
	Carbon monoxide	6.1	6.1
	Hydrocarbon kerosene fraction	1	1

Calculation of maximum single and annual emission is presented below:

Annual emission of pollutants M, t/YEAR:

M301 = $3.2 \cdot 0.5 \cdot 96 \cdot 365 \cdot 10^{-6} = 0.056064$;

M304 = $0.52 \cdot 0.5 \cdot 96 \cdot 365 \cdot 10^{-6} = 0.0091104$;

M328 = $0.3 \cdot 0.5 \cdot 96 \cdot 365 \cdot 10^{-6} = 0.005256$;

M330 = $0.54 \cdot 0.5 \cdot 96 \cdot 365 \cdot 10^{-6} = 0.0094608$;

M337 = 6.1 · 0.5 · 96 · 365 · 10^{-6} = 0.106872;
M2732 = 1 · 0.5 · 96 · 365 · 10^{-6} = 0.01752.

Maximum single emission of pollutants G, g/s;

G301 = 3.2 · 0.5 · 4 / 3,600 = 0.0017778;
G304 = 0.52 · 0.5 · 4 / 3,600 = 0.0002889;
G328 = 0.3 · 0.5 · 4 / 3,600 = 0.0001667;
G330 = 0.54 · 0.5 · 4 / 3,600 = 0.0003;
G337 = 6.1 · 0.5 · 4 / 3,600 = 0.0033889;
G2732 = 1 · 0.5 · 4 / 3,600 = 0.0005556.

Auto transport movement simultaneousness is provided in the calculations.
Fuel consumption = 0.019t/h/car * 4 car/h * 8h/DAY * 365 DAY = 222 t/YEAR;
According to the annex 99 of
CO_2 =222 t/YEAR. * 3.14 = 697t/YEAR.

Calculation of emission from belt conveyor (emission source 5)

Calculation of emission of the total mass of suspended particles, which arises while transporting materials via open belt conveyor is done according to the following methodical instructions [**11**]

Transportation is carried out through open conveyor belts. The width is 1 meter. Total length is 20 meters. Calculation speeds of the wind is, m/s: 0.5(**K_3 = 1**); 3.9(**K_3 = 1.2**). The average annual wind speed 3.9(**K_3 = 1.2**).

Quantitative and qualitative characteristics of emissions of pollutants according to the methodic

Pollutant		Maximum emission g/s	Annual emission t/Year
Code	Name		
2908	Dust (suspended particles) from sand and gravel during transportation by open conveyor belt (batch plant)	00038376	0.0854278

.Baseline data for calculation of pollutants' emission

Material	Parameters	Simultaneousness
Sand and Gravel	Working time – 8,760 h/YEAR, humidity – up to 10 %. (K_5 = 0,1). Size of particles – 50-10 mm. (K_7 = 0.5). Specific dusting – 0.0000045kg/m^2*s.	+

Conventional signs, calculation formulas, reporting parameters and their substantiation are presented below.

Emission of the total mass of suspended particles, which arises while transporting materials via open belt conveyor, is defined by the formula:

$$M_K = 3.6 \bullet K_3 \bullet K_5 \bullet W_K \bullet L \bullet l \bullet \gamma \bullet T, \text{ t/YEAR};$$

K_3 - coefficient, which considers the local metteo conditions;
K_5 - coefficient, which considers the material moisture.
W_K - specific dusting from the belt conveyor, kg/m^2*s;
L - Width of the belt conveyor, m.
l - Length of the belt conveyor, m.
γ - coefficient, which considers shredding of the materials;
T - annual working time, h/YEAR;

Maximum single emission, which arises from open belt conveyor while transporting, is defined by formula:

$$M'_K = K_3 \bullet K_5 \bullet W_K \bullet L \bullet l \bullet \gamma \bullet 10^3, \text{ g/s};$$

Calculation of maximum single and annual emission of pollutants into the ambient air is presented below.

$M'_{2902}{}^{0.5m/s}$= 1 · 0.1 · 0,0000045 · 10 · 1 · 0.5 · 10^3 = 0.0022574 g/s;
$M'_{2902}{}^{3,9\ m/s}$= 1.7 · 0.1 · 0,0000045 · 10 · 1 · 0.5 · 10^3 = 0.0038376 g/s;
M_{2902} = 3.6 · 1.2 · 0.1 · 0,0000045 · 10 · 1 · 0.5 · 8,760 = 0.0854278 t/YEAR.

During correction, the emission calculated is multiplying by 0,4 coefficient for inorganic dust:
0.0038376× 0.4 = 0.00153504 g/s ≈ 0.0016g/s;
0.0854278× 0.4 = 0.03417112 t/YEAR ≈ 0.035t/YEAR

Calculation of scattering of harmful substances into the ambient air

Calculation of scattering of harmful substances is performed using PC software "Ecologist – 3" Emission is implementing in state regime - all the sources are functioning simultaneously. According to the general plan equipment's flue pipe is taken as the conditional coordinate origin. Calculating area is right-angled with the linear dimensions: 2,200m X 1,700m. Calculating step – 100m. Additional calculations are performed in 5 control points and presented in Table 45.

Table 45: Air emissions calculation points

№	Point coordinates (m)		Height (m)	Type of the points	Comment
	X	Y			
1	122.00	798.00	2	500 m-at the border of the normalized zone	North
2	1,148.00	137.00	2	500 m-at the border of the normalized zone	East
3	89.00	-508.00	2	500 m-at the border of the normalized zone	South
4	-723.00	126.00	2	500 m-at the border of the normalized zone	West
5	933.00	55.00	2	point at the border of residential zone	Nearest settlement

Calculation of scattering (taking into consideration the baseline) is performed by the mentioned parameters and the main results are presented below.

Results and analysis of calculation of scattering of harmful substances

The summary table presents maximum concentrations of pollutants at control points, in maximum permissible concentration portions (taking into consideration the baseline).

Table 46: Maximum Allowable Concentrations (MAC) at the site boundaries

Names of the harmful substances	Maximum Permissible Concentration Portion from an Object	
	at the border of the nearest residential area	at the border of 500m radius
1	2	3
Nitrogen Dioxide	0.14	0.15
Nitrogen Oxide	0.00092	0.0016
Soot	0.03	0.04
Sulfur Dioxide	0.11	0.12
Carbon Monoxide	0.17	0.17
Benzo(a)pyrene	0.0096	0.01
Kerosene Fraction	0.01	0.02

Suspended Particles	0.31	0.32
Inorganic Dust: 70-20% SiO_2	0.0039	0.0079
Total Impact Group 6009 (2) 301 330	0.16	0.16
Total Impact Group 6046 (2) 337 2908	0.0086	0.02

As the data show that the standards set by regulations on protection of the ambient air are not exceeded by any of the harmful substances, in none of the control points. So, the construction works and batch plant functioning will not cause deterioration of the air quality, and the resulted emissions are below the acceptable limits.

12.16 Impact on the atmospheric air at O&M Phase

During Terminal operation the impact on ambient air quality will be mostly related to combustion emissions (ships, port) and dust (from dry bulk materials, cargo operations, vehicles movement, etc.). It will not exceed the volumes calculated for the construction phase and will not affect the closest residents located at the distance of 750m from the Terminal.

The following mitigation measures and practices are proposed to reduce the emissions and dust:

Developing air quality management procedures applicable to ship operators, such as:

- Maintaining emissions of NOx and SOx within the limits established by international regulations
- Using low-sulfur fuels in port, if feasible, or as required by international regulations
- Navigation of port access areas at partial power, achieving full power after leaving the port
- Avoiding or limiting the practice of blowing soot from tubes or flues on steam boilers while in port or during unfavorable atmospheric conditions
- If the port provides onshore power for vessels to reduce shipboard power use during loading / unloading activities, requiring vessels to shut down power plants (go “cold iron”) if docked above a specified time threshold

For the terminal operations:

- Ensuring proper technical functioning of the machinery and vehicles;
- Selection of the optimal route and speed when the vehicles are moving;
- Stopping the vehicle engines or operating on the minimal turnover, when they are not used;
- Providing the instructions for personnel;
- Identification/registration of the complaints and proper response to it.
- Low sulfur content diesel will be used as fuel for generator sets to control emission of SO2;
- Any vehicle or machinery whose exhaust exceeds 5,000 ppm of CO2 shall be refused.

Dry cargo storage and handling facilities will be designed to minimize or control dust emissions, including:

- Installing dust suppression mechanisms (e.g. water spray or covered storage areas)
- Minimizing free fall of materials
- Minimizing dry cargo pile heights and containing piles with perimeter walls
- Removing materials from the bottom of piles to minimize dust re-suspension
- Ensuring hatches are covered when material handling is not being conducted
- Covering transport vehicles

Regularly sweeping docks and handling areas, truck /rail storage areas, and paved roadway surfaces.

12.17 Impact on socio-economic environment at Construction Phase

Impact Caused due to Damage of Road Cover and Traffic Load

In the process of construction works, as well as the operational phase, the bypass road across the Megobroba Street will be used for transport operations and an earth road entering into the project area is (which has undergone the major repair work).
Within the construction phase the transportation operations will not be significant (the maximum number is 5-6 vehicles per day), and no traffic jams are expected.
During the terminal operation phase maximum number of daily vehicle-transport movements, as per the preliminary estimations, will be 20-25, which will not significantly change the flow regime in the Megobroba and Samegrelo streets.

Community safety and security, entry to the construction site

Before commencement of the reconstruction-construction works stipulated by the project, LTD "Trsansford" LLC will take the necessary measures for restricting unauthorized entries to the site. The agreement will be signed with the special security service, which is subordinated to the State Internal Affairs Service. Special entry card system will be introduced, the same as the one existing in Poti Port. As for the conditions for the entry of ships into the territory of new port, it will be implemented under the agreement signed with the existing security system at port.

Possible Impact upon the Cultural Heritage

The monuments of the cultural heritage are not allocated at the study area and probability of late discovery of the important archaeological monument is very low. However, in case of detecting the signs of the archeological monument, the "chance-finding" procedure will be applied and the contractor will immediately inform the competent state authorities for the purpose of identification of the protective value of the finding.

Positive impact on employment

The construction of the proposed Terminal will have direct positive impact on employment of local population, considering that the project developer (Transford LLC) is not planning to use non-resident workforce at operation phase. All contractors will be requested to maximally use the local labor.

12.18 Impact on socio-economic environment at O&M Phase

Considering the conditions for operation of the new Terminal at the historical territory of the former Poti Shipbuilding Factory (Shipyard) #201, no significant impact of noise, vibration and air emissions are expected onto residential areas located at the distance of 700m from the Terminal territory. Vehicles traffic through the residential areas at operation phase is not considered to be increased significantly. The calculations are presented in Subsection 12.5. The operation of the proposed Terminal will have direct positive impact on employment of local population, considering that Transford LLC is not planning to use non-resident workforce at operation phase. The operator will be requested to maximally use the local labor.

For Port marine safety Operator will develop plan and procedures based on Guide to Good Practice on Port Marine Operations (2003) in the close cooperation with Poti Port Authorities:
-To maintain infrastructure and navigation channels in a safe condition,
-To maintain emergency response and counter pollution plans and the ability to implement them,
-To provide an efficient and effective pilotage service,
-To provide an effective system for monitoring and regulating the harbor,
-To effectively and safely operate marine services, and

-To ensure that those with marine safety responsibilities are competent to undertake their duties

Terminal security arrangements will be integrated within the entire Port of Poti security management and will follow IMO requirements and guidelines applicable to ports of the International Ship and Port Facility Security Code and Solas Amendments 2002 (2003).

13 Cumulative Impacts

Cumulative impact is the incremental/compounding impact on the environment that results from the impact of the proposed project when added to other past, present, and reasonably foreseeable future actions/projects, regardless of which agency or person undertakes them. Although each impact may not be significant alone, cumulatively, these impacts may be significant if they occur close together in terms of location and time, resulting in incremental, widespread, often slow change of environmental conditions. Effects can be either direct or indirect, positive or negative. When cumulative impacts on the environment are anticipated, the IFI procedures and the Georgian legislation require that such impacts be described. Cumulative impacts of the project with those of existing, planned or future activities should be accounted for. This is typically done by adding predicted impacts to existing conditions. The potential cumulative impacts are discussed in this section.

To determine cumulative effects in the analysis area - past, present, and future actions within the same region were evaluated. For the proposed Multifunctional Transshipment Terminal project these actions predominantly include temporary cumulative impact due to coinciding in time with possible construction/reconstruction activities within other parts of the Port of Poti, as well as some municipal infrastructure rehabilitation projects for roads and water utilities in Poti. Cumulative effects may also occur as a result of increase of ships traffic accessing aquatory of the Port of Poti, when single impacts from new Terminal berth construction results in a compounding effect.

Past projects and activities are those that have been completed and their physical features are part of the current/existing landscape and environment. Residual (i.e., permanent) effects from these past projects/activities may be considered to be potentially cumulative with the effects of the proposed Project. However, it is assumed the impacts of these projects are already reflected in existing environmental conditions as described in Sections 8 to 11 on Environmental and Social Baseline and considered during project impact assessment.

Considering the low intensity of the planned construction works and the conditions for operation of the new Terminal at the historical territory of the former Poti Shipbuilding Factory (Shipyard) #201, no significant effects of cumulative impact of noise, vibration and air emissions are expected onto residential areas located at the distance of 700m from the Terminal territory. The calculations are presented in Subsection 12.5

It should be noted that the proposed project is not a “green field” development. This is an attempt to rehabilitate and give new life to the industrial zone and abandoned/deteriorated facilities of the Port of Poti, which is crucial for Poti population. Historically port was the primary and the city was secondary development so the extent of the industrial zone, buffer zones, distance to population – were subject of planning since 1894. The harbor of the New Port, where Terminal is located, was very busy during Soviet times with Shipyard#201 and the navy base activities – providing jobs and source of income for the population. So in terms of cumulative impact the construction and operation of the Terminal do not represent any new or “added” impacts , but mostly restoration of the usual mode of operations and visual and audible impacts that neighboring population are used to. The same is for the impacts related to ships traffic: the new Terminal and related traffic are not representing or creating an additional/new impact – it is restoration of the volumes of activities and relevant traffic which have been usual for the Port of Poti.

Figure 30: Cumulative impact of noise dissemination.

(Source: Noise Impact Analysis for O&M Phase, prepared by Universal Company, see Subsection 12.10 of this report)

Calculation shows that arisen noise during joint functioning of the noise sources in N3 control-measuring point (shown at the figure as “III Point, Cumulative”) will be within 40-42 db A.

Assessment of noise impact arisen during operation of new universal cargo berth complex of Poti and already functioning Poti port in residential zone (near control-measuring point).
As a result of functioning of new universal cargo berth complex expected impact of arisen noise on the surrounding territory have been already assessed. (Map N2 of equal sound levels). Expected sound levels in N3 control point at night will be 42 db A.
During operation of functioning part of Poti port we can take into consideration such long-term functioning machineries like: oil unloading electric pumps and port mobile cranes (accordingly on the distance of 650 m and 350 m from the control-measuring point); in the aquatory small ships – tugs will periodically move.
Calculation shows that arisen noise during joint functioning of the noise sources in EM3 control-measuring point will be within 40-42 db A.
As it is discussed at the end of Subsection 12.9, the impact of vibration on the people within buildings should be excluded if the distance between the building and vibration generating machinery exceeds 100 m. (Results of the survey of Transport Research Laboratory 2000: “Ground borne vibration caused by mechanized construction works” TRL).Considering temporary nature of vibration generated during the construction works, as well as distance 700m to the nearest Poti residents, vibration impact on population during the construction works will be negligible.

During operation of berths (new and existing) in the both aquatories it is expected that in N3 control-measuring point sound levels will be 44-45 db A (norm values for night).
Despite this, it should be taken into consideration that in some cases during performance of technological processes higher levels will arise shortly. Assessment of such cases will be available as a result of the long-term observation.

As for the cumulative impact: since it is expected that functioning sound levels at the residential houses (point N3) will be within normal values, harmful impact on people's health is not expected.

Calculation of air emissions presented in Subsection 12.15 indicates that concentrations of air pollutants at the residential area even in case of compound effect with the emissions of the existing port facilities – are well below the permissible limits.

In terms of cumulative impact from dredging or ships traffic on marine biota – it should be noted that all these new activities are planned for already heavily disturbed areas due to routine operations of the Port of Poti, including maintenance dredging and daily ships traffic. The Port aquatory and accesses, considering its historical profile and more than 12 decades of active operations, do not represent significant value in terms of marine biota and habitats, which are better developed in other portions of Georgia's Black Sea coast. But of course the ESIA and the proposed mitigation and monitoring program will be implemented strictly and properly, significantly reducing Terminal's input/portion in compound cumulative adverse impacts on marine environment.

In terms of cumulative impact on ships traffic and the navigation in the Bosporus Strait the following calculation is proposed as an argument.The total cargo turnover of the planned Terminal (all phases) considers 2.5 mln TEU/year (about 180 of vessels/ships annual turnover rate). Out of which the Phase-I (dry cargo at Berth#1) considers maximum 125 of vessels annual turnover rate. The percentage of ships anticipated to pass Bosporus is about 70-80% (about 88 -100 vessels per year). The remaining 20-35% (25-45 vessels per year) will be from/to Ukraine, Romania and Bulgaria ports.Considering that total more than 48,000 vessels are passing Bosporus annually, the portion of the new Terminal (88-100 vessels) in loading Bosporus is about 0.2% – which is not a number to cause significant impact on traffic in Bosporus or exceed the limitations established for daily/monthly navigation.

14 Environmental and Social Mitigation Framework

Table 47: Environmental and Social Mitigation at Construction Phase

Receptor/ Impact	Impact description	Mitigating measures
CONSTRUCTION PHASE		
Ambient Air quality: inorganic dust in the ambient air;	Demolition dust Earthworks dust; Dust generated from the vehicles movement; Dust generated from loading-unloading of the inert materials.	• During the demolition works avoid blasting, remove waste and debris timely and properly, avoid working in windy weather, apply suitable and sufficient water sprays (prior and during demolition). • Ensuring proper technical functioning of the construction machinery and vehicles; • During the business days, in the dry and windy weather, to water/spray the ground roads or ground covered territories once in four hours; • Observing the rules for storage of the dump construction materials, in order them not to be dusted in a windy weather; • When the powdered material is transported by tucks, when there is probability of dusting, to cover them with a tent; • In case of the land works and the materials loading-unloading, in order to avoid the surplus dust emission, to take the precautionary measures (e.g. in case of loading and un loading to restrict the materials to be dumped from the height); • Keeping the optimal speed of transport movement; • Washing the vehicle wheels before moving to the public roads; • Providing instructions for the personnel (particularly the vehicles and machinery drivers) before commencement of the works; • In case of receipt of the complaints, to identify/register them and proper response to them.
Air quality: Combustion products dissemination in the ambient air.	Vehicles, construction machinery exhaust; Welding aerosol.	• Ensuring proper technical functioning of the machinery and vehicles; • Deployment of the generators and other equipment-mechanisms away from the sensitive receptors; • Selection of the diameters of the exhaust pipes and heights for the equipment operating on the diesel-generators and liquid fuel, for the purpose of the optimal conditions for spraying the hazardous substances; • Selection of the optimal route and speed when the vehicles are moving; • Stopping the vehicle engines or operating on the minimal turnover, when they are not used; • Providing the instructions for personnel; • Identification/registration of the complaints and proper response to it. • Low sulfur content diesel will be used as fuel for generator sets to control emission of SO2; • Any vehicle or machinery whose exhaust exceeds 5000 ppm of CO2 shall be refused.
		Noise mitigation measures will be in place prior to the commencement of any construction work.

Noise dissemination within the working zone;	Noise caused by the vehicles; Noise caused by the construction machinery and construction operations.	• All contractors and subcontractors should comply with the relevant international noise standards; • Activities that take place near residential or sensitive receptors will be careful planned (restricted to daytime, taking into account weather conditions, etc.); • Residents in the vicinity to be notified about construction schedules and activities; • All plant and equipment will be fitted with silencers, mufflers, acoustic linings, or shields, as necessary. • If necessary, measures to be taken to reduce noise emissions from the site will include provision of screens or bunds to absorb noise and deflect it away from receptors; • Before commencing any piling operations, the contractors will be required to submit calculations to demonstrate that the appropriate standards will not be exceeded • Timing and programming outside sensitive seasons (e.g. avoiding the migration seasons of marine mammals, etc.), especially concerning underwater noise; • Apply a change management process to modify operations, if necessary to address noise issues; • Vehicles and generator sets will be serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them; • Heavy machineries and generators will be operated during day time only. • A noise monitoring program during construction will be implemented • Ensuring proper technical functioning of the machinery and vehicles; • Deployment of the noise generating equipment far from the sensitive receptors (dwelling houses, labor camps etc.); • In case of necessity, use of the acoustic protective inputs for the compressors, generators and other noise generating equipment; • Monitoring of noise levels; • As per the necessity, proving the personnel with the protective inputs (earplugs) – machinery operators should be equipped with the ear protective inputs. Ear protective inputs are required for the employees operating in those sections, where the noise level exceeds 85 DBA. Ear protective inputs alternative might be the delay time limitation within the area of the high acoustic background. According to the World Bank recommendations, the time for operating in the sections with >85 DBA, without any protective inputs, in case of exceeding every 3 DBA should be reduced to half; • Providing instructions for the personnel before commencement of the works.
Noise dissemination at the border of the residential zone;	Noise and vibration caused by the vehicles; Noise and vibration caused by the	• Providing proper functioning of the machinery and equipment; • Performing the noisy works only during the day hours; • Providing instructions for the personnel before commencement of the works • The existing motorways outside of the populated areas should be applied for performance of the transportation operations related to construction works, which will

	construction machinery; Noise caused by the construction/installation works	considerably reduce the impact related to the noise dissemination; • Identification/registration of the complaints and proper response to it: • Conducting the instrumental measurements at the boundary of the sensitive sections (populated zones). • Reduction of noise as much as possible at the locations of generation (noise stifling covers) and limiting the dissemination through the artificial portable screening.
Topsoil destruction	Soils stability violation during the process of the land works performance; Soil loss as a result of the infrastructure allocation; Movement of machinery on the ground with topsoil	• Observance of the established safety norms during the projected works performance; • Strictly observe the boundaries of the construction site for the purpose of preventing the excessive damage to the soil; • Maintain the integrity of the roads cover through technical service; • Removal of the topsoil and temporary storage in compliance with the relevant rules: • The dump height should not exceed 2 meters; • The dump slopes should have the angle with the relevant decline (450); • Water break channels should be installed throughout the dump perimeter; • Providing instructions for the personnel; • Identification/registration of the complaints and proper response to it; • Reinstatement Plan needs to be drafted for areas temporarily not in use and prone to erosion • Site Rehabilitation Plan should be developed and executed
Soil	Historical contamination by heavy metals and hydrocarbons Potential soil contamination with wastes; Contamination in case of spillage of fuel, lubricants or other substances.	• Supplement soil contamination assessment will be performed • Removal of the contaminated layers of the exposed soil at the territory of Terminal prior to starting the construction works and disposal at licensed quarry. • The sewage/solid waste/hazardous wastes will be treated and disposed or sold to authorize recyclers as per the IFC PS 3, General EHS guidelines and all relevant legal requirements of Georgia. • Contractors should prepare a Waste Management Plan defining adequate measures for SW collection, segregation, reuse and disposal during construction. • Proper sanitation bins will be installed in the port area for collection of sewage/solid waste/construction wastes on site. • Solid waste generated during the construction process will be separated and recycled where possible / appropriate. • Burning of waste on site will not be permitted. All waste, which cannot be recycled on site, will be collected and taken off site for recycling / reuse or disposal to an official/municipal waste disposal site after consultation with local authorities. • A ‘scavenging boat’ will be available at all times for collection of windblown rubbish within the harbor basin itself. • All rubbish, waste materials and debris shall be systematically cleared from working areas as they accumulate; all such materials should be cleared at the end of each working day.

		• If removal of waste materials at the end of the working day is not possible, the materials should be covered with tarpaulin or similar. • Waste materials not removed directly from the site shall be temporarily stored at designated points and covered, pending removal from the site. • All working areas and site roads will be kept clear of mud, water, silt and other materials at all times. If earth, mud, or other debris is deposited on roads, they will be immediately removed. • Hazardous waste should only be handled by licensed enterprises and following good international practices and applicable local and international regulations (Basel and Rotterdam Convention) Providing proper functioning of the machinery and equipment; • Safe storage of potentially contaminating materials (oil, lubricants etc.); • Equip the construction site with the relevant technical inputs and inventory (containers, spillage collecting inputs etc.); • Separation of wastes, recycling them as much as possible, placing the useless wastes into the container and removal from the territory; • After completion of the works, removal of all the potential contaminating materials; • In case of necessity, laboratory control of the soil quality; • Localization of fuel/lubricants spillage and its cleaning- the soil and ground contaminated with oil products should be removed from the territory for the purpose of its further remediation by the contractor having the proper permit for such activity; • Providing the instruction for the personnel.
Surface and groundwater contaminati on	Contamination due to improper management of wastes. Contamination due to leakage of oil from the vehicles and machinery; Contamination due to untreated sewage waters.	• The project Water Management Plan should be developed in order to secure sustainable water balance in the project region • The Dredging EHS Management Plan will be developed to prevent contamination of marine water during dredging and dredge disposal activities. • The project Water Management Plan should also include baseline review of the existing groundwater resources and current consumption in the project region. The main purpose of plan will be to define a set of measures and activities in order to preserve groundwater quality and quantity • Concrete paving/lining of the multifunctional transshipment complex territory should be conducted in observance of the relevant safety measures – material, wastes should not be scattered etc.; • Proper management of the construction wastewater and the storm waters. Storm waters (surface run-off) should be flown into the sea water only after preliminary treatment; • Mobile concrete batch plant (if installed) should be located no less than 100 meters away from the shoreline with permanent control and safety measures for preventing the water contamination; • Providing proper functioning of the machinery and equipment for preventing the risk of flowing the fuel/oil into water; • Proper management of materials and wastes; • The wastes generated during the course of the work should be

		collected and temporarily stored on the territory, specially allocated section, away from the water; • In case of fuel/oil spillage on the soil, localization of the spilt material and immediate cleaning of the contaminated section in order to prevent the water contamination. • Drainage system installation around the potentially contaminated sections of the surface (for example, throughout the perimeter of the construction wastes storage sections); • Providing the instruction for personnel.
Marine water contamination	Impact of dredging and dredge disposal activity	• The Dredging and Dredge Disposal Method Statement and the EHS Management Plan (DDDMS and DDDEHS-MP) will be developed before start of dredging. The DDDMS will include additional sediment contamination assessment (can be considered as supplement to EIA) that will include biological and chemical assessment of the dredging and dredge disposal areas, as well as additional/other sampling sites for comparison, also dredging methods, schemes and schedules, methods for analyzing the dredged materials for contaminants, how contaminated vs. non-contaminated dredged material will be disposed of differently. The DDDEHS-MP will include the following components: contaminated dredged material disposal, minimization of impact on marine biota, oil and fuel management, waste management, etc., also training, emergency preparedness and response procedures, dredging and dredge disposal Monitoring Program. • The dredging technology (bucket vs. bulk, vs. suction dredger, etc.) will be specified in order to assure that dredging impacts are being minimized. The design institute “Chermomornii-project” (Odessa) proposes suction dredger installed on self-loading/unloading (hoper) dredging ship with suction drag head. • Neither endangered nor threatened species, nor unique sensitive habitats are identified by ESIA team’ marine biologists in dredging or dredge disposal areas (see Subsection 12.3 Impact of Dredging Works, item “Impact on Marine biota”). However, to minimize impact of dredging works on marine biota the silt curtains will be used when/where necessary following and based on the detailed survey of marine habitats (sensitive/ endangered/threatened species, if any discovered) as part of Dredging and Dredge disposal EHS Management Plan preparation process. • Dredging and Dredge Disposal Monitoring Program, will be developed, covering the dredged areas, disposal site, and potentially sensitive areas in adjacent areas. The Monitoring Program will include, among other, the following components: water quality (i.e. sediment suspension and dispersion in the water column), biotic monitoring (metals bioaccumulation); protection and conservation of marine habitats, Dredged material will be analyzed for contaminants, and decision made how contaminated and non-contaminated dredged material will be disposed. • ECP contractors during dredging and dredge disposal activities will be obliged to have in place project-specific Contingency Plans, including spill prevention and control procedures as a part of their EHS Management plans.

		• For the protection of the marine water quality fauna and flora, the contractor will be required to ensure that turbidity in the waters occurs within minimum distance/radius from the dredge location. The distance will be specified after determining the receptors (sensitive habitats) locations during the detailed survey of marine habitats as part of DDDEHS-MP. Use of silt curtains when/where necessary will keep the distance manageable. • Prior to undertaking any dredging work, the contractor will be required to submit method statement, calculations, modeling study and specific information to demonstrate that his proposed method will ensure that suspended sediment levels, which could endanger flora and fauna, are not exceeded.
	Impact of construction activity	• Prior to undertaking any construction, reconstruction or demolition work, the contractor will be required to submit method statements. • Open stockpiles of construction materials (e.g. aggregates, sand, and fill material) should be covered with tarpaulin or similar fabric as a matter of course but particularly during rainstorms. Interception channels or bunds should be provided to prevent construction materials, soil, silt, or debris entering any drainage system. Final surfaces of any earthworks should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion. • Wastewater generated from washing down mixer trucks, drum mixers and similar equipment should, wherever practicable, be recycled; wastewater discharge should be kept to a minimum. Following silt removal and pH adjustment where necessary (to within a pH range of 6 – 10), surplus wastewater may be discharged into sewers. Surface run-off should be segregated from the concrete batching plant and casting area as far as possible, and diverted to the storm water drainage system. Surface run-off contaminated by materials in a concrete batching, plant or casting yard should be adequately treated before disposal into drains. • Contractors should prepare a spill prevention, control, and countermeasure plan (Emergency Management Plan) in the framework of hazardous materials management and safety and a Waste Management Plan (PS 3).
Visual-landscape change	Visual-landscape changes due to excessive movement of vehicles, construction machinery functioning, storage of the construction materials and wastes etc.	• Reasonable selection of the color and design for the temporary and permanent structures; • Disposal of the temporary constructions, materials and wastes in such a way that it should be noticeable for the visual receptors (road-side population and passengers); • Selecting the optimal route when the vehicles are moving (going astray from the populated areas); • After completion of the work planting the greenery on the territory and performing the landscape restoration works. • Temporary hoardings, barriers, traffic management and signage to be removed when no longer required; • Materials and machinery to be stored tidily during the works; • Lighting of work sites is restricted to approved working hours

		and those which are necessary for security; • Roads providing access to the site and work areas to be maintained free of dust and mud as far as reasonably practicable, and dust management techniques to be used; and
Impact on flora	Destruction of vegetation is not expected. (very limited vegetation in port industrial area)	• Taking all measures for preventing the soil quality deterioration; • Before commencement of the works to provide the instruction for the personnel on the issues of the vegetation cover protection. • After completion of the works, planting and growing the cultural and ornamental tree-plants.
Impact on fauna	Direct impact upon the fauna is not expected (no wild fauna in port industrial area)	• Strictly observe the vehicles movement routes and the boundaries of the construction site; • Selection of the optimal speed of traffic for mitigation of the probability of the direct impact(collapse); • Measures for mitigation of the dust quantity, noise and vibration level during the work performance process; • Minimal use of the directed light for the purpose of light dissemination mitigation; • Proper management of wastes; • Spillage of oil products and other poisonous substances into water and soil should be restricted; • Providing instruction of the personnel before commencement of the works.
Waste Management	Construction wastes (including the hazardous wastes); Domestic wastes.	• Contractors should prepare a Waste Management Plan defining adequate measures for SW collection, segregation, reuse and disposal during construction • Wastes (particularly the construction debris) should be maximally separated and recycled where possible/appropriate; • Allocation of the protected sections/premises from external factors impact for temporary disposal of wastes; • Hazardous wastes should be packed properly and have the relevant labels; • Hazardous wastes management should be undertaken by the contractor having the relevant permit for such activity and following good international practices and applicable local and international regulations (Bazel and Rotterdam Convention) • Strict control on the wastes management process. To maintain the special log-book for the purpose of recording the quantity of the generated wastes, types and further management process; • The personnel with proper training should be allocated for wastes management; • Instruction and training should be provided for the entire staff of the employed personnel on the issues of the wastes management. • Burning of waste on site will not be permitted. All waste, which cannot be recycled on site, will be collected and taken off site for recycling / reuse or disposal to an official/municipal waste disposal site after consultation with local authorities. • A ‘scavenging boat’ will be available at all times for collection of windblown rubbish within the harbor basin itself.

		• All rubbish, waste materials and debris shall be systematically cleared from working areas as they accumulate; all such materials should be cleared at the end of each working day. • If removal of waste materials at the end of the working day is not possible, the materials should be covered with tarpaulin or similar. • Waste materials not removed directly from the site shall be temporarily stored at designated points and covered, pending removal from the site. • All working areas and site roads will be kept clear of mud, water, silt and other materials at all times. If earth, mud, or other debris is deposited on roads, they will be immediately removed.
Seismicity, earthquake		As described in the study the port location will be exposed to medium seismic risk 8M scale. The port construction activities will however not include blasting activities at the port site; the current seismic risk will therefore not be increased. Furthermore, the design should take into account this risk and the related risk of heavy storms. Moreover, especially during construction, in order to reduce the loss of lives, property and livelihood it is imperative that the Contractor has plans to prepare, respond and recover from heavy storms. Reference is made to standards such as ISO: ISO 2394 General principles on reliability for structures, 1998, ISO 23469 Bases for design of structures – Seismic actions for designing geotechnical works, 2005, and the International Navigation Association: Seismic Design Guideline for Port Structures, Balkema, 2001,
Community Health and Safety	Surplus noise, emissions and traffic from vehicle movement, water and soil contamination, accidents. , other, including diseases	Contractors should prepare a Community H&S Plan (to be approved by Terminal management) defining adequate measures for ensuring safety and security of local population during the Construction Phase. The Plan should cover (but not limited to) the following: • Increased Transmission of Communicable and Vector Borne Diseases during Construction • Increased Hazards to Community Health during Construction • Increased pressure on Health Care Facilities during Construction • Site Trespass and Accidents during Construction • Mitigation of Community Health and Safety Risks for the Port • Port Marine Safety • Port Security • Visual Impacts The mitigation measures should also include (but not limited) to following: • For the purpose of the local residents' safety, warning, restrictive and pointing signs should be installed near the construction sites or the relevant places going from the construction sites or the site to the main road; • Ensuring proper technical functioning of the construction machinery and vehicles; • During the business days, in the dry and windy weather, to water the ground roads or ground covered territories once in four hours;

		• Observing the rules for storage of the dump construction materials, in order them not to be dusted in a windy weather; • When the powdered material is transported by tucks, when there is probability of dusting, to cover them with a tent; • In case of the land works and the materials loading-unloading, in order to avoid the surplus dust emission, to take the precautionary measures (e.g. in case of loading and un loading to restrict the materials to be dumped from the height); • Keeping the optimal speed of transport movement; • Washing the vehicle wheels before moving to the public roads; • Providing instructions for the personnel(particularly the vehicles and machinery drivers) before commencement of the works; • In case of receipt of the complaints, to identify/register them and proper response to them. • Selection of the optimal access routes to the working section; • Restrict the movement of the vehicles on the public roads; • Maximal restriction of the caterpillar machinery movement; • The information should be provided to the population about the time and period of the works performance; • Maximal rehabilitation of all the damaged sections of the road, to make it available for the population; • In case of necessity, the vehicles traffic should be controlled by specially controlled personnel (flagman); • Appropriate warning, indicating and restrictive signs to be installed near to the construction sites; • Identification/registration of the complaints and proper response to it. • To control and restrict the unauthorized entry of trespassers into the construction sites or without any protective inputs and their movement; • During the course of the transport operations, to observe the safety rules, limit the speeds; • Regular risk assessment should be conducted for identification of the concrete risk factors for the population and for the purpose of relevant management of such risks; • To take measures for preventing the ambient air, water and soil quality deterioration (see the relevant paragraphs);
Occupation Health and Safety (OHS)	General OHS Issues Physical Hazards Chemical Hazards Noise Respiratory Hazards Confined	As the design is in a preliminary phase specific mitigation measures cannot be defined. EPC Contractor should perform OHS risk assessment for all working position and based on it prepare Occupational H&S Plan (to be approved by Terminal management) defining adequate measures for ensuring safety and security of the workforce during the Construction Phase. The Plan should be prepared in accordance with IFC General EHS Guidelines and Georgian legislation. The outline OHS Plan is presented in Subsection “Environmental and Social Management Plan” EPC contractor to develop, implement and maintain OHS risk assessment and management plan including (but not limited to) following OHS measures: • Preventive and protective measures should be introduced according to the following order of priority:

	Spaces	• Eliminating the hazard by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc.; • Controlling the hazard at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc.; • Minimizing the hazard through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc. • Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE. • While working at the height the personnel should be insured through the special safety belts, ropes and other types of safety catchers; • Employees working in noisy environment will be made to wear ear muffs/ear plugs to avoid any adverse impact of noise on them; • Employees exposed to hand vibration while handling/operating of heavy machineries will compulsorily wear anti vibration gloves made up of viscoelastic material; • Shock absorbing techniques will be used to minimize the impact of vibration from heavy machineries; • Personnel should be provided with the individual protective inputs (overalls, hard hats etc.). • Medical insurance of the personnel is desirable. • Standard medical boxes should be available on the construction site and the sections especially dangerous for health; • For the purpose of the personnel safety, warning, restrictive and pointing signs should be installed at the construction site or the relevant places going from the construction site to the main road;
Socio-economic impacts	Impact on Employment Impact on Infrastructure Impact on Public Services Community Cohesion Cultural Heritage Decommissioning	EPC Contractor should prepare the following plans related to socio-economic impacts: Stakeholders Engagement Plan withGrievance Redress Mechanism Community Liaison and Employment Management Plan Transport Management plan Community H&S Plan Emergency Preparedness and Response Plan Plans should be prepared in accordance with IFC General EHS Guidelines and Georgian legislation. The outline (framework) management plans are presented in Section 17 “Outline Environmental and Social Management Plans” For instance the Community Liaison and Employment Plan should include: • Staff recruitment policy elaboration and its publication at the local(office), municipal and regional level;

		• Staff recruitment on the basis of the relevant testing, non – Discrimination and Equal opportunity ; • Establish a Grievance Mechanism for workers • Signing the individual working contract with personnel; • Conduct OHS risk assessment • To insert the articles into the agreements signed with the personnel in conjunction with every plan, procedure and mitigation measures, as well as inserting those articles, which deal with the safety plans monitoring and the reports on the accidents. • Providing every personnel with the information about their service – elaborate the code of conduct at work; • Informing every local personnel about the local habits and culture; • While making the purchase of various materials, the advantage is given to the local products and support to the local enterprises; • Elaborate the mechanism for review of the personnel complaints and use it in practice; • Maintaining the personnel's' complaints log-book.

Table 48: Environmental and Social Mitigation at Operation and Maintenance Phase

Receptor/Impact	Impact description	Mitigating measures
OPERATION & MAINTENANCE PHASE		
Surface waters/groundwater's	Port sewage and storm-water	• Installation of storm-water collecting channels throughout the perimeter of the Terminal territory and berths to prevent direct run-off of storm water to the sea; • Construction and regular maintenance of the storm water system with pre-treatment before discharge into marine water. Installation of the sand filtrate the end of storm-water collecting channels for treatment of the collected storm water prior to its discharge to the sea waters; • In case of the risk of oil and oil products leakage from the construction machinery, equip such technique with dripping devices, have spill response plan; • Segregated collection of the wastes, allocation of the facilities for temporary disposal of the hazardous wastes – to prevent surface contamination. • On the territory of multifunctional transshipment complex, industrial - faecal waste water will be connected to Poti sewer collector. Poti WWTP will be functioning by the time of Terminal operations start.
Marine water quality	Surface run-off. Routine/maintenance dredging Ship wastewater	• The impact of the storm water on marine water quality will be reduced through monitoring of discharged water quality from treatment facility and through proper maintenance of the filters. • Approval of Dredging EHS Management Plan by Terminal Management prior to starting dredging by any Contractor. The Plan to contain mitigation measures to reduce impact on marine biota. • No reception of wastewater from ships is planned for the Project Phase I at the moment

	Ship ballast water	• All ballast waters should be managed in accordance with Government of Georgia (GoG) Decree #17 dated 03 January 2014, Annex 5 “Technical procedure for management of ballast waters in Georgia” (released/discharged before entering the 50 miles zone of Georgia territorial waters, informing Georgia Black Sea Conventional Inspection, etc.)
Ambient air quality	Combustion emissions (ships, port)	• Developing air quality management procedures applicable to ship operators, such as: - Maintaining emissions of NOx and SOx within the limits established by international regulations - Using low-sulfur fuels in port, if feasible, or as required by international regulations - Navigation of port access areas at partial power, achieving full power only after leaving the port area - Avoiding or limiting the practice of blowing soot from tubes or flues on steam boilers while in port or during unfavorable atmospheric conditions - If the port provides onshore power for vessels to reduce shipboard power use during loading / unloading activities, requiring vessels to shut down power plants (go “cold iron”) if docked above a specified time threshold • Ensuring proper technical functioning of the machinery and vehicles; • Selection of the optimal route and speed when the vehicles are moving; • Stopping the vehicle engines or operating on the minimal turnover, when they are not used; • Providing the instructions for personnel; • Identification/registration of the complaints and proper response to it. • Low sulfur content diesel will be used as fuel for generator sets to control emission of SO2; • Any vehicle or machinery whose exhaust exceeds 5000 ppm of CO2 shall be refused.
	Dust (from dry bulk materials, cargo operations, vehicles movement, etc.)	Dry cargo storage and handling facilities will be designed to minimize or control dust emissions, including: • Installing dust suppression mechanisms (e.g. water spray or covered storage areas) • Minimizing free fall of materials • Minimizing dry cargo pile heights and containing piles with perimeter walls • Removing materials from the bottom of piles to minimize dust re-suspension • Ensuring hatches are covered when material handling is not being conducted • Covering transport vehicles • Regularly sweeping docks and handling areas, truck /rail storage areas, and paved roadway surfaces
Noise pollution	From ship cargo	Noise Mitigation and Management Plan prepared by Operator and approved by Terminal management will be in place prior to the

	handling, machinery and traffic	commencement Terminal operations. • All contractors and subcontractors should comply with the relevant local and international noise standards; • All plant and equipment will be fitted with silencers, mufflers, acoustic linings, or shields, as necessary. • If necessary, measures to be taken to reduce noise emissions from the site will include provision of screens or bunds to absorb noise and deflect it away from receptors; • Timing and programming outside sensitive seasons (e.g. avoiding the migration seasons of marine mammals, etc.), especially concerning underwater noise during routine dredging activities; • Apply a change management process to modify operations, if necessary to address noise issues; • Vehicles and generator sets will be serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them; • Shock absorbing techniques will be used to minimize the impact of vibration from heavy machineries; • Heavy machineries and generators will be operated during day time only. • A noise monitoring program during construction will be implemented
Solid Waste management	Ship wastes Port wastes Hazardous materials, oil	No reception of waste from ships is planned for the Project Phase-I at the moment. At the operation stage agreement should be achieved with port of Poti authority, Poti municipality, and the Georgia Black Sea Conventional Inspection in order to meet MARPOL requirements on the wastes from ships. • Terminal Operator will prepare a Waste Management Plan (approved by Terminal Management, Port authority and local municipality, defining adequate measures for SW collection, segregation, reuse and disposal during Terminal operation • Wastes should be maximally separated and recycled where possible/appropriate; • Allocation of the protected sections/premises from external factors impact for temporary disposal of wastes; • Hazardous wastes should be packed properly and have the relevant labels; • Hazardous wastes management should be undertaken by the contractor having the relevant permit for such activity and following good international practices and applicable local and international regulations (Bazel and Rotterdam Convention) • Strict control on the wastes management process. To maintain the special log-book for the purpose of recording the quantity of the generated wastes, types and further management process; • The personnel with proper training should be allocated for wastes management; • Instruction and training should be provided for the entire staff of the employed personnel on the issues of the wastes management. • Burning of waste on site will not be permitted. All waste, which cannot be recycled on site, will be collected and taken off site for recycling / reuse or disposal to an official/municipal waste disposal site after consultation with local authorities. • A ‘scavenging boat’ will be available at all times for collection of

		windblown rubbish within the harbor basin itself. • All rubbish, waste materials and debris shall be systematically cleared from working areas as they accumulate; all such materials should be cleared at the end of each working day. • If removal of waste materials at the end of the working day is not possible, the materials should be covered with tarpaulin or similar. • All operation areas will be kept clear of mud, water, silt and other materials at all times. If earth, mud, or other debris is deposited on pavement, they will be immediately removed.
Marine ecology	Impact on marine biota -due to maintenanc e (routine) dredging -due to increased ships traffic	• Development of the Dredging and Dredge Disposal EHS Management Plan (DDDEHS-MP) will be mandatory before start of any routine (maintenance) dredging activity by any Contractor and be approved by Operator, Terminal Management and Port of Poti Authority. The DDDEHS-MP will include the following components: oil and fuel management, waste management, training, and emergency preparedness and response procedures. • Dredging and Dredge Disposal Monitoring Program, will be developed, covering the dredged areas, disposal site, and potentially sensitive areas in adjacent areas. The Monitoring Program will include, among other, the following components: water quality (i.e. sediment suspension and dispersion in the water column), biotic monitoring (metals bioaccumulation); protection and conservation of marine habitats. • Both Terminal Operator and dredging contractor during dredging and dredge disposal activities will be obliged to have in place project-specific Contingency Plans, including spill prevention and control procedures as a part of their EHS Management plans. • For the protection of the marine water quality fauna and flora, the contractor will be required to ensure that turbidity in the waters 150 m from the dredge location is kept to a minimum (not to exceed natural turbidity by more than 25 NTU). • Prior to undertaking any dredging work, the contractor will be required to submit method statements, calculations, modeling studies or other information to demonstrate that his proposed methods will ensure that suspended sediment levels, which could endanger flora and fauna, are not exceeded. • Monitoring program will be developed by Terminal Operator and approved by Terminal Management, covering potentially sensitive adjacent areas (terminal aquatory, access ways, anchoring areas. The Monitoring Program will include, among other, the following components: water quality (i.e. sediment suspension and dispersion in the water column), biotic monitoring (metals bioaccumulation); protection and conservation of marine habitats.
OHS		Development of the OHS Management Plan will be mandatory for the Operator before start of Terminal operations and should be approved by Terminal Management and Port of Poti Authority. The OHS Plan will be based on IFC General OHS Guidelines and additional prevention, minimization, and control techniques specific to ports include the following:

	Physical hazards	Implementation of applicable recommendations from the international codes of practice, based on the International Labor Organization (ILO) Code of Practice for Safety and Health in Ports, 2005: - Separation of people from vehicles and making vehicle passageways one-way, to the extent practical -Locating means of access to ensure suspended loads do not pass overhead, to the extent practical - Constructing the surface of port areas to be: of adequate strength to support the heaviest expected loads; level, or with only a slight slope; free from holes, cracks, depressions, unnecessary curbs, or other raised objects; continuous; and skid resistant -Providing safe access arrangements suitable for the sizes and types of vessels calling at their facilities. These access arrangements should include guard rails and / or properly secured safety nets to prevent workers from falling into the water between the ship's side and the adjacent quay -Effectively guarding every weather deck and 'tween deck' hatchway to an adequate height when open -Avoiding placing cargo on, or allowing passage of vehicles over, any hatch cover that is not of adequate strength for that purpose -As far as is reasonably practicable, preventing workers from working in the part of a hold where a trimming machine or grab is operational -Inspecting and approving all slings before use - Clearly marking (indicating its own weight) all lifting beams and frames, vacuum lifting, or magnetic lifting device which does not form an integral part of a lifting appliance and every other item of loose gear weighing more than 100 kilograms (kg) - Inspecting disposable pallets and similar disposable devices before use and avoiding re-use of such disposable devices -Equipping lifting appliances with means of emergency escape from the driver's cabin and a safe means for the removal of an injured or ill driver installing telescoping arm loaders and conveyors; Layout to reduce the need for multiple transfer points. - Prevent, minimize, and control risk of exposure to chemical hazards
	Chemical hazards Confined spaces	- Implement confined space entry procedures as described in the General EHS Guidelines. With specific reference to access into cargo holds, confined space entry programs should include procedures that prevent or minimize the use of combustion equipment, including fueling activities, in the interior of cargo holds and that provide for alternative means of egress.
	Dust, noise, other	-Employees working in noisy environment will be made to wear ear muffs/ear plugs to avoid any adverse impact of noise on them; -Employees exposed to hand vibration while handling/operating of heavy machineries will compulsorily wear anti vibration gloves made up of viscoelastic material; -As per the necessity, proving the personnel with the protective inputs (earplugs) – machinery operators should be equipped with the ear protective inputs. Ear protective inputs are required for the employees operating in those sections, where the noise level exceeds 85 DBA. Ear protective inputs alternative might be the

		delay time limitation within the area of the high acoustic background. According to the World Bank recommendations, the time for operating in the sections with >85 DBA, without any protective inputs, in case of exceeding every 3 DBA should be reduced to half; -Providing instructions for the personnel before commencement of the works.
Community Health and Safety	General community H&S issues	Development of the Community H&S Management Plan will be mandatory for the Operator before start of Terminal operations and should be approved by Terminal Management and Port of Poti Authority. The Plan will be based on IFC General OHS Guidelines and additional prevention, minimization, and control techniques specific to ports include the following: Prevention of hazards to community health during operations • Water Quality and Availability • Structural Safety of Project Infrastructure • Life and Fire Safety (L&FS) • Traffic Safety • Transport of Hazardous Materials • Prevention of transmission of communicable and vector borne diseases during operations • Emergency Preparedness and Response Prevention of impact on cultural heritage during operations
	Port marine safety	Operator will develop plan and procedures based on Guide to Good Practice on Port Marine Operations (2003). -To maintain infrastructure and navigation channels in a safe condition, -To maintain emergency response and counter pollution plans and the ability to implement them, -To provide an efficient and effective pilotage service, -To provide an effective system for monitoring and regulating the harbor, -To effectively and safely operate marine services, and -To ensure that those with marine safety responsibilities are competent to undertake their duties
	Port security	Terminal security arrangements will be integrated within the entire Port of Poti security management and will follow IMO requirements and guidelines applicable to ports of the International Ship and Port Facility Security Code and Solas Amendments 2002 (2003).
	Visual amenities	– Appropriate lighting design to ensure the site is not over-lit; – Use of specifically design lighting that minimizes the spread of light and glare towards visual receptors; – Specify appropriate luminaries to reduce light spill, sky glow/glare – Consider the potential for solar power for lighting; and – Sensitive placement and specification of lighting to minimize any potential increase in light pollution within the natural environment

15 Environmental and Social Management System (ESMS)

IFIs' and the state agencies' approach to environmental management in the industry and infrastructure sectors, is the adaption of the key principles of environmental and social protection to the construction and subsequent operations of any infrastructure facilities, including new ports and terminals. These principles are:

- Identification of environmental and social risks and impacts;
- Minimization of potential impact using projection and mitigation leverages;
- Design, establish and maintain environmental and social management system and programs that will describe mitigation and performance improvement measures and actions
- Monitoring of the control effectiveness;

This part of the present Environmental and Social Impact Assessment report highlights how the mentioned principles were adapted to the proposed project. It is also described how the obligations stipulated by this report will be implemented through the field measures. Key roles and responsibilities are defined and the schedule for implementation of the mentioned measures is set forth.

The objective of the environmental management system developed in conjunction with the Poti Multifunctional Transshipping Terminal Project, to ensure the environmental and social requirements to be unconditionally met by the EPC contractor (s).

According to IFC PS-1 the ESMS shall incorporate the following elements: (i) policy; (ii) identification of risks and impacts; (iii) management programs; (iv) organizational capacity and competency; (v) emergency preparedness and response; (vi) stakeholder engagement; and (vii) monitoring and review.

The following procedures will form the Environmental and Social Management System for the proposed Project, as well as current and future management of the Terminal:

1. Planning Procedure - details the method by which management identifies environmental issues and the actual or potential impacts associated with Terminal reconstruction or operations, complies with legislative and other requirements, assists the management to set environmental and social objectives and targets, based on the impacts identified.

2. Training, Awareness and Competence Procedure - provides guidelines for environmental awareness training of relevant Terminal employees and contractors to ensure personnel have the specific skills, knowledge and competency levels in their roles, and that appropriate training is provided where gaps in skills, knowledge and / or competency are identified.

3. Communication and Reporting Procedure - to ensure that there is clear communication on environmental issues within Terminal management, as well as with developer, contractors and community; and a system for receiving, documenting and responding to relevant communication from external interested parties.

4. Document Control Procedure - to describe the procedure for the control of all documentation relating to the ESMS.

5. Emergency Preparedness and Response Procedure - to identify the potential for and to respond to accidents and emergencies, and for preventing and mitigating the environmental impacts that may be associated with them.

6. Monitoring and Measurement Procedure - to ensure that effective monitoring and measurement of Terminal activities that may have a significant impact on the environment are undertaken on a regular basis.

7. Non-conformance, Corrective and Preventative Action Procedure – to provide a guideline to ensure that major technical non-conformances are identified and included on the Register; and system non-conformances are identified and addressed prior to the finalization of the audit report.

8. Records Procedure – to provide guidelines for the identification and maintenance of environmental records.

9. Management System Audit Procedure - to describe the methods and responsibilities for the planning, preparation, performance, reporting and follow-up of the ESMS Audits.

Key element of the ESMS is development of appropriate environmental and social management plan and monitoring program. The generic ESMP developed for the Project of the new Multifunctional Transshipment Terminal at port of Poti provides a framework for managing, mitigating and monitoring environmental and social impacts of the Project at construction and operation/maintenance phases, through the site-specific management plans and should be used to demonstrate that sound environmental and social practices will be followed.

16 Environmental and Social Management Plan

Environmental and social management plan (ESMP) is composed of two key components:

1. **site specific plans and procedures** (presented in the table below) to be developed by EPC contractors based on **mitigation measures** elaborated within this ESIA (Section 24 of this Report) and generic/outline plans and procedures presented in Section 28 of this Report;
2. **monitoring program** (presented in Section 29 further in this Report)

Within the framework of the generic ESMP the EPC contractor(s) will elaborate a series of site specific management plans and will constantly update these plans during the course of the activity. The Developer (Transford LLC or its Project Management Consultant - PMC) will oversee/supervise the implementation of each of the elements of the environmental management plans through the regular inspections and permanent monitoring program. Contractors will be required to prepare their own specific EMPs based on ESMP provided as part of this ESIA, describing in detail the actions they will take to provide each measure. The contractors' specific ESMPs should include (but not limited to) the (1) plans and procedures presented in the Table 46 below and (2) the specific mitigation measures elaborated within this ESIA. These site-specific EMPs have to be prepared and submitted by the Contractor to the Developer (Transford LLC or its PMC) for approval, prior to initiation of construction works. Transford (or its PMC), as Project Developer, is also responsible for auditing Contractor's environmental and social management system to ensure that there are institutional and human capacities in place (environmental and social managers, field officers, coordination mechanisms with construction managers, etc.) to properly and timely implement the approved specific ESMP requirements.

Therefore, it is considered that prior to commencement of work, at mobilization (pre-construction survey) stage, the contractor will closely cooperate with the Developer, in order to develop detailed environmental management plans related to a specific components of the port reconstruction works.

Detailed environmental and social management plans prepared by the Contractors should be based on the following:

- Mitigation measures set forth in the ESIA report;
- Outline management plans and procedures (presented in Section 17), defining/outlining in general the objectives and scope per each site-specific EMP to be developed in details by the Contractor;
- Contractor's work plan and construction method statements;
- International and local environmental and social requirements, H&S plans set by the Developer and Contractor's own EHS procedures.

Mentioned scheme should be complemented by the reports on the periodic monitoring of the works performance, which will describe how the mitigation measures were taken and how effective they were.

Effective implementation of the environmental management system depends on the development and implementation of environmental and social management plans.

Environmental and social management plans and procedures relevant to the Project are summarized in the table below.

The developer should review and approve the plans elaborated by the construction Contractor, after which the Contractor will be responsible for fulfillment of these plans. The Project Developer (directly, or through its PM consultant) will supervise and monitor the fulfillment of the plans by Contractor.

Table 49: List of Environmental and Social Management Plans and Procedures

#	Name of plan	Objective of the plan	Responsibility for	
			Preparation	**Implementation and monitoring**
1	Community H&S management plan	Planning of site-specific measures during construction and operations for ensuring health and safety of the population residing in the vicinity of multifunctional transshipment terminal.	Before commencement of the construction works, Contractor should develop detailed site-specific management plan based on actual site conditions, mitigation measures proposed in ESIA and in accordance with the outline management plan presented in Section 17 of this document. The plan should be approved by Developer.	Contractor is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
2	Stakeholder engagement plan	Planning of project-specific measures to ensure awareness and engagement of all stakeholders and the grievance mechanism for affected communities.	SEP should be prepared by Developer as a stand-alone document and contain public consultation program and grievance redress mechanism.	Developer is responsible for SEP
3	Community liaison and	Planning of site-specific measures	Before commencement of the construction works,	Contractor is responsible for proper implementation

#	Name of plan	Objective of the plan	Responsibility for	
			Preparation	Implementation and monitoring
	employment management plan	during construction and operations for ensuring communication with local communities and employment program for local labor.	Contractor should develop detailed site-specific Community Liaison and Employment management plan based on actual neighboringcommunities and in accordance with the outline presented in Section 17 of this document. The plan should be approved by the Developer.	of the plan. Monitoring and control over implementation should be undertaken by the Developer
4	Transport management plan for construction phase	Planning of site-specific measures during construction for ensuring, safe management of transport and mitigating the potential impact caused by movement of vehicles.	Before commencement of the construction works, Contractor should develop detailed site-specific management plan based on actual site conditions and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	Contractor is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
5	Air emissions management and dust control plan	Planning of site-specific measures during construction for ensuring, safe management of potential impact caused by emissions and dust.	Before commencement of the construction works, Contractor should develop detailed site-specific management plan based on actual site conditions and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	Contractor is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
6	Port wastewater management plan	Planning of site-specific measures during construction and operations for ensuring, safe management of port sewage and storm water. (Ship wastewater – not applicable due to absence of appropriate vessels, facilities and conditions.)	Before commencement of the construction works, Contractor should develop detailed site-specific management plan based on actual site conditions, mitigation measures proposed in ESIA and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	Contractor is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
7	Dredging and Dredge Disposal EHS Management Plan	Planning of site-specific measures during construction phase for ensuring, safe management of	Before commencement of the construction works, Contractor should develop detailed site-specific management plan based	Contractor is responsible for proper implementation of the plan. Monitoring and control over implementation

#	Name of plan	Objective of the plan	Responsibility for	
			Preparation	Implementation and monitoring
		dredging and dredge disposal activities	on actual marine conditions, mitigation proposed in ESIA and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	should be undertaken by the Developer
8	Spill prevention and control plans	Planning of site-specific measures during construction phase to ensure spill prevention and control	Before commencement of the construction works, Contractor should develop detailed site-specific management plan based on actual site conditions and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	Contractor is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
9	Transport management plan for operational phase	Planning of site-specific measures during port operations phase for ensuring safe management of transport and mitigating the potential impact caused by movement of vehicles.	Operator should develop detailed site-specific management plan based on actual operations conditions and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	Operator is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Terminal management
10	Solid Waste Management plan	Planning of site-specific measures during construction phase for ensuring safe management of solid waste (both construction and domestic) Waste reception from ships – not applicable due to absence of appropriate vessels, facilities and conditions.)	Before commencement of the construction works, Contractor should develop detailed site-specific management plan based on site conditions, mitigation measures and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	Contractor is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
11	Water and Energy Consumption/ Management Plan	Planning of site-specific measures during both construction and operation phases for ensuring rational use of water and energy	Contractor (Operator) should develop detailed site-specific management plan based on site conditions, technology and in accordance with the outline presented in Section 17 of this document. The plan should be approved by Developer.	Contractor (Operator) is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer

#	Name of plan	Objective of the plan	Responsibility for	
			Preparation	Implementation and monitoring
12	Noise management plan	Planning of site-specific measures during both construction and operation phases for ensuring mitigation of noise impact on population and aquatic fauna.	Contractor (Operator) should develop detailed site-specific management plan based on site conditions and in accordance with the outline plan presented in Section 17 of this document. The plan should be approved by Developer.	Contractor (Operator) is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
13	Emergency preparedness and response plan	Planning of site-specific measures during construction and operation phases for ensuring preparedness and safe management of emergency situations.	Contractor (Operator) should develop detailed site-specific management plan based on actual site conditions andin accordance with the outline plan presented in Section 17 of this document. The plan should be approved by Developer.	Contractor (Operator) is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer
14	Occupational H&S management plan	Planning of site-specific measures during construction and operations for ensuring health and safety of the employees and the contractors of multifunctional transshipment terminal.	Contractor (Operator) should develop detailed site-specific management plan based on actual site conditions and in accordance with the outline plan presented in Section 17 of this document. The plan should be approved by Developer.	Contractor (Operator) is responsible for proper implementation of the plan. Monitoring and control over implementation should be undertaken by the Developer

17 Outline (Framework) Environmental and Social Management Plans

This section of the ESIA presents the proposed set of environmental and social management plans' outline (framework/structure, sample content) to be used as a basis and guidelines for the preparation of site-specific ESMPs for the Poti Multifunctional Transshipment Terminal at construction and operation phases, by Terminal construction and operation contractors. The Plans should be also incorporate mitigation measures identified in Section 24 of this report.

17.1 Outline Community H&S Management Plan

Various aspects of the community H&S management at the construction and operation phases related to air and water quality, noise, transport/traffic, community liaison, etc. are discussed further in outline management plans per each component based on IFC General EHS Guidelines and will be developed in details by contractors and operators as part of the Terminal environmental management system. This particular outline management plan is related to community H&S and covers: 1) Marine safety, 2) Port security and 3) Visual Impacts

Marine safety

Port operators have certain key responsibilities necessary for the safe operation of ships including safe access and maneuvering of ships inside the harbor and port areas. Port operator of the Multifunctional Transshipment Terminal (hereafter Terminal) will develop and implement Safety Management System able to effectively identify and correct unsafe conditions.

This safety system will be in compliance and integrated within the Port of Poti general safety procedures and will include procedures to regulate the safe movement of vessels within the harbor (including pilotage procedures), protect community from dangers arising from marine activities at the harbor, and prevent events that may result in injury to workers, the public, or the environment. The Safety Management System includes comprehensive emergency preparedness and response plans that provide a coordinated response based on the port and community resources required to manage the nature and severity of the emergency event.

The overall objective of the Marine Safety management is to ensure safety in the port, the prevention of human injury or loss of life, and the avoidance of damage to the environment, to property, to cargo and to neighboring communities. The Marine Safety procedures will be developed based on Guide to Good Practice on Port Marine Operations (2003). The objectives of effective Marine Safety Management system are:

- To maintain infrastructure and navigation channels in a safe condition,
- To maintain emergency response and counter pollution plans and the ability to implement them,
- To provide an efficient and effective pilotage service,
- To provide an effective system for monitoring and regulating the harbor,
- To effectively and safely operate marine services, and
- To ensure that those with marine safety responsibilities are competent to undertake their duties

Terminal operator will:
a) provide for safe practices in port operation and a safe marine environment;
b) establish safeguards against all identified risks;
c) continuously improve safety management skills of personnel, including preparing for emergencies related to marine safety
d) prevent operational pollution of the marine environment.

Terminal Marine Safety System will include:

- Dedicated risk assessment for port marine operations and for dredging operations
- Dedicated method statement for dredging operations
- Dedicated management plan for marine operations reviewed two-yearly
- Dedicated safety plan for marine operations reviewed two-yearly
- Dedicated harbor master who carries out regular audits of all the harbor
- Two yearly internal audit of the marine safety management system
- The investigation of all reported marine incidents
- Comprehensive training and development

Port security

The new Multifunctional Transshipment Terminal operators will act in close cooperation with the Port of Poti administration and will have a clear understanding of their responsibilities, including international legal and technical obligations to provide security to crews, and personnel in port. In accordance with applicable international legal requirements, port security arrangements (e.g. access control) will be established through the completion of a Port Facility Security Assessment of port operations followed by the appointment of a Port Facility Security Officer and the preparation of a Port Facility Security Plan depending on the outcome of the risk assessment. Terminal security arrangements will be integrated within the entire Port of Poti security management and will follow IMO requirements and guidelines applicable to ports of the International Ship and Port Facility Security Code and Solas Amendments 2002 (2003).

The port security plan (PSP) should be based on the port security assessment and include:
1. Details of the security organization of the port.
2. Details of the port's links with other relevant authorities and the necessary communications systems to allow the effective continuous operation of the organization and its links with others.
3. Details of security level 1 measures, both operational and physical, that will be in place.
4. Details of the additional security measures that will allow the port to progress without delay to security level 2 and, when necessary, to security level 3.
5. Provision for the regular review, or audit of the PSP and for its amendment in response to experience or changing circumstances.
6. Details of the reporting procedures to the appropriate member States' contact points.
7. Details of the necessary liaison and coordination with state agencies.
8. Identification of restricted areas and measures to protect them at different security levels.
9. Procedures for the verification of identity documents.
10. Requirements for drills and exercises carried out at appropriate intervals to ensure the effective implementation of the PSP.

The PSP should refer to, and take into account, any other existing port emergency plan or other security plans. The PSP should be protected from unauthorized access or disclosure.

All security measures and operations that are to be implemented in the port at each security level will be listed and tabulated in response to issues identified in the security assessment. This should cover personnel security, perimeter and physical barriers, access control and all approved security measures. It should detail the roles and tasks of all members of the port community to establish/monitor/control, as appropriate, restricted areas and navigation zones.

Visual impact

The objectives of the visual impact mitigation and management are: to reduce and/or manage adverse visual impacts of construction on landscape and visual amenity and to achieve a balance between the revetment design and use requirements, achieving a visual outcome that minimizes the detrimental effects on the landscape and less affects Community.

At the construction phase the visual impact mitigation and management considers:

- Avoid loss or damage to landscape features;
- Temporary hoardings, barriers, traffic management and signage to be removed when no longer required;
- Materials and machinery to be stored tidily during the works;
- Lighting of work sites is restricted to approved working hours and those which are necessary for security;
- Roads providing access to the site and work areas to be maintained free of dust and mud as far as reasonably practicable, and dust management techniques to be used; and
- Use of appropriate soil erosion prevention techniques.

At the operation phase the visual impact mitigation and management considers:

– Appropriate lighting design to ensure the site is not over-lit;
– Use of specifically design lighting that minimizes the spread of light and glare towards visual receptors;
– Specify appropriate luminaries to reduce light spill, sky glow and glare;
– Consider the potential for solar power for lighting; and
– Sensitive placement and specification of lighting to minimize any potential increase in light pollution within the natural environment.

Performance indicator will be - no complaints received about visual impacts during construction. Monitoring considers visual inspections of the construction area. Terminal is responsible for ensuring that construction activities are planned and undertaken so as to minimize visual impact. The construction supervisor is to advise the Engineer of any complaints. Corrective actions usually consider tidy up construction site; and restore or rectify areas of damage.

17.2 Outline Stakeholder Engagement Plan

Stakeholder Engagement Plan is a document for planning a comprehensive and appropriate approach to consultation and disclosure of the Project ESIA. Community engagement should be free of external manipulation, interference, coercion and intimidation, and conducted on the basis of timely, relevant, understandable and accessible information, in a culturally appropriate manner. Consultation activities should always be well planned and based on principles of respectful and meaningful dialogue.

The Stakeholders Engagement Plan is prepared based on IFC PS1 requirements and the IFC Good Practice Handbook for Stakeholders Engagement. The purpose of the SEP is to provide a consultation and participation strategy which:

- Identifies people or communities that are or could be affected by the project, as well as other interested parties;
- Ensures that such stakeholders are appropriately engaged on environmental and social issues that could potentially affect them through a process of information disclosure and meaningful consultation;
- Maintains a constructive relationship with stakeholders on an ongoing basis through meaningful engagement during project implementation; and
- Meets legal requirements related to consultation.

According to IFC Performance Standards (2012), PS1-Assessment and Management of Environmental and Social Risks and Impacts, Clause 27: “The client will develop and implement a Stakeholder Engagement Plan that is scaled to the project risks and impacts and development stage, and be tailored to the characteristics and interests of the Affected Communities”. In terms of disclosure (Clause 29), the client will provide Affected Communities with access to relevant information on:

(i) the purpose, nature, and scale of the project;
(ii) the duration of proposed project activities;
(iii) any risks to and potential impacts on communities and relevant mitigation measures;
(iv) the envisaged stakeholder engagement process; and
(v) the grievance mechanism.

The client will undertake a process of consultation (Clause 30) in a manner that provides the Affected Communities with opportunities to express their views on project risks, impacts and mitigation measures, and allows the client to consider and respond to them. The extent and degree of engagement required by the consultation process should be commensurate with the project's risks and adverse impacts and with the concerns raised by the Affected Communities. Effective consultation is a two-way process that should:

(i) begin early in the process of identification of environmental and social risks and impacts and continue on an ongoing basis as risks and impacts arise;

(ii) be based on the prior disclosure and dissemination of relevant, transparent, objective, meaningful and easily accessible information which is in a culturally appropriate local language(s) and format and is understandable to Affected Communities;

(iii) focus inclusive engagement on those directly affected as opposed to those not directly affected;

(iv) be free of external manipulation, interference, coercion, or intimidation;

(v) enable meaningful participation, where applicable; and

(vi) be documented. Where there are Affected Communities, the client will establish a grievance mechanism to receive and facilitate resolution of concerns and grievances about the client's environmental and social performance.

The objectives of these engagement activities were to:

- Publicize the proposed development of the project both at local and national level
- Engage key stakeholders by introducing the pre-feasibility study, ongoing feasibility exercise and ESIA process;
- Identify additional potential and key stakeholders;
- Identify concerns and opportunities to be addressed by the feasibility study and ESIA process;
- Provide stakeholders with points of contact to address further concerns and liaise with over project development.

The process of project stakeholder identification is aimed to list the key stakeholder groups who will be informed and consulted about the project. These should include persons or groups who:

• are directly and/or indirectly affected by the project
• have interests in the project that determine them as stakeholders
• have the potential to influence project outcomes

Grievance Redress

It is expected that there would be more potential for issues that lead to grievances in the construction phase of the project, with some potential during future operation and maintenance. Key grievances could include:

- Health and safety issues related to primary environmental impacts on nearby residents.
- Economic losses from loss of use of land or damage to agriculture or forest products.
- Social impacts due to construction crew activities or impacts on social infrastructure.

Anyone will be able to submit a grievance if they believe that Terminal activity is having a detrimental impact on the community, the environment, or on their quality of life. Grievances could include:

- Negative impacts on a person or a community (e.g. financial loss, physical harm, Nuisance).
- Dangers to health and safety or the environment.
- Failure to comply with standards or legal obligations.

- Harassment of any nature.
- Criminal activity.
- Improper conduct or unethical behavior.
- Financial malpractice or impropriety or fraud.
- Attempts to conceal any of these.

It may be found that a grievance is not connected to the project activity or that the project is being carried out in full compliance with applicable national and international standards. In these cases, it will be explained in writing to the person who filed the grievance. In all other cases, it will be investigated whether there has been a failure to work to the intended standard, to identify ways to redress the grievance, and to identify measures to prevent the incident occurring again.

17.3 Outline Community Liaison and Employment Management Plan

This Plan considers the social commitments made in the Project ESIA, with respect to community liaison and the Project. The Plan will serve as an important part of the environmental and social management process to translate commitments as set out in the ESIA and Contract documentation into actions in order to mitigate environmental and social impacts during construction. Specifically, the Plan should be developed to provide framework description of the community liaison and employment program, acknowledge the relevant Project policies and requirements, and point to detailed procedures that will govern the execution of community liaison and employment activities during Terminal construction and operation.

This Plan defines how the Contractor will maximize the positive impacts of port construction activities on local communities, eliminate any negative impacts where possible, and mitigate adverse situations, when necessary. The community liaison team/officer will build positive, non-dependent relationships between the Project and the local settlements during construction period, which will be the basis of strong relationships during the operational phase.

17.4 Outline Transport Management Plan for Construction Phase

The objective of the Plan is to maintain functionality of the internal and external road network, to prevent the access of unauthorized vessels too close to the dredge area and bund wall reconstruction site, ensure that dredging operations do not unduly interfere with vessel movements in the Port.

Design of appropriate traffic control will be established at any intersections of the haul route with public roads, including any temporary signage for construction works and application of appropriate speed limits;
If a spill of material occurs on the road, remove spilt material from the roadway. Where material is spilt on the bitumen surface and it is deemed to be a hazard to motorists, mobilize road sweepers to remove the product from the road;
Undertake maintenance of the road including grading and watering the surface to produce a well-bound surface that was low in dust emission;
Define traffic movement areas during construction;
Manage deliveries outside shift change timings;
Conduct road safety audit for haul route used to transport material for Terminal construction;
Establishment of a Port of Poti approved exclusion zone for both the construction and operational phases of the project;
Port of Poti to provide a notice to mariners advising the commencement of construction and expected duration of operations;
Port of Poti to specify the required navigational lighting for the bund construction phase;
The Port Project Engineer is to place a public notice prior to works commencing; and
Dredge operator to liaise with the Port of Poti Harbor Master regarding vessel movements.

The performance indicators will be:
All vessels remain well clear of the dredging and reclamation areas;
No complaints received about shipping access to and from the Port of Poti during construction; and
No complaints regarding road function within and leaving the existing Poti area

Monitoring:
Visual inspections of the construction area to ensure no vessels are within the exclusion zone; and
Traffic monitoring during construction should road traffic cause complaint.

Responsibility:
Port of Poti and the Terminal Engineer are responsible for ensuring that notice of the dredging works is provided to all users and visitors to the Port;
The construction supervisor is responsible for liaising with the Harbor Master regarding vessel movements; and
The construction contractor is responsible for ensuring adequate internal traffic design capacity and functionality.

Reporting:
Contractors shall report to Terminal Engineer on any complaints or incidents.

Corrective Action:
Increase the number of signs/buoys and/or relocate them to ensure they are effective;
Contact boat owners who approach too close to dredging area and explain the hazards; and
Undertake appropriate traffic impact studies if required.

17.5 Outline Air Emissions Management and Dust Control Plan

To ensure that the construction and operation of the proposed development has a minimal adverse impact on air quality, the following practices shall be followed:

Access roads would be sealed as soon as practicable after clearing, and access restricted to open cleared areas, in order to minimize dust emissions from open areas and from vehicle movements.
Keeping stockpiles of construction materials on site to a reasonable size, and avoiding multiple handling of material where possible.
Water sprays on open areas and stockpiles, water trucks or dust suppression additives will be utilized where necessary
Vehicle control measures (e.g. limiting vehicle speeds, limiting movements on unsealed roads, use of water trucks on unsealed roads, and wheel wash areas)
Covering of construction material loads on trucks in and out of the construction area to prevent dust releases.
A dredging and dredge spoil disposal management plan, incorporating mitigation measures for controlling odor and dust releases, particularly from dewatered and stored spoil (if/when any).
Enclosure of dust generating activities where operationally practical and efficient.
Implementation of appropriate dust suppression or capture technology where enclosure is not practical.
Efficient operation of machinery, equipment and vehicles to minimize exhaust emissions.
Low sulfur content diesel will be used as fuel for generator sets to control emission of SO2.
Any vehicle or machinery whose exhaust exceeds 5000 ppm of CO2 shall be refused.
Clean up of residues and spills in a timely manner.
Vehicle inspection and maintenance program for all on site construction vehicles.
Vegetation will not be burnt.

Monitoring:
Regular review of the efficiency of air quality and greenhouse gas management measures to ensure implementation of continuous improvement.
Monitoring would be undertaken during the construction phase of the project in order to meet key targets.
Visual inspections of dust deposition on surrounding areas will be undertaken on a periodic basis.
Visual inspections will be undertaken during activities likely to cause dust releases to assess the effectiveness of mitigation measures, and need for increased dust suppression.
Inspections of dust releases and associated control measures would be conducted on a regular basis.
Dust monitoring program will be implemented if material complaints are received.
Monitoring of air quality, with sampling undertaken on a quarterly basis at site.
Auditing of dust management practices, including review of objectives and targets.
External and internal audits of the EMP biennially.

Reporting
Environmental incident reporting including incident investigation and the inclusion of corrective and preventative actions.
Results of the dust management and monitoring program will be documented in Terminal's annual report.
Any complaints will be documented in and managed through to resolution via Terminal incident reporting procedure.
Where an incident causing air pollution occurs the MoENRP will be informed within 24 hrs.

Corrective actions
An incident-reporting and complaint handling mechanism would be incorporated within the EMP for dust incidents to be monitored and logged, and corrective and / or preventative actions to be implemented. Response mechanisms may be in the form of:
• Increased level of application of existing dust suppression management controls.
• An increase in the monitoring and inspections required.
• Dust monitoring at the site boundary, using dust measurement instruments where appropriate.
• A review and update of procedures or plans associated with dust management practice.
• Training for on-site personnel on avoiding, minimizing and controlling dust releases.
Audit findings could result in recommended corrective action measures such as:
• Updating plans and associated documentation to reflect changes to dust management practices.
• Alteration or inclusion of training practices for on-site personnel in practices for avoiding, minimizing and controlling releases of dust.
• Seeking additional resources to assist in achieving the ESMP objectives in relation to dust.

17.6 Outline Port Water Management Plan

The key potential impacts on water quality will be from dredging, dredge disposal and the bund wall reconstruction. The objective of the Plan is: to minimize the migration of turbid plumes and the introduction of contaminants in the marine environment during dredging, bund reconstruction and ongoing port operations.

Construction Phase:
Development and implementation of a Water Quality Monitoring Plan for dredging operations based on water quality objectives detailed in the ESIA and any subsequent baseline monitoring;
Minimal stockpiling of construction materials (rock and core material) will occur at the site. If small stockpiles are established, silt fences will be provided around these and they will be regularly inspected and maintained;
Engage appropriate construction equipment to undertake the works to minimize the duration of works;

Precautions will be taken by the revetment construction staff to minimize the risk of spillage of pollutants, such as fuels, oils, greases and other chemicals associated with the dredging and revetment construction operations, into the water;
Undertake maintenance and servicing of vehicles at offsite facilities;
All plant and machinery (particularly hydraulic hoses, fuel lines, etc.) will be inspected daily and any defaults or signs of wear and tear reported to the Construction Supervisor for repair as part of a preventative maintenance program;
All fixed plant will be equipped with drip trays. Drip trays will be checked after significant rainfall events, and any oily water will be collected and disposed of in such a way that prevents contamination of surface waters;
Petroleum product spillages will be immediately cleaned up with appropriate absorbent materials along with remediation of the area if required. The absorbent will be kept in an appropriate container marked 'regulated waste' for a waste contractor licensed to receive such waste;
Spill kits including containment and treatment equipment and materials will be provided at the site, near where equipment is being used;
In the case of a spill or other accident, monitoring of the receiving environment will be undertaken by an experienced professional as required;
In the case of environmental nuisance or harm, Environmental Representative will report the incident to Port of Poti and the Ministry of Environment;
Have contact details for the relevant authorities available to allow immediate reporting of any oil spills to water to allow a rapid emergency response;
Sewerage and grey water from the temporary site office amenities will be collected and disposed of appropriately (e.g. at a Municipal WWTP);
During construction, daily visual site inspections will be carried out to determine if there is any silty discharge from the site;
Analysis of material to be dredged and disposed and comparison of concentrations of contaminants to ESIA data and allowable concentrations.
If material exceeds these guidelines, undertake a risk assessment to determine the likelihood that contaminants will be mobilized into the surrounding environment and any management and monitoring that is required;
During reconstruction of the bund wall, any material that is displaced will be removed and managed as soon as practical.
Wastewater generated from washing down mixer trucks, drum mixers and similar equipment should, wherever practicable, be recycled; wastewater discharge should be kept to a minimum. Following silt removal and pH adjustment where necessary (to within a pH range of 6 – 10), surplus wastewater may be discharged into sewers. Surface run-off should be segregated from the concrete batching plant and casting area as far as possible, and diverted to the storm water drainage system. Surface run-off contaminated by materials in a concrete batching, plant or casting yard should be adequately treated before disposal into drains.
Any temporarily exposed slope-surfaces should be covered by e.g. tarpaulin, and any temporary access roads should be protected by crushed stone or gravel. Interception channels should be provided (e.g. along the crest / edge of excavation) to prevent storm runoff washing across exposed soil surfaces.
Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm.
Open stockpiles of construction materials (e.g. aggregates, sand, and fill material) should be covered with tarpaulin or similar fabric as a matter of course but particularly during rainstorms. Interception channels or bunds should be provided to prevent construction materials, soil, silt, or debris entering any drainage system.Final surfaces of any earthworks should be well compacted and the subsequent permanent work or surface protection should be carried out immediately after the final surfaces are formed to prevent erosion.

Operation Phase:
Installation of storm-water (surface run-off) management measures;
Implementation of monitoring program for the marine water;

Performance Indicators:
Minimization of the duration of elevated turbidity during bund reconstruction;
Minimal impact on water quality around the dredging and dredge disposal area, including impacts from oxidation;
The concentration of turbid plumes should not significantly exceed predicted values from modeling.

Monitoring:
Monitor turbidity and water quality within receiving waters as part of a water quality monitoring program;

The Terminal (or appointed contractor) will monitor the operation on a continual basis and report any incidents that are likely to cause environmental harm to the project location and surrounding areas.

Responsibility:
The Engineer is responsible for ensuring the monitoring programs are implemented; and
The Terminal may subcontract a specialist sub-consultant to undertake the monitoring program.
Reporting:
Reports following the monitoring studies are to be sent to relevant agencies;
Monthly analysis of turbidity monitoring results will be provided to the relevant agencies; and
Monthly compliance reports comparing results of water quality monitoring to allowable concentrations under the local legislation.
Corrective Action:
In the event of an environmental incident (e.g. fuel spillage), implement appropriate contingency and emergency response measures; and
If any parameters monitored fall outside of the water quality objectives defined in the ESIA, the EMP will be reviewed and amended as necessary.

17.7 Outline Dredging and Dredge Disposal EHS Management Plan

The objective of the Dredging and Dredge Disposal EHS Management and Monitoring Plan (DMP) is that at a minimum, the environmental impacts arising from the proposed dredging and disposal activities will be managed at levels deemed acceptable by the requirements of the local and international legislation and regulations. The DMP presents the management measures including objectives, actions and associated key performance indicators that will be implemented throughout the dredging program. The DMP also presents the proposed monitoring and inspection programs required to determine any environmental impacts arising from the dredging activities, and allow for the effective and timely implementation of contingency measures if required.

Considering the proposed dredging and disposal activities outlined in ESIA, the DMP will include the following information:

- *overall management framework* – describe how the plan integrates with the overall management framework
- *context* – put the proposal in the context of the local environment, including history of dredging and dredge material disposal at the site
- *description of the project* – provide information on dredging and disposal for the term of the plan or permit, including the location, staging, and timing of activities
- *information on approvals* – provide details of any approvals, relevant conditions and any other statutory requirements
- *description of the existing environment* – characterize the dredging and disposal sites and adjacent areas, including its water column, sediments, biota, resources and other uses (existing and potential) of the area
- *description of the material for disposal* – provide a summary of sediment types, their

status relevant to the values in these Guidelines
• *description of potential impacts* – address both potential short-term and long-term impacts and any uncertainties regarding the predicted impacts
• *management strategies and actions* – describe strategies and actions to mitigate impacts – including specific and auditable measures; performance indicators; monitoring requirements; corrective actions; and responsibilities and timing for management and monitoring activities
• *contingency arrangements* – identify corrective actions and contingency plans should undesirable or unforeseen impacts occur
• *continuous improvement* – identify opportunities for continuous improvement to prevent, minimize or mitigate environmental impacts in the longer term
• *auditing requirements and reporting* – outline reporting and documentation standards, timing and responsibility of any auditing or reporting
• *review of management plan* – make provisions for a review of the management plan, including consultation with the TACC, to ensure it remains current.

-Development of the Dredging and Dredge Disposal EHS Management Plan (DDDEHS-MP) will be required before start of dredging. The DDDEHS-MP need to include the following components: oil and fuel management, waste management, training, and emergency preparedness and response procedures.
-Dredging and Dredge Disposal Monitoring Program, will be required covering the dredged areas, disposal site, and potentially sensitive areas in adjacent areas. The Monitoring Program need to include, among other, the following components: water quality (i.e. sediment suspension and dispersion in the water column), biotic monitoring (metals bioaccumulation); protection and conservation of marine habitats.
-ECP contractors during dredging and reclamation activities will be obliged to have in place project-specific Contingency Plans, including spill prevention and control procedures as a part of their EHS Management plans.
-For the protection of the marine water quality fauna and flora, the contractor will be required to ensure that turbidity in the waters 150 m from the dredge location is kept to a minimum.
-Prior to undertaking any dredging work, the contractor will be required to submit method statements, calculations, modeling studies or other information to demonstrate that his proposed methods will ensure that suspended sediment levels, which could endanger flora and fauna, are not exceeded.

The site-specific DMP should contain the following information

- Scale of the proposed activity;
- Biological environments (flora and fauna) profile of the site;
- Quantity of sediments to be dredged, depth;
- Contamination level;
- Dredge site and its distance to the proposed disposal site;
- Physical characteristics of sediments in the excavation site;
- Dredge technology to be employed;
- Site Conditions;
- Others as needed.

For excavation component:

- Dredging technology to be employed
- Dredging equipment
- Impact control measures (water, sediment, noise etc.)
    - In accordance with the most current code of best practice approved by the MoENRP;
    - Local exceedance are confined to the smallest practicable area and over the shortest practicable time in the vicinity of the dredging and disposal operations;
    - Re-suspension and/or dispersal of sediments or accumulated contaminants will not be detrimental to the long term protection of beneficial uses;

  - In place systems to minimize effects to water quality;
  - Support activities to avoid erosion of catchments;
  - Control possible release of contaminants.
- Plan to reverse impacts of dredging and spoil disposal for re-colonization and full recovery of environment

For transportation component:

- Registration of vessel to be used for transport of dredged materials;
- Distance of reclamation project from the proposed beneficial use site;
- Site accessibility;
- Required transport;
- Load and estimated number of trips;
- Use tides to assist entry of deep-draught vessels
- Contain possible release of contaminants during transport;
- Monitoring and mitigation of release of nutrients contained within pore water from dredged sediments (nutrient level released to water should be monitored specially during season of algal blooms);
- Nutrient reduction plan;
- Control of turbidity;
- Mitigation of overflow of fine sediments.

For disposal component:
Dumping of dredged materials to open coasts or water not for purposes of beach nourishment, reclamation and others must satisfy the below requirements:

- Disposed only in approved disposal grounds with future area utilization is pre-identified in the land-use classification and plan as determined by the State and other statutory Authorities;
- Tested free from chemical and organic contaminants;
- Analyzed free from invasive species;
- Analyzed sediment characteristics as identical to bottom sediment of disposal site;
- Appropriate environmental management measures in place (silt curtains etc.);
- Control, management and satisfactory discharge plan;
- In place control measures to maintain water and sediment quality;
- Avoid use of temporary disposal grounds;
- Establish spoil disposal arrangements for maintenance dredging for new and ongoing dredging that minimize long term impacts.

For pollution control:

- Control of possible noise, air, groundwater pollution from sources such as equipment etc.
- Conduct information and feedback mechanisms with the local community to identify noise, air pollution issues (e.g. inform community about possible odor and grey sediment caused by dredging)
- Alter or enclose equipment to reduce noise and air emission at source including use of sound-absorbing materials to prevent the spread of noise by isolating the source
- Limit times of operation
- Use of environmentally friendly lubricants for dredging equipment

17.8 Outline Spill Prevention and Control Plan

Incorrect management of the spillage of hazardous substances or fuel may result in environmental harm. Performance objectives for this Plan are as follows:
To minimize the potential for environmental harm from the release of hazardous substances to the land or marine environment.

Adhere to applicable Georgian and international standards, applicable codes of practice and relevant statutory provisions.
Implementation of Safety Management System.
Implementation of Emergency Response Plan.
Preparation of Job Safety Analysis to manage workplace risks.
Implement a hazard study during detailed design to identify all potential causes of chemical leakage and spillage or hazards to workers and ensure that appropriate protective systems are implemented.
Implement Management Plans for identified hazards and risks and health and safety issues.

Construction:
Precautions will be taken by the revetment construction staff to minimize the risk of spillage of pollutants, such as fuels, oils, greases and other chemicals associated with the dredging and revetment construction operations, into the water;
Petroleum product spillages will be immediately cleaned up with appropriate absorbent materials along with remediation of the area if required. The absorbent will be kept in an appropriate container marked 'regulated waste' for a waste contractor licensed to receive such waste;
Spill kits including containment and treatment equipment and materials will be provided at the site, near where equipment is being used. All personnel on the site will be familiar with the use of the clean-up kit and dispose of waste in the prescribed manner;
Job safety analysis, safe work instructions, controlled laydown areas and provision of appropriate supervision to be undertaken during dredging and bund wall reconstruction;
Hazardous substances handling is to be carried out by suitably trained personnel only;
No refueling or maintenance will occur on the construction site and no hazardous substances will bestored on the site;
Ensure training is provided for handling and storage of hazardous substances to all personnel working on site; andCopies of MSDS for all hazardous materials to be maintained on-site.

Performance Indicator: - maintain a training register for all staff and contractors.

Monitoring:
The Construction Supervisor shall regularly visually monitor the area around the construction site for hydrocarbon spillages.
The Engineer to undertake regular monitoring of the performance of staff and contractors in terms of compliance with Safety Management System.

Responsibility:
The Construction Supervisor is responsible for monitoring the construction site for spills and initiatingappropriate spill response and clean up measures as required.

Reporting:
Daily or weekly reports (as appropriate) will be completed on-site and reviewed by the Port ProjectEngineer for the duration of construction activity;
Immediately notify the Port Project Engineer and DERM in the event of an uncontained spillage;
All spills will be reported immediately to the Port Project Engineer and cleaned up with the contaminated materials removed and disposed to an approved site;
In the event of a spill the Construction Supervisor is to complete an Environmental Incident Report and Corrective Action Report and forward on to the GPC Environmental Officer;
Incident or non-compliance corrective action shall be closed out by senior management according to an agreed responsibility and timescale; and
Workplace Health and Safety representative will be responsible for enforcing all occupational and public health directives and keeping all related records and communications.

Corrective Action:
In the event of an incident or failure to comply, a selection of the following actions will be undertaken as appropriate:

- investigate why the incident occurred and investigate and implement mitigating measures;
- ensure safety information provided is adequate and up-to-date and revise regularly as appropriate;
- ensure employees, contractors and visitors to the site are familiar with the procedures and policies relevant to their positions;
- ensure safety directives and procedures are enforced; and ensure safety documents are readily available to everyone on the site.

17.9 Outline Transport Management Plan for Operation Phase

The objective of the transport management plan at the operation phase is to minimize the negative impact upon the environment and local population caused by the Multifunctional Transshipment Terminal (hereafter Terminal), in particular, disturbance of the residents near to the access roads to the work site.

For the purpose of enhancing the vehicles movement management, Terminal Operator should elaborate the following requirements related to the special issues:

Inform the population within the nearby area to the Terminal, about the traffic movement related to the Terminal operations, about the negative impact caused due to the traffic and the possibilities of addressing the potential complaints.

In case of necessity, to identify the constraints on the sizes of the vehicles related to the project, their number, traffic route, frequency and time, in order to minimize the impact upon the population and surrounding environment, wherever it is possible.

Control of the risk factors caused due to traffic related to the project, speed limit, special training for drivers, through travels management and using the relevant road signs.

Mitigation of negative impact upon the environment through special control of the emissions, high quality technical service to the vehicles, in observance of the relevant standards (including noise limit and defined business hours).

Review of the vehicles movement management effectiveness and in case of necessity, correcting the applied mitigation measures.

In order to achieve the above mentioned objectives, in traffic management plan the attention should be paid to the following:

- Vehicles sizes and the schedule of their movement;
- Local procedures for traffic;
- Description of the necessary number and types of the vehicles related to heavy cargos transportation;
- Communication with local population;
- Management of the complaints related to the vehicles movement and addressing the relevant issues;
- In addition to the work territories defined under the project, restricting the penetration through the other territory;
- Identification of the roads capacity and definition of the approved route for special categories of the vehicles;
- Strict observance of the limited speed established under the project;
- Short-term training to be conducted for drivers in the environmental protection and safety issues;

Weekly reports, in which the monitoring data of the traffic management plan implementation will be reflected. Terminal manager will be obliged to periodically inspect the transportation activity in conjunction with the traffic management plan implementation. Operator is responsible for drafting the traffic management plan and its implementation.

17.10 Outline Solid Waste Management Plan

Incorrect handling and storage of waste materials may result in the introduction of wastes into the marine environment. The objective of this Plan is: to ensure best practice management for the handling and storage of all waste materials on the Terminal site; no waste is to be released into the marine environment or adjacent vegetation communities; and waste management must comply with the local and international regulations.

Construction Phase

Port Berth-1 demolition works and management of wastes generated will be conducted in accordance with Paragraph 12 "Wastes" of IFC PS3, the developer Transford LLC will avoid generation of hazardous and non-hazardous waste materials. Where waste generation cannot be avoided, Transford LLC will reduce the generation of waste, and recover and reuse waste in a manner that is safe for human health and the environment. In order to reduce the volume of waste transportation for disposal and reuse the concrete waste, it is proposed by Transford LLC to crush the concrete waste generated from demolition of the existing structures of Berth-1 (concrete foundations, concrete sleepers, concrete covers and bases, monolithic concrete top-coat, precast concrete slabs, concrete arrays rear coupling, concrete piles, etc.) and to re-use about 80% of it for the backfilling behind the sheet piles to be installed along the entire reconstructed Berth-1.

Where waste cannot be recovered or reused, Transford will treat, destroy, or dispose it in an environmentally sound manner that includes the appropriate control of emissions and residues resulting from the handling and processing of the construction waste material. The construction waste from demolition of old/existing structures will be disposed according to the "Code of Georgia on Waste Management" (2014), IFC PS3 and the local legislation, at the locations officially designated (and provided to Contractor) by the Poti Municipality, following the standard procedure.

If/when the generated waste is considered hazardous (as defined by international conventions or local legislation), Transford LLC will oblige contractors to apply good international industry practice (GIIP) alternatives for its environmentally sound disposal. For hazardous waste disposal Transford LLC will use contractors that are reputable and legitimate enterprises licensed by the Georgian Ministry of Environment and Natural Resources Protection and obtain chain of custody documentation to the final destination. The developer Transford LLC will ascertain whether licensed disposal sites are being operated to acceptable standards and where they are, Transford will use these sites. Where this is not the case, Transford will reduce waste sent to such sites and consider alternative disposal options, including the possibility of developing their own recovery or disposal facilities at the project site.

The removal of the contaminated layers of the exposed soil at the territory of Terminal prior to starting the construction works and disposal at licensed quarry should be considered. Supplemental soil contamination assessment should be undertaken to cover total area of new port (including Project Phase-II area) and the management plan for all contaminated soil removal and adequate treatment/disposal should be developed. The sewage/solid waste/hazardous wastes generated during the Construction Phase will be treated and disposed or sold to authorized recyclers as per the IFC PS 3, IFC General EHS guidelines and all relevant legal requirements of Georgia.

- Contractors should prepare a Waste Management Plan defining adequate measures for SW collection, segregation, reuse and disposal during construction.
- Proper sanitation bins will be installed in the port area for collection of sewage/solid waste/construction wastes on site.

- Solid waste generated during the construction process will be separated and recycled where possible / appropriate.
- Burning of waste on site will not be permitted. All waste, which cannot be recycled on site, will be collected and taken off site for recycling / reuse or disposal to an official/municipal waste disposal site after consultation with local authorities.
- A 'scavenging boat' will be available at all times for collection of windblown rubbish within the harbour basin itself.
- All rubbish, waste materials and debris shall be systematically cleared from working areas as they accumulate; all such materials should be cleared at the end of each working day.
- If removal of waste materials at the end of the working day is not possible, the materials should be covered with tarpaulin or similar.
- Waste materials not removed directly from the site shall be temporarily stored at designated points and covered, pending removal from the site.
- All working areas and site roads will be kept clear of mud, water, silt and other materials at all times. If earth, mud, or other debris is deposited on roads, they will be immediately removed.
- Hazardous waste should only be handled by legitimate enterprises and following good international practices and applicable local and international regulations (Bazel and Rotterdam Convention)
- Collection and disposal of waste from the construction site will be by a licensed contractor and disposed of at a licensed waste disposal facility under appropriate tracking documentation;
- Ensure that all construction wastes and rubbish is contained in bins or other appropriate containers; and
- Ensure the removal of all rubbish and other waste from the dredge to an appropriate location at the cessation of dredging.

Operation phase

Implement Terminal ESMS procedures for waste management at the operation phase, as required.

Performance Indicators:

All waste materials are handled and stored in a safe and appropriate manner; and

There is no environmental impact on, and disturbance to, the surrounding marine area from waste.

Monitoring:

The Construction Supervisor will monitor the storage of waste materials including the disposal of waste from on board the dredge and other floating plant; and

The Construction Supervisor will monitor the management and disposal of waste for the construction phase.

The Operator will monitor the management and disposal of waste for the operation phase.

Responsibility:

The Construction Supervisor is responsible for ensuring the appropriate waste handling and storage procedures are implemented on the construction site.

Reporting:

In the event of the release of wastes into the marine environment, the Construction Supervisor is to complete an Environmental Incident Report and Corrective Action Report and forward on to the Engineer and Environment Officer;

The Engineer to immediately notify Terminal and Port of Poti in the event of an uncontained spillage; and

Records of all wastes collected and disposed of from the construction site are to be kept on file.

Corrective Action:

Implement appropriate waste management and preventative measures to reduce the potential for an environmental incident.

17.11 Outline Water and Energy Consumption/Management Plan

The objective of the Plan is to ensure efficient use of energy and resources during construction and operation of the proposed development, thereby resource consumption and greenhouse gas emissions.

The project Water Management Plan should be developed in order to secure sustainable water balance in the project region

The project Water Management Plan should also include baseline review of the existing groundwater resources and current consumption in the project region. The main purpose of plan will be to define a set of measures and activities in order to preserve groundwater quality and quantity

Minimize consumption of resources through good operational practices, and making environmentally sound choices when procuring new equipment and infrastructure.
Recycled construction materials (e.g. rip-rap) to be utilized where possible Contractor proposals to be assessed on energy and resource efficiency
Investigate options for increased energy efficiency through the life of operation of the project and during decommissioning.

Energy and water consumption is monitored to determine current usage and efficiency.
Develop a continuous improvement program that monitors fuel, electricity and water use on a monthly basis, and reports on CO2 emissions per unit production. Report greenhouse gas emissions in compliance with reporting guidelines.

17.12 Outline Noise Management Plan

Dredging and construction activities may result in increased noise levels at surrounding industrial facilities and surrounding marine environment; Traffic generation due to haulage of materials is not expected to increase traffic noise significantly and should not have an effect on the amenity of residences in the area; Construction and dredging activities may reduce the amenity of surrounding areas;
Construction activities have limited potential to impact on the amenity of nearby noise sensitive receivers.

The objective of the Plan is:
To reduce or minimize the impact of noise associated with the dredging and construction activity on surrounding industrial facilities, marine users and residents; and
To protect the amenity of nearby sensitive receivers, the project shall ensure operational noise levels do not exceed the project specific noise goals nominated in this ESIA.

Construction Phase:
• All contractors and subcontractors should comply with the relevant international noise standards;
• Activities that take place near residential or sensitive receptors will be careful planned (restricted to daytime, taking into account weather conditions, etc.);
• Residents in the vicinity to be notified about construction schedules and activities;
• All plant and equipment will be fitted with silencers, mufflers, acoustic linings, or shields, as necessary.
• If necessary, measures to be taken to reduce noise emissions from the site will include provision of screens or bunds to absorb noise and deflect it away from receptors;
• Before commencing any piling operations, the contractors will be required to submit calculations to demonstrate that the appropriate standards will not be exceeded

• Timing and programming outside sensitive seasons (e.g. avoiding the migration seasons of marine mammals, etc.), especially concerning underwater noise;
• Apply a change management process to modify operations, if necessary to address noise issues;
• Vehicles and generator sets will be serviced regularly and maintained properly to avoid any unwanted generation of noise or vibration from them;
• Employees working in noisy environment will be made to wear ear muffs/ear plugs to avoid any adverse impact of noise on them;
• Employees exposed to hand vibration while handling/operating of heavy machineries will compulsorily wear anti vibration gloves made up of viscoelastic material;
• Shock absorbing techniques will be used to minimize the impact of vibration from heavy machineries;
• Heavy machineries and generators will be operated during day time only.
• A noise monitoring program during construction will be implemented

Normal construction hours will be 6.30 am to 6.30 pm Monday to Saturday. All work outside of these hours will require approval in advance by the appropriate authority, and will need to comply with the stated noise limits;
Dredging and dredge disposal will be conducted 24 hours a day, 7 days a week;
All combustion engine plant, such as generators and compressors will be checked to ensure they produce minimal noise;
Vehicles will be kept properly serviced and fitted with appropriate mufflers. The use of exhaust brakes will be eliminated, where practicable;
Where practical, all vehicular movements to and from the construction site will be made only during normal working hours;
Where practical, machines will be operated at low speed or power and will be switched off when not being used rather than left idling for prolonged periods;
Activities that cause excessive noise will be limited to Saturdays or business days between 6:30 am and 6:30 pm;
Machines found to produce excessive noise, compared to industry best practice, will be removed from the site or stood down until repairs or modifications can be made;
Vehicle deliveries are expected to be during normal construction hours;
Long term fixed plant such as site office generators will be appropriately located so as to minimize noise impacts on the nearest sensitive receivers;
Maintain and operate all equipment on board the dredge in a safe and efficient manner.
All plant and machinery will be turned off when not in use; and
Adjacent commercial industries and residences will be notified of the construction timetable, particularly when noise activity is to be undertaken.

Operation Phase:
Development approvals for future proponents will be subject to a noise assessment to ensure that they comply with the relevant noise criteria.

Performance indicator will be - absence of complaints from people directly affected by construction noise.

Monitoring:
Maintain a record of any noise complaints in a log book, including the date and time of complaint, name of complainant, nature of complaint, action taken and follow up; and
Where required, upon receipt of a noise complaint monitoring will be undertaken within 3 to 5 working days. If exceedances are detected, the source will be investigated and equipment and operational procedures reviewed to identify means of reducing noise to acceptable levels.

Responsibility:
The Construction Supervisor is responsible for logging and responding to all noise complaints during construction.

The Operator is responsible for logging and responding to all noise complaints during operation.

Reporting:
All complaints are to be reported to the Construction Supervisor and Terminal Environment Officer; and Maintenance of a record of any noise complaints in a log book.

Corrective Action:
All complaints are to be responded to within 24 hours of receiving the complaint and in accordance with Terminal ESMS;
Maintain all equipment so that noise levels do not exceed specified guidelines; and
Modify operational practices where appropriate.
Install soundproofing and / or noise abatement devices where practicable.

17.13 Outline Emergency Preparedness and Response Plan

Purpose of the Plan is to establish a policy and procedures regarding Poti Multifunctional Transshipment Terminal (hereafter Terminal) management's and employee's response to various types of emergency situations. (I.e. Fire, earthquake, bomb threat, accidental spill or release and terrorist attack).

This procedure covers the following Issues:

- Fire Reporting and Response
- Evacuation
- Bomb Threat
- First Aid
- Hazardous Materials Spill & Response

Terminal has develop this plan and addresses emergency situations that may arise in Terminal's facilities locations and which may threaten human health, and safety, and impact the environment, and cause damage to Terminal and Port of Poti and the customers assets. Management is responsible for implementing the **Emergency Action Plans** (EAP) These Emergency Action Plans will meet the following objectives:

- Provide a means of notifying employees, customers, and local
- Authorities of an emergency situation.
- Provide for a safe and orderly method of evacuation of employees and customers from Terminal premises.
- Account for all employees, customers whom occupied Terminal premises at time of evacuation, should one occurs.
- Provide emergency first aid treatment or summon emergency medical assistances for injured individuals.
- Provide training and needed information to those employees responsible for taking action in the event of an emergency situation.

Please keep in mind, if there is an existing EAP for the pre-existing port, the new plan should be included should that it all covers similar situations, and is updated to the most recent revisions.

Signs as required by local ordinance, regulations, or law will identify emergency exits. Employees are required to be familiar with the location(s) of alarm pull stations or other method so designated, and emergency exits.

Training on Emergency Action Plans will take place during new employee orientation, or when changes occur in the emergency action plans, and periodically (as set forth by Terminal HS&E Dept.).Smoking is never allowed anywhere on Terminal premises during an emergency

Fire Reporting and Procedures:If a fire alarm or alert is sounded or a fire is reported by an employee or customer, regardless of the reason for the alarm or alert, or the severity of the fire, the following actions should be taken immediately:

1. Immediately notifies the Fire Department by dialing xxxxxx, or the local fire emergency number: xxxxxx.
2. Give Terminal name, address, and the area of where the fire is located. Assign an employee to wait for and escort the fire department outside Terminal and take them to the location of the fire.
3. Announces evacuation instructions over the public address (if it is available or other method) Example" Ladies & Gentlemen! Terminal is being temporary closed. We request that you leave your area, and collect at the nearest collection Point marked.
4. A Fire Marshall or representative should take a head count to ensure that all employees or customers have evacuated from the immediate fire area

Note: When one or more employees are unaccounted for, employees are not to re-enter the building to conduct a search. Notify the ranking fire or other emergency response official on scene and provide information of who might be still in the building.

5. Immediately after the fire, notify the Terminal Senior management. Coordinate any salvage and repairs which might be require resuming operation.
6. If trained in the use of fire extinguishers, may attempt to suppress a small fire, until relieved by the Fire Department or until it becomes apparent that the fire cannot be controlled by fire extinguishers.

Note: Employees should never attempt to control a fire, which endangers their health or life. They should never place themselves against a wall or no point of exit.

Evacuation:

1. Telephone the local emergency agency (i.e. fire, police, hazardous material team etc.).
2. Makes the following announcement on public address (if available) Refer to # 2 in above. Make this announcement twice, and repeat it every minute, if needed.
3. Secures all cash, checks, and charge documents in safe if time permits.
4. Designate several safe areas or meeting point inside or outside of Terminal as a gathering point for all employees and customers. Take a head count of employees to insure all were safely evacuated.

Note: Employees are not to re-enter the building. Management will notify the fire or other emergency response officials on scene of a potential trapped person and their approximate location.

5. Dismiss all non-essential employees, or customers.
6. Telephone the local emergency agency (i.e. fire, police, hazardous material team etc.).
7. Makes the following announcement on public address (if available) Refer to # 2 in above. Make this announcement twice, and repeat it every minute, if needed.
8. Secures all cash, checks, and charge documents in safe if time permits.
9. Designate several safe areas or meeting point inside or outside of Terminal as a gathering point for all employees and customers. Take a head count of employees to insure all were safely evacuated.

Note: Employees are not to re-enter the building. Management will notify the fire or other emergency response officials on scene of a potential trapped person and their approximate location.

10. Dismiss all non-essential employees, or customers.

Bomb Threat:

When someone calls and says there is a bomb in a building or you notice a suspicious person leaving a package or running in a building, the following steps will be performed:

Keep the caller on the line as long as possible. Ask them to repeat the message. Tries to write down every word spoken by the caller.

Ask the caller where the bomb is located and when it will go off.

Tells the caller that the building is occupied and detonation of a bomb could result in the death or injury to innocent people.
Pay particular attention to background noises, such as music playing engine noises horns etc.
Listen to the voice: Male, Female, voice quality or accents, and speech impediments etc.
When the caller hangs up**, DO Not Hang Up the Phone!**
Sometimes, phones can be traced back to the source. Immediately notify management and describe the threat.
Call the local Police or Fire Department to report the incident. Follow all recommendations and instructions provided by either department.
If the Police or Fire Department declines to give instructions to evacuate the building, search the premises (If times permits) for any suspicious looking devices or packages. If one is found**, Do Not touch or move any suspicious device or package!** Follow the Evacuation Plan
Treat the injured individual using the supplies from First Aid Station, first aid kit.
In the event an employee/customer is seriously injured and requires professional medical care, if possible drive the employees/ customer to your First Aid Station medical provider. If any individual is not mobile or has a life threatening injury or illness, arrange for emergency care and transportation (call ___).

First Aid
If an employee, contractor or customer is injured, the initial responsibility of management is to provide the needed first aid, by a qualified first aid person or arrange for emergency medical response or professional medical care.

Hazardous Materials Spill:

Management will respond to accidental spills or release of hazardous substances when the substances can be absorbed, neutralized, or otherwise controlled at the time of the spill or release by an employee or customer in the immediate area or by a spill response team or qualified and trained individual. Management will contact the appropriate local authorities, such as Fire Department or Emergency Management Agency of Georgia**.**

17.14 Outline Occupational H&S Management Plan

EMPLOYEE & CONTRACTORS SAFETY RULES

It is nearly impossible to list or include every safety rule for all the possible task and assignments while working at Terminal Container Terminal. But the following rules have been provided to help avoid any potential hazards, which may cause an injury, or incident while performing some of the most common task or assignments that you may be required to perform. As an employee you are require to read, understand, and where it is needed seek clarification, and most IMPORTANTLY follow these rules provided to you, Damietta Port, fines it important to take the time to list them, and provide in this booklet, we ask you to ask your supervisor for additional information to better ensure you are working Safely. Please keep in mind these rules are not all inconclusive, using Good Common Sense is the best way to be a Healthy and Safe employee. Failure to follow these safety rules and or safe work practices will result in disciplinary action, up to and including termination of job.

GENERAL SAFETY RULES:

1. Read and follow the safety notices and other information, you receive and are posted.
2. Observe and follow all safety instructions, signs, posted speed limits, traffic signs and operation procedures.
3. Beware of blind spots and pedestrian walkways.
4. Always when possible help your fellow co-worker when ask for assistances or when needed to ensure your and theirs safety.

5. Never participate in “Horseplay “Horseplay that results in injury is often not covered by workers insurance.
6. If you spill something, you clean it up, if you see a spill report it immediately to your supervisor.
7. Report All Unsafe Acts & Unsafe Conditions, Hazards, or equipment immediately to your supervisor. Ensure that other employees are made aware of the problem, so that they may avoid using or being involve in an injury or incident.
8. Wear all required Personal Protective Equipment (PPE) and follow posted warning signs to help reduce any potential injury while performing your task or assignment.
9. Never stand on a chair, furniture or any unapproved device, use an approve ladder or step stool, or scaffold prescribed to perform that specific task or assignment.
10. Never use or be in possession of any intoxicating beverages or controlled drugs before, and during work.
11. Prescription drugs which may impair your senses and ability to operate equipment must have your Doctors approval prior to working.
12. Never operate any piece of equipment unless you are Qualified, Certified and authorized to do so.
13. Material Safety Data Sheets (MSDS) should be requested and available for any shipment which has any Hazardous Materials in any container.
14. A central location should be provided for MSDS’s and kept current. All employees should be made aware of this location, and be informed of any potentially hazardous chemical or substances.
15. If anyone is overcome or exposed to any chemical, a copy of the MSDS should accompany the injured employee to a medical facility.
16. Inform your supervisor of any injury you sustain regardless of its nature and extent.
17. Ask questions to remove doubt about the safe way to perform a job task or assignment.
18. Do Not alter or attempt to repair safety equipment.
19. Do Not use substitutes, or improvise, without consulting your supervisor.
20. Do Not attempt shortcut method, first discuss with your supervisor.
21. Do Not use defective equipment, and tools; report them to your supervisor immediately, mark it or tag it out of service.
22. Do Not overload equipment; follow the prescribed lifting weight capacity. Check the capacity rating tag or plate.
23. If you have any visitors or contractors in a PPE designated area, they are required to wear the PPE (i.e. hard hat, steel toes, Ear plug, and Safety glasses etc.).
24. Always use seatbelts when operating any vehicles.
25. Do Not wear any metal objects, such as rings, metal wristbands, metal rim glasses, chains etc. when working on energized electrical circuits, batteries, and equipment.
26. All flammables will be stored in approved flammable storage cabinets.
27. Ensure All electrical power cords are in good working condition (insulation not broken or plugs missing).
28. Any employee or contractor engage in climbing operations on crane towers, poles etc. shall wear fall protection equipment properly.
29. Do Not perform any maintenance or repair work on machinery or equipment that can release energy until the Lock-out/Tag-out procedures are in force.
30. When lifting, lift properly. Keep the back straight, stand close to the load, and use your leg muscles to do the lifting, keeping the load close to the body. Never twist your upper body while carrying a load. If need always seek assistances.

FIRE SAFETY

1. Report All fire hazards to your supervisor immediately
2. Firefighting equipment shall be used ONLY for firefighting purposes.
3. Smoking is **not** permitted at any time in the areas where “No Smoking “signs are posted.
4. Do Not block off access to firefighting equipment.
5. Keep All doors, aisles, fire escapes and stairways completely unobstructed at all times.
6. In case of a fire, your first consideration must be the safety of all persons, and then attention should be directed to the protection of property.

7. Change clothes immediately if they are soaked with oil, gasoline, and paint thinner or any other flammable liquid.
8. Know the location of All fire extinguishers, and how to use them.
9. Know how to report a fire and how to turn on the fire alarm.
10. How to use a Fire Extinguisher:
    PASS, if you can remember this acronym
    Pull the pin
    Aim at the base of the fire
    Squeeze the top handle or lever
    Sweep from side to side

MAJOR INCIDENT PROCEDURE PLAN (MIPP):

The purpose of MIPP is to provide a simple, logical and comprehensive procedural framework to ensure:

- The *overall* direction of efforts to bring the emergency under control and restore the affected site to normal operation as soon as possible.
- The organization and coordination of effective action, making the most efficient use of available resources, in order to ensure:
  - Safety of personnel;
  - Protection of both property outside the affected harbor and the environment.

Those personnel who may be involved in a Damietta site emergency incident fully understand their role, and appreciate the roles of others, in effectively dealing with the incident.

Response to incidents involving the new terminals should be in accordance with the MIPP. Adequate oil spill response resources shall be maintained at the new terminals to handle spills. The response action or resources could be within the main resources for Terminal, in general.

In summary MIPP, will enable a similarly stringent Emergency Response Plan to be implemented for the Terminal, and ensures that operator will apply a unified and collective approach to responding to emergencies Such an Emergency Response Plan will enable the new extension to benefit from all the various tried and tested procedures, roles, responsibilities, and associated learning, from its application at other Port Facilities..

CRANE & HOIST SAFETY

Many types of cranes, hoists, and rigging devices are used at the Company for lifting and moving materials. It is the Terminal policy is to maintain a safe & healthy workplace for its employees; therefore, it cannot be overemphasized that only qualified and licensed individuals shall operate these devices.

The safety rules and guidance in this chapter apply to all operations at Terminal that involve the use of cranes and hoists installed in or attached to buildings and to all Terminal employees, supplemental labor, and subcontractor personnel who use such devices.

Supervisors are responsible for:

- Ensuring that employees under their supervision receive the required training and are certified and licensed to operate the cranes and hoists in their areas.
- Providing training for prospective crane and hoist operators. This training must be conducted by a qualified, designated instructor who is a licensed crane and hoist operator and a full-time employee.
- Evaluating crane and hoist trainees using the Crane Safety Checklist and submitting the Qualification Request Form to the Safety Office to obtain the operator's license.

- Ensuring that hoisting equipment is inspected and tested monthly by a responsible individual and that rigging equipment is inspected annually.

Crane and Hoist Operators are responsible for:

- Operating hoisting equipment safely.
- Conducting functional tests prior to using the equipment.
- Selecting and using rigging equipment appropriately.
- Having a valid operator's license on their person while operating cranes or hoists.
- Participating in the medical certification program, as required.
- Equipment will not be operated within 10 feet of energized electrical transmission lines or distribution lines.
- Ensuring that a fire extinguisher, rated at least 10 BC, shall be located in the cab of the crane

Maintenance Department is responsible for:

- Performing annual maintenance and inspection of all Terminal cranes and hoists that are not covered by a program with maintenance responsibility.
- Conducting periodic and special load tests of cranes and hoists.
- Maintaining written records of inspections and tests, and providing copies of all inspections and test results to facility managers and building coordinators who have cranes and hoists on file.
- Inspecting and load testing cranes and hoists following modification or extensive repairs (e.g., a replaced cable or hook, or structural modification.)
- Scheduling a non-destructive test and inspection for crane and hoist hooks at the time of the periodic load test, and testing and inspecting before use new replacement hooks and other hooks suspected of having been overloaded. The evaluation, inspection, and testing may include, but are not limited to visual, dye penetrant, and magnetic particle techniques referenced in ASME B30.10 (Hooks, Inspection and Testing.)
- Maintaining all manuals for cranes and hoists in a central file for reference.

Safety Department is responsible for:

- Conducting training for all Crane & Hoist Operators
- Issuing licenses to Crane and Hoist Operators
- Periodically verifying monthly test and inspection reports.
- Interpreting crane and hoist safety rules and standards.

Safe Operating Requirements:

All workers who use any Terminal crane or hoist shall have an operator's license. The Terminal Issues licenses for authorized employees who have been specifically trained in crane and hoist operations and equipment safety.

Crane and Hoist Operators

To be qualified as a Crane and Hoist Operator, the candidate shall have received hands-on training from a licensed, qualified crane and hoist operator designated by the candidate's supervisor. Upon successful completion of training, the licensed crane and hoist operator and the candidate's supervisor will fill out and sign the Qualification Request Form and Crane Safety Checklist and send them to the Safety Office for approval. The candidate will be issued a license upon approval by the HS&E Manager. Crane and Hoist Operators must renew their license every three years by satisfying the requirements described above.

General Safety Rules:

Operators shall comply with the following rules while operating the cranes and hoists:

- Do not engage in any practice that will divert your attention while operating the crane.
- Respond to signals only from the person who is directing the lift, or any appointed signal person. Obey a stop signal at all times, no matter who gives it.

Operators shall comply with the following rules (continued):

- Do not move a load over people. People shall not be placed in jeopardy by being under a suspended load. Also, do not work under a suspended load unless the load is supported by blocks, jacks, or a solid footing that will safely support the entire weight. Have a crane or hoist operator remain at the controls or lock open and tag the main electrical disconnect switch.
- Ensure that the rated load capacity of a crane's bridge, individual hoist, or any sling or fitting is not exceeded. Know the weight of the object being lifted or use a dynamometer or load cell to determine the weight.
- Check that all controls are in the OFF position before closing the main-line disconnect switch.
- If spring-loaded reels are provided to lift pendants clear off the work area, ease the pendant up into the stop to prevent damaging the wire.
- Avoid side pulls. These can cause the hoist rope to slip out of the drum groove, damaging the rope or destabilizing the crane or hoist.
- To prevent shock loading, avoid sudden stops or starts. Shock loading can occur when a suspended load is accelerated or decelerated, and can overload the crane or hoist. When completing an upward or downward motion, ease the load slowly to a stop.

Operation Rules:

Pre-operational Test

At the start of each work shift, operators shall do the following steps before making lifts with any crane or hoist:

- Test the upper-limit switch. Slowly raise the unloaded hook block until the limit switch trips.
- Visually inspect the hook, load lines, trolley, and bridge as much as possible from the operator's station; in most instances, this will be the floor of the building.
- If provided, test the lower-limit switch.
- Test all direction and speed controls for both bridge and trolley travel.
- Test all bridge and trolley limit switches, where provided, if operation will bring the equipment in close proximity to the limit switches.
- Test the pendant emergency stop.
- Test the hoist brake to verify there is no drift without a load.
- If provided, test the bridge movement alarm.
- Lock out and tag for repair any crane or hoist that fails any of the above tests.

Moving a Load

- Center the hook over the load to keep the cables from slipping out of the drum grooves and overlapping, and to prevent the load from swinging when it is lifted. Inspect the drum to verify that the cable is in the grooves.
- Use a tag line when loads must traverse long distances or must otherwise be controlled. Manila rope may be used for tag lines.
- Plan and check the travel path to avoid personnel and obstructions.
- Lift the load only high enough to clear the tallest obstruction in the travel path.
- Start and stop slowly.
- Land the load when the move is finished. Choose a safe landing.
- Never leave suspended loads unattended. In an emergency where the crane or hoist has

Become inoperative, if a load must be left suspended, barricade and post signs in the

Surrounding area, under the load, and on all four sides. Lock open and tag the crane or Hoist's main electrical disconnect switch.

Parking a Crane or Hoist

- Remove all slings and accessories from the hook. Return the rigging device to the designated storage racks.
- Raise the hook at least 2.1 m (7 ft.) above the floor.
- Store the pendant away from aisles and work areas, or raise it at least 2.1 m (7 ft) above the floor.
- Place the emergency stop switch (or push button) in the OFF position.

General Rigging Safety Requirements

- Only select rigging equipment that is in good condition. All rigging equipment shall be
- Inspected annually; defective equipment is to be removed from service and destroyed
- To prevent inadvertent reuse. The load capacity limits shall be stamped or affixed to
- All rigging components.

Terminal policy requires a minimum safety factor of 5 to be maintained for wire rope slings.

Rigging a Load

Do the following when rigging a load:

- Determine the weight of the load. Do not guess.
- Determine the proper size for slings and components.
- Do not use manila rope for rigging.
- Make sure that shackle pins and shouldered eye bolts are installed in accordance with the manufacturer's recommendations.
- Make sure that ordinary (shoulder less) eye bolts are threaded in at least 1.5 times the bolt diameter.
- Use safety hoist rings (swivel eyes) as a preferred substitute for eye bolts wherever possible.
- Pad sharp edges to protect slings. Remember that machinery foundations or angle-iron edges may not feel sharp to the touch but could cut into rigging when under several tons of load. Wood, tire rubber, or other pliable materials may be suitable for padding.
- Do not use slings, eye bolts, shackles, or hooks that have been cut, welded, or brazed.
- Install wire-rope clips with the base only on the live end and the U-bolt only on the dead end. Follow the manufacturer's recommendations for the spacing for each specific wire size.
- Determine the center of gravity and balance the load before moving it.
- Initially lift the load only a few inches to test the rigging and balance.

Crane Overloading:

- Cranes or hoists shall not be loaded beyond their rated capacity for normal operations.
- Any crane or hoist suspected of having been overloaded shall be removed from service
- By locking open and tagging the main disconnect switch. Additionally, overloaded
- Cranes shall be inspected, repaired, load tested, and approved for use before being
- Returned to service.

Working at Heights on Cranes or Hoists:

- Anyone conducting maintenance or repair on cranes or hoists at heights greater than 1.8 m (6 ft.) shall use fall protection. Fall protection should also be considered for heights less than 1.8 m. fall protection includes safety harnesses that are fitted with
- A lifeline and securely attached to a structural member of the crane or building or properly secured safety nets.
- Use of a crane as a work platform should only be considered when conventional means of reaching an elevated worksite are hazardous or not possible. Workers shall not ride a moving bridge crane without an approval from the Safety Office, which shall specify the following as a minimum?
- Personnel shall not board any bridge crane unless the main disconnect switch is locked and tagged open.
- Personnel shall not use bridge cranes without a permanent platform (catwalk) as work platforms. Bridge catwalks shall have a permanent ladder access.
- Personnel shall ride seated on the floor of a permanent platform with approved safety handrails, wear safety harnesses attached to designated anchors, and be in clear view of the crane operator at all times.
- Operators shall lock and tag open the main (or power) disconnect switch on the bridge catwalk when the crane is parked.

Hand Signals

Signals to the operator shall be in accordance with the standard hand signals unless voice communications equipment (telephone, radio, or equivalent) is used. Signals shall be discernible or audible at all times. Some special operations may require addition to or modification of the basic signals. For all such cases, these special signals shall be agreed upon and thoroughly understood by both the person giving the signals and the operator, and shall not be in conflict with the standard signals.

Inspection, Maintenance, and Testing:

All tests and inspections shall be conducted in accordance with the manufacturer's recommendations.

Monthly Tests and Inspections

- All in-service cranes and hoists shall be inspected monthly and the results documented on the Company's Crane and Hoist Inspection Form
- Defective cranes and hoists shall be locked and tagged "out of service" until all defects are corrected. The inspector shall initiate corrective action by notifying the facility manager or building coordinator.

Annual Inspections
The Maintenance Department shall schedule and supervise (or perform) annual preventive maintenance (PM) and annual inspections of all cranes and hoists.

Load Testing:

- Newly installed cranes and hoists shall be load tested at 125% of the rated capacity by designated personnel.
- Slings shall have appropriate test data when purchased. It is the responsibility of the purchaser to ensure that the appropriate test data are obtained and maintained.
- Re-rated cranes and hoists shall be load tested to 125% of the new capacity if the new rating is greater than the previous rated capacity.
- Fixed cranes or hoists that have had major modifications or repair shall be load tested to125% of the rated capacity.

- Cranes and hoists that have been overloaded shall be inspected prior to being returned to service.
- Personnel platforms, baskets, and rigging suspended from a crane or hoist hook shall be load tested initially, then re-tested annually thereafter or at each new job site.
- All cranes and hoists with a capacity greater than 2722 kg (3 tons) should be load tested every four years to 125% of the rated capacity. Cranes and hoists with a lesser capacity should be load tested every eight years to 125% of the rated capacity.
- All mobile hoists shall be load tested at intervals to be determined by [MOI].

Records:

The Maintenance Department shall maintain records & copies of licenses for all cranes, hoist and rigging equipment.

SHIP / SHORE SAFETY

Container Terminal Operations

Control of container operations

1. The access of vehicles and pedestrians into container handling areas should be strictly controlled.
2. No passengers in visiting container vehicles should be permitted to enter a container-handling area. Passengers should await the return of the vehicle from the container handling area in a suitable waiting room.
3. All persons permitted to enter a container-handling area should be informed of the procedures they should follow while they are in that area. This may be done by signs, or by providing leaflets or copies of the relevant terminal procedures which they should follow. Different instructions will be relevant to different groups of people, such as terminal workers, drivers of visiting container vehicles, drivers of private vehicles, pedestrians and the crews of ships at berths in the terminal.
4. Instructions to drivers of container vehicles should specify where and when twist locks securing containers to vehicles should be released or locked.
5. All containers arriving at a terminal by road should be inspected for damage or tampering that could affect their safe handling. If a container is found to be unsafe, appropriate action should be taken.
6. The gross weight of all loaded containers should be known before they are lifted. Containers exceeding the maximum allowable weight of the container or the capacity of the relevant container-handling equipment should not be lifted.
7. The number of road vehicles permitted to enter straddle carrier and rail-mounted gantry crane (RMG) exchange area at one time should be limited in order to reduce congestion.
8. Access to container-handling areas by pedestrians should be prohibited so far as is practicable. Any access that is permitted should be restricted to clearly designated walkways or under specific supervision.
9. No private cars should be permitted to enter container-stacking areas. Any private cars that are permitted to enter quayside areas should be required to keep to specified vehicle routes. They should not be permitted to enter a quayside area while containers are being loaded or unloaded from a ship. Where appropriate, a minibus or other suitable terminal vehicle should be provided to carry ships' visitors, ships' crews and other persons engaged in operations to or from such areas.
10. All container terminal vehicles should be fitted with a flashing yellow warning light.
11. Containers should only be moved within the container terminal on vehicles that are suitable for the purpose.

12. All vehicles that have to be driven in a container handling area while they are carrying containers that are not secured to them should be driven at an appropriate slow speed. Care should be taken to avoid heavy braking and sharp cornering.

Straddle carrier exchange operations

1. A straddle carrier exchange grid should only be used for loading and unloading freight containers from road vehicles. Grids should not be used as general waiting areas for road vehicles. Vehicles that need to wait for significant periods should be redirected to appropriate parking facilities.
2. Wherever possible, the grids should be operated with a one-way flow of traffic for road vehicles.
3. Where it is necessary for a road vehicle to reverse into a slot on a grid, there should be ample space for the maneuver to be carried out safely. Straddle carriers should only approach the slot from the opposite direction.
4. Reversing movements by road vehicles should not be permitted for any other purpose.
5. The entry of road vehicles to grid slots for loading or unloading should be controlled so that only one vehicle is in a slot at any one time.
6. Twist locks and other container-securing devices should be released and locked in a designated safe place that should be clear of straddle carrier exchange grids.
7. The road vehicle driver should leave the cab of the vehicle and stand in a clearly marked area before the approach of a straddle carrier. This area should be forward of the cab of the vehicle, a safe distance from the vehicle and visible to the straddle carrier operator. The road vehicle driver should remain in the marked area throughout the loading or unloading operation. The driver should not return to the cab until the straddle carrier has left the grid.
8. A straddle carrier should only approach a road vehicle in order to load or unload it from the rear of the vehicle and should also leave the vehicle to its rear.
9. Any oversize container or problem container that cannot be handled safely at the grid should be moved to a suitable designated area where it can be dealt with safely.

Rail-Mounted Gantry crane exchange operations

1. Twist locks securing a container to a road vehicle should only be released or locked in a designated safe place. Where practicable, this should be separate from the place where the vehicle is loaded or unloaded. Particular care should be taken to ensure that all twist locks securing a container that is to be lifted are fully disengaged.
2. Drivers of road vehicles should not stop on the marked runways of RMG
3. Drivers of road vehicles should remain in the cabs of their vehicles at all times when in an RMG operated container-stacking area, unless specifically instructed otherwise.
4. When drivers of road vehicles have to be instructed to leave the cabs of their vehicles while in an RMG operated container-stacking area, they should only do so in accordance with a safe system of work. It is essential that where there is an overhead hazard the driver always wears a safety helmet and high-visibility clothing, and is visible to the RMG operator at all such times.
5. The driver of a road vehicle who needs to enter the ground cab of an RMG should only do so while the gantry is stationary. No more than one driver should be in the cab at any one time.
6. RMG operators should ensure that a road vehicle at which they are to work is stationary and that the cab of the vehicle is not under the intended lift.
7. Whenever practicable, containers should be transferred to or from a road vehicle to the side of the vehicle and not from the rear.
8. Visual and audible warnings of the movement of RMGs should be given. Particular care should be taken if it is necessary to carry out “blind side” container exchange operations at the opposite end of the gantry to the operator’s cab.

Entry to stacking areas

1. Entry into container-stacking areas should be restricted to authorized terminal vehicles that are fitted with flashing yellow lights and to authorize road container vehicles in RMG stacking areas.
2. No person should be allowed to enter a container stacking area on foot other than by a clearly delineated walkway that does not cross a container traffic route. If a crossing of such a traffic route is found to be necessary, the crossing should be clearly marked and signed.
3. Work on foot in a container-stacking area should be done only with the express permission of Control. Permission should be given only after the relevant area has been isolated and Control has issued a permit to enter, and only for work that takes into account the characteristics of the terminal and the work to be carried out.
4. A visual signal, such as a token or light on the control desk, should be used to remind the controller that an area has been temporarily isolated.
5. The permit to enter and to work in a specified area should be issued only by an authorized control officer who is satisfied that:
    - All drivers of vehicles and plant operators in the container-handling area have been notified of the closure of the relevant area and have acknowledged the instruction.
    - Each vehicle should have a board in the cab upon which the driver should enter a clear indication of the block that has been isolated;
    - The relevant area has been clearly signed to prevent entry by other vehicles;
    - The person or persons to enter the area are wearing high visibility clothing in accordance with terminal rules;
    - The person to enter, or the person in charge of the group if there is more than one person, has been issued with a two-way radio and is familiar with its use;
    - The person or persons to enter the area have been fully instructed on the operations to be carried out, the procedures to be followed and the precautions to be taken.
6. The area to be isolated should include a suitable buffer zone between the location of the work and any active area. In a container-stacking area that is operated by straddle carriers, there should be at least one clear lane between the lane in which work is to be carried out and any active lane.

7. The particulars to be included in the permit to work should include:
    - The name(s) of the person(s) wishing to enter;
    - The work to be performed;
    - time of entry;
    - Any specific instructions;
    - An instruction not to leave the area until Control has been notified by radio and permission to do so has been received.
8. Control should ensure that any additional operators who enter the container-handling area, or relieve operators already in it at change of shift, are informed of the position of the isolated block.
9. The permit to work should be returned to Control once the work has been completed and permission to return has been received.
10. The permit should not be transferred if the work is not completed at the end of a shift or for other reasons, and needs to be continued by others. A new permit should be issued in such cases.
11. Control should check the return of the permit for cancellation. If it has not been returned after a reasonable time, steps should be taken to find out why and, if necessary, the whereabouts of the missing person(s).

Emergency procedures

1. In an emergency, such as an accident or fire, Control should send a clear signal or instruction by radio or some other immediately recognized means. On hearing the

emergency signal or instruction, all vehicles should immediately stop in a safe manner and remain stationary until instructed to do otherwise. When stopping, drivers and operators should bear in mind the need to leave clear access for emergency services and other rescue personnel and equipment.

2. Whenever possible, unserviceable vehicles, plant and equipment should not be repaired in an operational container-handling area. If it is necessary to do so, for example to enable them to be removed, the area should be isolated.
3. Unserviceable vehicles, plant and equipment should be clearly and appropriately marked to ensure that they are not used.

Container-stacking areas

1. The ground of all container-stacking areas should be maintained in a sound and level condition.
2. Every slot in a container-stacking area should be able to be readily identified. This may be done by the identification of blocks and rows on the ground or by other markings.
3. The tracks of RMGs that service blocks of containers should be clearly marked and kept clear at all times.
4. Dangerous goods should only be kept in the stacking area in accordance with national legal requirements and terminal rules.
5. Containers in stacks should all be of the same length to ensure that the lower corner fittings of a container above the bottom tier rest directly on the top corner fittings of the container below. Non-standard-length containers may be stacked on standard containers, provided that their corner fittings are located in the same positions.
6. Containers should not be stacked more than one high within 6 m of a building where there is a risk to persons in the building if a container is mishandled or subjected to high winds.
7. Consideration should be given to the possible effects of high winds on container stacks. This may include the orientation of containers in line with prevailing winds.
8. The ends of rows in stacks serviced by straddle carriers should be stepped down, where this is practicable, in order to improve the visibility of straddle carriers emerging from the stack.
9. Whenever practicable, tank containers should only be stacked one high. When it is necessary to stack tank containers more than one high, it is recommended that stacking cones be used, in view of the differences of tank container frame designs. Tank containers carrying highly volatile substances should not be stacked above the pressure relief valves of highly volatile flammable substances.
10. Any person seen on foot in a container-stacking area, other than in an area that has been isolated, should be reported to Control immediately. Control should isolate the area until the pedestrian has been removed.
11. A conspicuous metal plate with a long handle may be inserted into a top corner fitting of a refrigerated container connected to the electrical supply in order to prevent it from being lifted while still connected

Container handling and lifting

1. Containers exceeding the maximum gross weight on their safety approval plate or the capacity of the handling equipment should not be handled.
2. Containers should be handled and lifted in accordance with relevant international standards. Table 1 of ISO 3874 *Series 1 freight containers – Handling and securing*illustrates the nine specified methods of lifting. It should be noted that all methods have their limitations and many are not allowed for specified loaded containers.
3. Loaded containers should generally be lifted by container cranes vertically from their four top corner fittings with the aid of a purpose-designed spreader.

4. Empty containers may be lifted with the aid of a four legged sling assembly. The assembly may incorporate a chandelier spreader. The sling legs should be long enough to give a safe angle of not more than 90° between them at the crane hook. This angle should never be exceeded. Sling hooks inserted into corner castings should face outwards.
5. Containers carrying over-height loads may be lifted from the bottom corner fittings or with the aid of special purpose-designed over-height frames.
6. The design of spreaders for twin lift operations should take into account the potential total gross weight of the two containers and possible asymmetrical loading of cargo inside them.
7. Containers should only be handled by other methods after careful evaluation of the equipment to be used and the methods of operation proposed.
8. Containers should only be handled by forklifts or goosenecks if they are fitted with forklift pockets or gooseneck tunnels, in accordance with ISO 1496, and provided that. These are maintained in good condition. Tank containers should never be handled by forklifts.
9. Operators should drive at an appropriate safe speed. Speed should be reduced for cornering
10. In order to maximize its stability, container-handling plant traveling with a container should carry it as low as is practicable to ensure adequate clearance of obstacles
11. RMGs lifting a container from a road vehicle whose operator is required to stay in the cab should lift the container slowly until it is seen to be clear of the vehicle.
12. Special precautions should be taken when it is necessary to handle damaged containers. Damaged containers should be withdrawn from service unless they are safe to continue to their destination for unloading or to a repair depot.
13. Hatch covers that are landed during loading or unloading operations should be clearly visible and not obstruct traffic routes. All relevant traffic vehicles and personnel should be alerted when hatch covers are landed.
14. The insertion of twist locks into or removal of twist locks from corner fittings of containers on the quayside should be carried out in accordance with a safe system of work that protects workers from the hazards of container handling vehicles. Possible methods include carrying out the operations on platforms on the sill beams of container cranes and the use of protected workstations on the quay.
15. Twist lock bins should not obstruct traffic routes on the quayside. However, they may be used to protect workers from traffic while twist locks are inserted on the quay.

Changing spreader frames

1. When a spreader frame is changed:
    - The work should be carried out by trained personnel;
    - All electrical power circuits to the frame should be isolated before the plug is removed;
    - The hoist wires on the crane should be fully slackened off before the frame disconnected;
    - The electrical plug should be stored in the dummy stowage after removal, and should not be allowed to become damp;
    - Frames should be securely stowed on trailers to enable them to be removed from operational areas;
    - When a frame is attached, it is essential to ensure that the control switches in the cab corresponds to the position on the frame.

2. If it is necessary to change a spreader frame on a crane or other container-handling appliance in a container handling area, the area around the operation should be isolated.
3. Suitable arrangements should be made for storage of spreader frames that are not in use in a safe place that does not obstruct traffic routes. This may be on ready-use trailers.
4. Where necessary, spreader frames that are not in use should be protected by barriers and warning signs.
5. Painting spreader frames in bright colors helps to ensure that they are highly visible when kept on a quay.

Access to tops of containers

1. Safe means of access, such as steps, a portable ladder, a mobile elevating work platform or an access cage, should be provided if access to the top of a container is necessary.Workers should never climb up the door fittings of a container.
2. Portable ladders should not be used for access to containers stacked more than two high unless no safer means of access is reasonably practicable.
3. The surrounding area should be isolated if access is necessary to the top of a container in a container-stacking area.
4. Port workers who have to work on top of containers should be prevented from falling off them. Whenever possible, the work should be carried out from a mobile elevating work platform or an access cage. If this equipment is not available, fall arrest equipment should be worn.

Customs inspections

1. Containers should not normally be opened for customs examinations in stacks in container parks. If it is necessary to open a container in a stack, the area should be isolated.
2. Containers to be opened for customs examination should be taken to a separate secure area with safe means of access into the container.

Stripping of containers and other cargo transport units

1. Lift trucks used for stripping a container or other cargo transport unit should be suitable for the purpose, with a short mast and low overhead guard for the operator. To prevent build-up of dangerous exhaust gases, only liquefied petroleum gas (LPG)-fuelled or electric trucks should be used. Lift trucks should not impose excessive point loads on the floors of containers. Container floors are generally designed to withstand the wheel pressure of a lift truck with a lifting capacity of 2.5 tones. Lift trucks with small metal wheels on the outer end of forks should not be used, as they can subject floors to high-point loadings.
2. If containers or other cargo transport units are stripped while on a trailer, care should be taken to ensure that the trailer cannot move or tip up during the operation. Brakes should be securely applied, wheels should be chocked and the front end of the unit adequately supported. Where necessary, a ramp or bridge piece should be provided.

General cargo operations

1. General cargo operations should be planned so as to minimize the necessity for port workers and vehicles to work in the same area.
2. Where practicable, walkways that have to pass through cargo-handling areas should be located at the edges of the areas, rather than passing through the middle of them.
3. All port workers carrying out general cargo-handling operations should be provided with and should wear high-visibility overalls or other outer garments, safety footwear, safety helmets and gloves, when necessary. They should also wear any other items of

personal protective equipment that may be necessary for carrying out particular operations.

4. When objects are lifted with jacks, the jacks should be:
    - constructed so that they will remain supported in any position and cannot be lowered accidentally;
    - set on solid footings;
    - centered properly for the lifts;
    - placed so that they can be operated without obstruction.

5. If cargo platforms are used, they should be:
    - constructed of robust material;
    - Sufficiently large to receive the cargo and ensure the safety of persons working on them;
    - Not overloaded.
6. Hatch covers should not be used in the construction of cargo platforms.
7. Where heavy objects, such as loaded drums or tanks, are handled up or down an incline, their movement should be controlled by ropes or other tackle as well as chocks or wedges. Port workers should not stand on the downhill side of the load.
8. Drums, casks and similar cylindrical cargo that can be rolled should be kept under control at all times. They should be pushed with the hands flat on the circumference of the drum and well in from the ends in order to prevent possible trapping. Wooden casks or barrels should be pushed on their hoops.
9. The method of stacking or storage of cargo should be determined in the light of the:
   — cargo-handling equipment that is available;
   — Location and size of space those are available;
   — Length of time that cargo will be kept in that location;
   — Next operation.
10. Dunnage should be used as appropriate under goods that are to be loaded or unloaded by lift trucks or other lifting devices.
11. Dunnage should be of sufficient size to allow for forks, other lifting devices or slings to be inserted or removed easily.
12. Stacks of goods should be broken down systematically from the top tier in order to ensure that the stability of the stack is maintained.
13. Where appropriate, cargo should be kept on pallets.
14. Long thin cargo, other than timber, should be kept in racks.
15. Due consideration should be given to the need to maintain the stability of racking when goods are loaded and unloaded from it. Goods should never be balanced on the edge of racking. This may lead to the overturning of racking, particularly if the lower levels of racking are empty or lightly loaded and the center of gravity of the loaded rack is above that level.
16. Cargo placed at a quay edge should be positioned so that there is a clear space of not less than 1.5 m between any part of the stack and the quay edge. If this is not practicable, the cargo should be placed in such a way that there is not enough room for a person to squeeze between the stack and the quay edge.

Roll-on-roll-off (RoRo) operations

1. Any necessary checks on RoRo vehicles and their cargo should be carried out at the access gate or other suitable place.
2. Particular attention should be paid to any couplings between vehicles to ensure that they will not become uncoupled on a ship's ramp. Particular attention should be paid to vehicles towing caravans, which should always use proper ball hitches and trailers. Goosenecks on tractors are liable to become disconnected from a trailer at the ends of a ramp if the slope is too great. Additional side safety chains or other fastenings should be used where necessary except when heavily loaded roll trailers are being stowed
3. Checks on the declaration and placarding, marking and signing of dangerous goods should be carried out in accordance with national & International legal requirements.

4. Abnormal loads may need to be escorted directly to or from the ship or a suitable waiting area.
5. Ro-Ro traffic should be appropriately controlled at all times. All traffic marshals should wear high-visibility clothing. Speed limits should be enforced.
6. Parking on RoRo traffic access routes should be prohibited except in suitable designated areas. Vehicles carrying dangerous goods in such areas should be segregated as necessary.
7. Adjustments of loads on vehicles and the sheeting and unsheathing of loads on vehicles should only be permitted in clearly indicated designated areas.
8. Trailer legs should be lowered to the ground before trailers are uncoupled. It is important to ensure that the trailer parking brakes have been properly applied and the front of the trailer left high enough to permit another vehicle to couple to it.
9. The shore approaches to ramps of RoRo ships should be kept clear at all times.

Container ships operations

1. Containers stowed in open hatches that are secured by the cell guides do not need further securing arrangements.
2. Containers carried by ships that do not have cell guides should be secured by lashings, bars, etc., both in the hold and on deck.
3. All lashing gear is provided by the ship and is ship's equipment. Fully manually operated twist locks are now tending to be replaced by semi-automatic twist locks (SATLs). On loading, SATLs may be placed in position on the underside of the container on the quay. When the crane lowers the container into position, the SATLs automatically lock into position. On discharge, the SATLs have to be unlocked with the aid of a long pole. Such poles can only be used from deck level to unlock up to four containers high because of their length and weight.
4. The operators of container quay cranes should be positioned in such a way that they can see directly down onto the cargo and the crane, and thus lock on to individual containers and lift them without other persons being involved.
5. The need for working on top of containers should be eliminated or reduced by the use of:
    - hatch less ship that eliminates it;
    - SATLs that reduce the need but do not eliminate it completely;
    - A combination of lashing platforms and SATLs restricting it further;
    - Fully automatic twist locks.

6. When a jib crane or derrick is used for discharging/ loading, there may be a need to steady the load when a container is being lifted or lowered, or a spreader is lowered onto a container.
7. When it is necessary to use over-height frames to lift open-topped containers:
    - The over-height frame should be marked with its weight and safe working load;
    - A physical check that twist locks have turned and are engaged should be made before lifting;
    - Where necessary, care should be taken to ensure that the twist lock operating ropes do not catch on fixed objects while the frame is in use;
    - Frames should be securely stowed on trailers when not in use.
8. When container cranes are used to lift loads other than freight containers, it should be ensured that:
    - The equipment and methods are adequate and safe;
    - The manufacturer's recommendations are followed if the crane's heavy lift hook is used;
    - Lifting frames are not asymmetrically loaded beyond the manufacturers recommendations;
    - Only tested and marked lifting points on the main frame or other frames are used.

9. Further general guidance on safe work on container ships is contained in the ICHCA International Ltd. Safe working on container ships, International Safety Panel Briefing Pamphlet No. 8.

Deck working

1. Terminal should ensure that safe access is provided by the ship to any place on the ship where stevedores have to work and that the place of work is safe.
2. The placing and removal of lashing equipment on the ends of containers should be carried out in the athwart-ship gaps between containers stow.
3. The space provided between the containers stows for port workers to carry out such work should provide:
    - A firm and level working surface;
    - A working area, excluding lashings in place, preferably of 1 m and not less than 750 mm wide to allow clear sight of twist lock handles and the manipulation of lashing gear;
    - Sufficient space to permit the lashing gear and other equipment to be stowed without causing a tripping hazard.

Container top working

1. When work on container tops cannot be avoided, safe means of access to them should be provided.
2. When a cage or platform is used for access:
    - At least two persons should travel in the cage or platform, one of whom should have a radio in direct contact with the crane operator;
    - The crane operator should only take directions from that person;
    - The secondary means of attachment to the spreader should be connected;
    - All parts of the body, particularly the hands and head, should be kept inside the cage or platform at all times.

Port workers should never climb up the ends of containers. When this involves loading or discharging by jib crane, an additional reason for being on the top layer of the containers may be to steady the load as it is positioned or removed. In these circumstances, a safe system of work should be developed to ensure that port workers have safe access.

When work has to be undertaken on container tops, precautions should be taken to ensure the safety of port workers. Suitable fall prevention or fall arrest systems of work should be devised and used in order to eliminate or control the risk of falling from the container stow. Fall prevention systems include working from inside a cage used for access, or secured to a short lanyard that prevents falls from open sides of containers.

Other systems or methods may be used in connection with container top working, provided that they ensure the safety of port workers at all times.

Work on top of containers should cease in high-wind conditions

Similar precautions should be taken to ensure the safety of port workers who have to go onto the tops of containers on the deck or in the hold of combi ships, where freight containers are stowed and lashed.

Further guidance on safe working on tops of containers is in the ICHCA International Ltd. Container top safety, lashing and other related matters, International Safety Panel Research Paper No. 4.

Ro-Ro ships

General requirements

Ro-Ro ships are equipped with a variety of cargo access equipment, e.g. ship/shore ramps, bow/stern/side doors, internal ramps and cargo lifts. This equipment is normally operated by the ship's crew.

The main operations in a RoRo hold are the marshalling of vehicles and lashing them to the deck for the voyage. In a RoRo ship, cargo such as paper reels is brought into the hold on roll trailers. It is then taken off the trailer by lift truck and placed into a stow in the hold area.

In each of these operations, mechanical appliances are widely used and are usually driven and operated by port workers, who may also marshal vehicles and lash/unlash vehicles to the deck.

The principal hazards for port workers working in RoRo holds are associated with vehicle movements. Vehicles moving in a confined space represent a risk of person/ machine contact and vehicle exhaust fumes can affect health. Lashing operations can also present a risk. Port workers should also be aware of any cargo-access equipment in the area where they are working and know how it operates.

Audible and visual warnings should be given before any cargo-access equipment is operated. Port workers should be alert for such indications.

The slope of an internal ramp should not exceed 1 in 10.

All port workers on RoRo ships should wear high-visibility clothing.

Vehicle movements

All movement of vehicles on board RoRo ships should be effectively and continuously controlled.

Only authorized persons should be allowed on any vehicle deck while vehicle movements are taking place.

Drivers should comply with the relevant speed limits on ramps and vehicle decks at all times. These may be lower than those on the quay. Signs indicating the speed limit should be clearly displayed in prominent positions both on the quay and on the ship.

All large vehicles and trailers being reversed or maneuvered into stowage positions on deck should do so under the direction of a signalman. Signalmen should satisfy themselves that no person is in a position of danger, particularly in any trapping area behind a reversing vehicle. Drivers should not move their load/vehicle unless a signalmen so directs. Drivers should immediately stop their vehicles at any time the signalman is not within their field of vision.

While loading and unloading is taking place, the area should be kept clear, so far as is practicable, of dunnage, loose wires, unused vehicles, securing gear and other extraneous equipment or material.

<u>Vehicle lashing operations</u>

3. The wearing of bump caps by port workers lashing vehicles may be more appropriate than safety helmets owing to the restricted working positions.
2. Port workers carrying out lashing operations should work in pairs, each worker always remaining in sight of the other.
3. Great care should be taken when vehicles are moving, especially when the system requires vehicles to reverse into place. In particular, it is essential to ensure that:
    - Large vehicles are always controlled by a signaler when reversing.
    - Port workers do not position themselves at the back of a vehicle when vehicle loading operations are taking place in that row.

4. Port workers should release lashings warily, as vessel and vehicle movement during the voyage may have made them excessively taut.

18 Environmental and Social Monitoring Program

Environmental monitoring is a very important component of environmental management to safeguard the protection of environment at both construction and operation stages of the Project. The Georgian regulation on Environmental Impact Assessment (2009, amended in 2013) requires environmental self-monitoring at all stages of the project lifetime. As part of the ESIA report, the Developer is required to determine methods, locations, frequency and parameters of environmental control and monitoring; Monitoring should also include plans for expected social impacts. It should ensure that the commitments made in the EIA, and in any subsequent assessment reports, together with any licenses/permits conditions, are implemented.

In response to environmental impacts identified during this ESIA study, the Monitoring Program has been developed as an integrated part of Environmental and Social Management System. An Environmental and Social Monitoring is needed to verify the effectiveness of the proposed mitigation measures in reducing impacts and also to allow mitigation measures to be refined or developed as needed to address actual impacts and future effects/developments.

More specifically, the objectives of a monitoring program are:

- to record project impacts during construction and operation and assess the changes in environmental conditions;
- to monitor the implementation and evaluate the effectiveness of the mitigation measures;
- to indicate potential problems and identify any shortcomings in order to allow prompt implementation of corrective actions, refinement and/or enhancement of mitigation measures;
- to meet legal requirements, corporate commitments and community obligations;
- to allow development of mitigation measures to deal with unforeseen issues or changes in operations;
- to allow Terminal (Transford LLC) and international lender (IFC or OPIC) to verify that requirements of loan agreements are being met.

The Monitoring Program describes the parameters to be monitored, the activities to be executed, locations, time and frequency of monitoring activities, and the collection, analysis, and reporting of monitoring data. Monitoring includes:

- Baseline monitoring which may be carried out over seasons or years to quantify ranges of natural variation and/or directions and rates of change that are relevant to impact prediction and mitigation (both environmental and social systems);
- Compliance monitoring which aims to check that specific regulatory standards and conditions are met (e.g. in relation to pollution emissions);
- Impact and mitigation monitoring which aims to compare predicted and actual (residual) impacts and hence determine the effectiveness of mitigation measures.

Monitoring can aim to monitor conditions at the sources of the potential disturbances or at the locations of impact receptors. Impact monitoring is particularly relevant with regard to social impacts, as the cause of impacts is often not any single impact, but rather an accumulation of diffuse impacts.

The Terminal should ensure that the contract/bidding documents (including specifications and bills of quantities) contain a listing of all required mitigation measures and a time frame for the compliance monitoring of these activities. The ESMP should be included in tender/contract documents so that the contractor is fully aware at bidding stage of what is expected of him in terms of environmental stewardship and can build the necessary costs into his tender pricing. The monitoring will comprise supervision and surveillance to check whether the contractor is meeting the provisions of the contract during construction.

Environmental supervision and monitoring, as part of the Developer's (Transford LLC) Environmental and Social Management System (ESMS) are conducted throughout all phases of project development and implementation, with the aim of:

(i) Ensuring that action necessary to provide the required mitigation is taken;
(ii) Ensuring that the mitigation protects the environment as intended; and
(iii) Determining the actual environmental and social impacts that occur once mitigation has been applied, to establish whether there are any residual or unexpected impacts that require further action.

The Monitoring Program is considered for pre-construction, construction, and operational phases of the Multifunctional Transshipment Terminal Project at Port of Poti. It is assumed that the Terminal Developer (Transford LLC, or its project management consultant), through the qualified environmental staff and/or consulting company will be responsible for all monitoring activities, and that the results would be reported to Terminal management, Port of Poti, Marine administration, Ministry of Environment and other stakeholders as appropriate. In addition, lenders (IFC or OPIC) may wish to receive full reports or selected data.

Table 50: Environmental and Social Monitoring at Construction Phase

Environmental and Social Monitoring Program to be performed by Terminal Developer (or its Project Management and Supervision Consultant) at ***Construction Phase***					
Receptor/Media	***Parameter/Activities***	***Standard***	***Location***	***Monitoring method and frequency***	***Reporting***
Ambient air quality	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Air emissions management and dust control plan" "Transport Management Plan"	Full compliance	Construction site Vehicle operation locations	Inspections by supervising Environmental Field Officers Daily	Supervision Reports Weekly
Ambient air quality	Opacity (visibility through dust) Excessive emissions from improperly maintained machinery	Minimum impairment of visibility for >1 minute Best practices	Construction site Vehicle operation locations	Visual inspections/monitoring by supervising Environmental Field Officers Daily	Monitoring reports. Weekly
Noise	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Noise Management Plan"	Full compliance	"At source" Construction site	Inspections by supervising Environmental Field Officers Daily	Supervision Reports Weekly
Noise	Noise levels (subjective) Complaints/grievances from population	Audibly loud noises No complaints	"At receptor" (nearest neighboring community/ residences)	Daily	Monitoring reports. Weekly
Port wastewater quality	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Port Wastewater Management Plan" "Solid Waste Management Plan" "Concrete Batch Management Plan" "Spill Prevention and Control Plan"	Full compliance	Construction site	Inspections by supervising Environmental Field Officers Daily	Supervision Reports Weekly

Environmental and Social Monitoring Program to be performed by Terminal Developer (or its Project Management and Supervision Consultant) at ***Construction Phase***					
Receptor/Media	***Parameter/Activities***	***Standard***	***Location***	***Monitoring method and frequency***	***Reporting***
Port wastewater quality	pH, BOD_5, TSS, TDS TPH, other as/if required	Georgian national surface water quality standards IFI/lenders requirements	"End of pipe" - at the outlet of the storm-water treatment facility (send filter tank)	Sampling and laboratory analysis Weekly After any chemical, fuel, oil and hazardous materials spills	Monitoring reports. Monthly
Marine water quality	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Port Wastewater Management Plan" "Dredging and Dredge Disposal Management Plan"	Full compliance	Port aquatory, dredging and dredge disposal areas	Inspections by supervising Environmental Field Officers Daily	Supervision Reports Weekly
Marine water quality	Quality of marine water against baseline characteristics pH, BOD_5, toxic metals (As, Pb, Hg, Cd, Cr, Ni, etc.)TSS, TDS TPH, other as/if required Turbidity in the waters 150 m from the dredge location	Baseline characteristics along Georgia coast and ports	Port aquatory, dredging and dredge disposal areas	Sampling and laboratory analysis Visual inspections during dredging Weekly After any chemical, fuel, oil and hazardous materials spills	Monitoring reports. Monthly
Community Health and Safety	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Community H&S Management Plan" "Transport Management Plan" "Noise Management Plan" "Air Emissions and Dust Control Plan"	Full compliance No complaints or grievances from community population	Construction site, port aquatory, neighboring communities or residences	Inspections by supervising Environmental Field Officers Daily	Supervision Reports Weekly
Occupational Health and Safety	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Occupational H&S Management Plan"	Full compliance Georgia and IFC OHS standards No complaints from employees, no accidents or injuries,	Construction site,	Inspections by supervising Environmental Field Officers Daily	Supervision Reports Weekly

Table 51: Environmental and Social Monitoring at Operation Phase

Environmental and Social Monitoring Program to be performed by Terminal Operator ***at Operation Phase***					
Receptor/Media	***Parameter/Activities***	***Standard***	***Location***	***Monitoring method and frequency***	***Reporting***
Ambient air quality	Implementation of site-specific mitigation measures, in accordance with "Air emissions management and dust control plan" "Transport Management Plan at operation stage"	Full compliance	Port territory Vehicle operation locations	Inspections by Operator's Environmental Officers Daily	Supervision Reports Weekly
Noise	Implementation of site-specific mitigation measures, in accordance with "Noise Management Plan"	Full compliance	"At source" Port operations	Inspections by Operator's Environmental Officers Weekly	Supervision Reports Monthly
Noise	Noise levels (subjective) Complaints/grievances from population	Audibly loud noises No complaints	"At receptor" (nearest neighboring community/ residences)	Inspections by Operator's Environmental Officers Monthly	Monitoring reports. Quarterly
Port stormwater and industrial/flash water quality	Implementation of site-specific mitigation measures, in accordance with "Port Wastewater Management Plan" "Solid Waste Management Plan" "Spill Prevention and Control Plan"	Full compliance	Port territory	Inspections by Operator's Environmental Officers Weekly	Supervision Reports Monthly
Port storm water and industrial/flash water quality	pH, BOD_5, TSS, TDS TPH, other as/if required	Georgian national surface water quality standards IFI/lenders requirements	"End of pipe" - at the outlet of the storm-water treatment facility (send filter tank)	Sampling and laboratory analysis Monthly After any chemical, fuel, oil and hazardous materials spills	Monitoring reports. Quarterly

Environmental and Social Monitoring Program to be performed by Terminal Operator ***at Operation Phase***					
Receptor/Media	***Parameter/Activities***	***Standard***	***Location***	***Monitoring method and frequency***	***Reporting***
Marine water quality	Implementation of site-specific mitigation measures, in accordance with "Port Wastewater Management Plan" Routine maintenance "Dredging and Dredge Disposal Management Plan" (if/when any)	Full compliance	Port aquatory, dredging and dredge disposal areas	Inspections by Operator's Environmental Officers Weekly	Supervision Reports Monthly
Marine water quality	Quality of marine water against baseline characteristics pH, BOD_5, toxic metals (As, Pb, Hg, Cd, Cr, Ni, etc.) TSS, TDS TPH, other as/if required	Baseline characteristics along Georgia coast and ports	Port aquatory, dredging and dredge disposal areas	Sampling and laboratory analysis Monthly After any chemical, fuel, oil and hazardous materials spills	Monitoring reports. Quarterly
Community Health and Safety	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Community H&S Management Plan" "Transport Management Plan at Operation Stage" "Noise Management Plan" "Air Emissions and Dust Control Plan"	Full compliance No complaints or grievances from community population	Construction site, port aquatory, neighboring communities or residences	Inspections by Operator's Environmental Officers Weekly	Supervision Reports Monthly
Occupational Health and Safety	Implementation of site-specific mitigation measures by Contractor(s), in accordance with "Occupational H&S Management Plan"	Full compliance Georgia and IFC OHS standards No complaints from employees No accidents or injuries	Construction site,	Inspections by supervising Environmental Field Officers Daily	Supervision Reports Weekly

Table 52: Outline Monitoring Program for Dredging Impact on Marine Environment

Type of Impact /Environmental Component	Measuring and Observation Object/Site	Controlled Parameters and Indicators	Observation Terms and Recurrence
Dredging and Dredge Disposal Monitoring			
Dredging area	12 checkpoints will be established in aquatory	Water layer – surface and bottom top layer -pH - concentration of suspended particles -concentration of oil hydrocarbons Benthic sediments: -granulometric composition; -heavy metal concentration; -oil hydrocarbon composition	At the pre, interim and post dredging stages
Dredge disposal area	18 checkpoints will be established at dumping areas	Water layer – surface and bottom top layer -pH -concentration of suspended particles -concentration of oil hydrocarbon Benthic sediments: - granulometric composition; -heavy-metal concentration; Benthos: -species composition, biomass, quantitative indicators	
Impact Monitoring on Fishery and Non-Fishery Species			
Invertebrates	12 checkpoints at bottom deepening adjacent sites within 100 meters within 250 meters within 450 meters	Allocation of Invertebrates	Once, prior to work commencement Once a year during 4 years after completion of works
Benthos	-„-	species composition; structure and allocation of benthic symbiosis (Flora and Fauna) Sample collection	Once, prior to work commencement Once a year during 4 years after completion of works
Phytoplankton and Zooplantkon	-„-	Species composition; structure and allocation of benthic symbiosis (Flora and Fauna) Sample collection	Once, prior to work commencement Once a year during 4 years after completion of works
Ichtyoplankton	-„-	Species composition and quantitative indicators	Before and after completion of dredging works
Bacterioplankton	-‘-	Identifying microorganism groups	Before and after completion of works
Chlorophyll and Primary Products	-„-	Collecting water samples	Before and after completion of works
Toxicological Studies of Invertebrates and Fish	-„-	Collecting samples of hydrobiont tissues and organs	Once a year during 4 years after completion of works

19 Summary Environmental and Social Impacts

A general method for rating the significance of environmental impacts was used to evaluate impacts identified and analyzed in the ESIA of the Multifunctional Transshipment Terminal Project.

The significance of an impact was defined as a combination of the consequence of the impact occurring and the probability that the impact will occur. The criteria used to determine impact consequence were:

- Extent - the area in which the impact will be experienced (**local, regional, national /international);**
- Intensity - the magnitude or size of the impact (**none, low, medium, high**);
- Duration – the timeframe for which the impact will be experienced **(none, short-term, medium-term, long-term)**

The combination of these three criteria corresponds to a Consequence Rating**(Not significant, Very low, Low, Medium, High)**

After the consequence determined, the probability of the impact occurring will be considered, using the probability classifications (the likelihood of the impact occurring) – **improbable, possible, probable, definite.**

The overall significance of impacts was determined by considering combinations of consequence and probability without and with/after the implementation of mitigation measures and ESMPs, using the following ratings – **insignificant, very low, low, medium, high, very high**.

The results of rating exercise (see table below) may be considered as a conclusion/outcome of the present ESIA.

Summary of Environmental and Social Impacts at <u>Construction Phase</u> of Multifunctional Transshipment Terminal Project

Table 53: Summary of impacts at Construction Phase

Receptor/Media	Impact (Construction Phase)	Extent Intensity Duration	Consequence	Probability/ likelihood	Significance without mitigation	Significance with/after mitigation and EMP implementation
CONSTRUCTION PHASE						
Ambient Air quality: Inorganic dust in the ambient air;	Bert 1 demolition, Earthworks dust; dust generated from the vehicles movement; dust generated from loading-unloading of the inert materials.	Local Medium Short-term	Medium	Probable	Medium	Low to Very Low
Air quality: Combustion products dissemination in the ambient air.	Vehicles, construction machinery exhaust; welding aerosol; other	Local Medium Short-term	Medium	Probable	Medium	Low to Very Low
Noise dissemination within the working zone;	Noise caused by the vehicles; Noise caused by berth1 demolition the construction machinery and construction operations.	Local Medium Short-term	Medium	Probable	Medium	Low to Very Low
Noise dissemination at the border of the residential zone;	Noise and vibration caused by the vehicles; Noise and vibration caused by the construction machinery; Noise caused by the construction/installation works	Local Medium Short-term	Medium	Probable	Medium	Low to Very Low
Topsoil destruction	Soils stability violation during the process of the land works performance; Soil loss as a result of the infrastructure allocation; Movement of machinery on the ground with topsoil	Local Low Short term	Not significant	Improbable	Insignificant	Insignificant
Soil/ground contamination	Potential soil contamination with wastes;	Local Medium	Medium	Probable	Medium	Low to Very Low

Receptor/Media	Impact (Construction Phase)	Extent Intensity Duration	Consequence	Probability/ likelihood	Significance without mitigation	Significance with/after mitigation and EMP implementation
CONSTRUCTION PHASE						
	Contamination in case of spillage of fuel, lubricants or other substances.	Short-term				
Surface and groundwater contamination	Contamination due to improper management of wastes. Contamination due to leakage of oil from the vehicles and machinery; Contamination due to untreated sewage waters.	Local Medium Short-term	Medium	Probable	Medium	Low to Very Low
Marine water contamination	Impact of dredging and dredge disposal activity Impact of construction activity	Local Medium Medium-term	Medium	Probable	Medium	Medium
Visual-landscape change	Visual-landscape changes due to excessive movement of vehicles, construction machinery functioning, storage of the construction materials, wastes etc.	Local Low Short term	Not significant	Possible	Insignificant	Insignificant
Impact on flora	Destruction of vegetation is not expected (very limited vegetation in port industrial area)	Local Low Short term	Not significant	Possible	Insignificant	Insignificant
Impact on fauna	Direct impact on terrestrial fauna is not expected (no wild fauna in port industrial area)	Local Low None	Not significant	Improbable	Insignificant	Insignificant
Impact on marine biota	Impact of dredging and dredge disposal activity Impact of construction activity	Local Medium Medium-term	Medium	Definite	Medium	Medium
Waste Management	Demolition wastes, Construction wastes (including the hazardous wastes);	Local High Medium-term	Medium	Probable	Medium	Low

Receptor/Media	Impact (Construction Phase)	Extent Intensity Duration	Consequence	Probability/ likelihood	Significance without mitigation	Significance with/after mitigation and EMP implementation
CONSTRUCTION PHASE						
	Domestic wastes.					
Community Health and Safety	Surplus noise, emissions and traffic from vehicle movement, water and soil contamination, accidents other, including diseases	Local Medium Medium-term	Medium	Possible	Medium	Low
Occupation Health and Safety (OHS)	General OHS Issues Physical Hazards Chemical Hazards Noise Respiratory Hazards Confined Spaces	Local Medium Medium-term	Medium	Probable	Medium	Low
Socio-economic impacts	Impact on Employment Impact on Infrastructure Impact on Public Services Community Cohesion Cultural Heritage Decommissioning	Local Medium Medium-term	Medium	Probable	Medium	Low adverse Medium positive

Summary of Environmental and Social Impacts at <u>Operation Phase</u> of Multifunctional Transshipment Terminal Project

Table 54: Summary of impacts at Operation Phase

Receptor/Media	Impact (Operation Phase)	Extent Intensity Duration	Consequence	Probability/ likelihood	Significance without mitigation	Significance with/after mitigation and EMP implementation
OPERATION PHASE						
Surface waters /groundwaters quality	Port sewage and storm-water	Local Medium Long-term	Medium	Probable	Medium	Low
Marine water quality	Surface run-off. Routine/maintenance dredging Ship wastewater (not applicable)	Local Low Long-term	Low	Probable	Medium	Low
Ambient air quality	Combustion emissions (ships, port) VOC (from fuel storages) Dust (from dry bulk materials, cargo operations, vehicles movement, etc)	Local Medium Long-term	Medium	Probable	Medium	Low
Noise pollution	From ship cargo handling, machinery and traffic	Local Medium Long-term	Medium	Probable	Medium	Low
Solid Waste management	Ship wastes (not applicable) Port wastes Hazardous materials, oil	Local Low Long-term	Medium	Probable	Medium	Low
Marine ecology	Impact on marine biota -due to maintenance (routine) dredging -due to increased ships traffic	Local Medium Long-term	Medium	Probable	Medium	Low
OHS	Physical hazards Chemical hazards Confined spaces Dust, noise, other	Local Medium Long-term	Medium	Probable	Medium	Low
Community Health and Safety	General community H&S issues Port marine safety Port security Visual amenities	Local Medium Medium-term	Medium	Probable	Medium	Low

20 Summary of Public Consultations

Paragraph 6 of the Law of Georgia on Environmental Impact Permit requires the project proponent (Developer) to organize a public discussion of the EIA prior to submission of the final version of the documentation to the MENRP. The establishment of the timeframes for information disclosure and public review and discussion in accordance with Georgian Law includes the following steps:

- The project proponent publishes information on the Project in central and regional newspapers. The advertisement has to include the project title, location, place and the date, time and venue of public disclosure meeting(s). It also identifies locations where the ESIA can be reviewed and where comments may be submitted.
- Within one week after publishing the information in the newspapers, the project proponent submits the ESIA report (hard copy and electronic version) to the MENRP. A period of 45 days is allowed for public comment on the ESIA. Between 50 and 60 days after publication, the project proponent will hold a series of meetings to receive comments from stakeholders (which may include government agencies, local authorities, NGOs, community members). Within five days of the meetings, the project proponent submits minutes of the meetings (summary of comments and discussions) to the MENRP.
- All comments received from the stakeholders at the meeting or in writing will be reviewed and addressed in the final version of the ESIA. A copy of all written comments, the minutes together with a comment-response section should be included in the final ESIA as an Appendix. The final ESIA should be submitted to the MENRP and made available to the public, along with a project location map, an executive summary, and the any necessary reports on emissions and allowable limits. The permit is to be issued or denied within 20 days from registration of the submission.

For the new Multifunctional Transshipment Terminal project starting from November 2014 till February 2015, the intensive consultations have been held with all major stakeholders separately: Port of Poti, Poti Municipality, Marine Administration, Ministry of Environment, Ministry of Economy, Ministry of Infrastructure, neighboring residents, other. No records are filed for that series of bilateral meetings. After that the Georgian version of the EIA report has been disclosed on 19 March 2015 (the copies of advertisements in Regional newspaper “Poti” and central newspaper “Sakartvelos Respublika” are presented below on Fig.33 and 34) and both hard and electronic versions of the Report have been sent to MENRP for review and comments. According to the legislation the disclosure period (45 days after the announcement) was finishing on 03 May 2015 and the Public Consultation date and place (08 May 2015, former Shipyard #201 Conference Room) was announced in the same advertisements in the same newspapers. The main stakeholders including port of Poti administration, Poti Municipality and the community representatives have been invited to the meeting. The copy of the Minutes of the Meeting is attached. None of comments have been received from community members or NGOs during the disclosure period. None of representatives of local community or NGOs have attended the Public Consultation meeting. Following from Georgian legislation, the absence of comments from general public or affected community during the disclosure period and at the Public Consultation meeting is considered as very low or no interest from general public and the comments to be addressed are limited to those received from the MENRP.

TRANSFORD LLC

სს „ფოთის გემთმშენებელი ქარხნის" აკვატორიისა და ტერიტორიის ფარგლებში უნივერსალური გადასატვირთო კომპლექსის მშენებლობის პროექტის

გარემოზე ზემოქმედების შეფასების ანგარიში

#	სახელი, გვარი	ორგანიზაციის დასახელება	ტელეფონი, ელფოსტა
1.	ნინო წაქაძე	Wings & Freeman Capital	593-39-02-98 nino.tsakadze@gmail.com
2.	თამთა ჭონიაშვილი	Wings & Freeman Capital	595-415-005 tamtachoniashvili@wfcapital.ge
3	Svitlana Ostapchuk	Wings & Freeman Capital	095-073-06-30 svitlana.ostapchuk@wfcapital.ge
4.	[illegible]	Wings & Freeman Capital	555 57 77 87 [illegible]@wfcapital.ge
5.	[illegible]	„ბი ენდ პი"	599573524, BandP@BandP.ge
6	[illegible]	[illegible]	599508293 [illegible]@space.ge
7	დავით ნადირაშვილი?	[illegible]	597 51 57 80 david_nadirashvili@yahoo.com
8	[illegible]	[illegible]	595-47-35-39 m.kupsava@transford.net
9	[illegible]	[illegible]	599219073 t.beraia@transford.net
10	[illegible]	[illegible]	591 662166 z.bzhalava@transford.net
11	[illegible]	[illegible]	577 427673 otar.turmanidze@yahoo.com
12	დავით კერესელიძე?	[illegible]	577454090 davit.kereselidze@tsu.ge
13	[illegible]	[illegible]	595 054896 [illegible]@mra.gov.ge
14	[illegible]	[illegible]	577466446 glazhdyalas.com?

Figure 31: Copy of the attendant's list signed at the public meeting held on 08 May 2015

Protocol №1 of Transford LLC

Poti 8May, 2015y.

The meeting was attended by :

1. Representatives of "Transford" LLC: Apalon Bzhalava, Tamaz Beraia, Mariam Kuprava;
2. Representative of "Pace Georgia" Ltd: Irakli Tateishvili;
3. Representative of "B&P" Ltd: Jumber Tsomaia;
4. Representative of Ministry of Environment Protection and Natural Resources: Levan Ioseliani
5. Representatives of "wings and Freeman Capital" Ltd: Karlo Goginava, Nino Tsaqadze,Tamta Tchonashvili, Svitlana Ostapchuki;
6. Representative of "Poti shipyard" JSC: DaviT Nadirashvili;
7. Representatives of "Universal Company" Ltd: Otar Turmanidze; Davit Kereselidze;
8. Representative of "Independent Commission": Gia Zhorzholian

Chairman of Meeting: A.Bzhalava
Secretary of Meeting: M.Kuprava

Meeting Agenda :
Assessment of environmental effects of universal loading complex construction project at water and local areas of "Poti Shipyard" JSC.

It was clarified at meeting that there were no any written claims from local people.

The following decisions were made at the meeting:

All the remarks represented by Ministry of Environment Protection and Natural Recourses of Georgia to be investigated, particularly:

A) Environmental and radiations effects and all the relevant problems of the cargo loaded at our berths;
B) Assessment of economic and social impacts of additional and other work processes, representation of information invading their positive and negative sides;
C) Investigating, measuring and concluding main characteristics of discharging place of inertial materials;
D) Maintenance of project depths of water area;

Chairman of Meeting: A.Bzhalava Signature _____

Secretary of Meeting: M.Kuprava Signature _____

404386151 TRANSFORD LLC

Figure 32: Copy of the Minutes of the Public Meeting held on 08 May 2015

Figure 33: Copy of the advertisementin the regional newspaper “Poti”
(on the places of ESIA disclosure and the place and date of the public consultation meeting)

Figure 34: Copy of the advertisement in the central newspaper "Sakartvelos Respublika" (on the places of ESIA disclosure and the place and date of the public consultation meeting)

Figure 35: Photos from the public consultation meeting held on 08 May 2015

Annex 1. Copies of Reports from the Laboratory:

LELP IVANE JAVAKHISHVILI TBILISI STATE UNIVERSITY
Caucasian Aleksandre Tvalchrelidze Institute of Mineral Resources

Examination Center "GEOANALYTIKA"

Tbilisi, Mindeli st. 11 ☎:2541554 E-mail: tcimr@internet.ge

Customer: ltd "transfordi"

Name of Production: Ground coast
Analysis time:
Date of beginning: 28.05.2015
Date of finishing: 05.06.2015

Chemical content

N	Identification of sample	Cu, mg/kg	Pb, mg/kg	Zn, mg/kg	Ni, mg/kg	Co, mg/kg	Cd, mg/kg	Mn, mg/k
1	EAR 1	505	323	701	47.67	23.94	2.91	4600
2	EAR 2	1262.5	929	2378	30.18	25.91	5.05	5000
3	EAR 3	65.65	27.12	89.0	41.81	20.25	1.46	1000

The head of examination center G.Todradze

CHANCELLERY

LELP IVANE JAVAKHISHVILI TBILISI STATE UNIVERSITY
Caucasian Aleksandre Tvalchrelidze Institute of Mineral Resources

Examination Center "GEOANALYTIKA"

Tbilisi, Mindeli st. 11 ☎:2541554 E-mail: tcimr@internet.ge

Customer: ltd "transfordi"

Name of Production: Water
Analysis time:
Date of beginning: 28.05.2015
Date of finishing: 05.06.2015

Results of study

N	Identification of sample	Oil points, mg/l
1	4W	12.2
2	6W	18.75

see apeeendix 2.

The head of examination center G.Todradze

LELP IVANE JAVAKHISHVILI TBILISI STATE UNIVERSITY
Caucasian Aleksandre Tvalchrelidze Institute of Mineral Resources

Examination Center "GEOANALYTIKA"

Tbilisi, Mindeli st. 11 ☎:2541554 E-mail: tcimr@internet.ge

Customer: ltd "transfordi"

Name of Production: Sea bed soil
Analysis time:
Date of beginning: 28.05.2015
Date of finishing: 05.06.2015

Chemical content

N	Identification of sample	Cu, mg/kg	Pb, mg/kg	Zn, mg/kg	Ni, mg/kg	Co, mg/kg	Cd, mg/kg	Mn, mg/kg	Oil points, mg/l
1	sample #1	35.55	30.50	100.7	66.51	18.98	1.51	4100	93
2	sample #2	56.1	38.15	107.6	59.0	24.68	1.84	4100	677
3	sample #3	61.2	45.03	118.2	18.8	27.74	1.99	5400	1177
4	sample #4	81.6	70.58	158	39.0	25.09	2.3	3850	1213
5	sample #5	102	82.47	170	22.848	25.6	3.16	4000	4080
6	sample #6	132.6	53.9	150	55.9	27.13	1.94	4350	2723

see apeeendix 1.

The head of examination center G.Todradze