Final Initial Environmental Examination

Project Number: 51132-002

Georgia: Improvement of Telavi Water Supply System

GEO: Sustainable Water Supply and Sanitation Sector Development Program

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

Prepared by "United Water Supply Company of Georgia" LLC of the Ministry of Regional Development and Infrastructure of Georgia for the Asian Development Bank

Prepared in November 2017

Updated in September 2020

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ABBREVIATIONS

ADB	**-**	Asian Development Bank
CA	**-**	Cross section area
CC	**-**	Civil Contractor
DC	**-**	Design Consultant
EA	**-**	Executing Agency
EIA	**-**	Environmental Impact Assessment
EIP	**-**	Environmental Impact Permit
EMP	**-**	Environmental Management Plan
GoG	**-**	Government of Georgia
GRC	**-**	Grievance Redress Mechanism
IA	**-**	Implementing Agency
IEE	**-**	Initial Environmental Examination
IP	**-**	Investment Program
IPMO	**-**	Investment Program Management Office
kg	**-**	Kilogram
km	**-**	Kilometre
lpcd	**-**	Litres per Capita per Day
M	**-**	Metre
mg/l	**-**	milligram per litre
mm	**-**	Millimetre
MoRDI	**-**	Ministry of Regional Development & Infrastructure of Georgia
MoE	**-**	Ministry of Environment and Natural Resources Protection of Georgia
SSEMP	**-**	Site Specific Environmental Management Plan
PS	**-**	Pumping Station
SDP		Sustainable Water Supply and Sanitation Sector Development Program
USIIP		Urban Services Improvement Investment Program
UWSCG	**-**	United Water Supply Company of Georgia
WS		Water Supply
WWTP	**-**	Waste Water treatment Plant

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EXECUTIVE SUMMARY

I. Introduction:

1. This Initial Environmental Examination (IEE) for the Telavi Water Supply System Improvement Project (hereinafter "project") was prepared in November 2017 within the framework of the Asian Development Bank funded Urban Services Improvement Investment Program (USIIP), Tranche 3 and was updated in June 2020, due to the changes in the project design and the fact that the project will be implemented as a part of another ADB funded program entitled: Sustainable Water Supply and Sanitation Sector Development Program (SDP). Both USIIP and SDP are implemented by the "United Water Supply Company of Georgia", LLC of the Ministry of Infrastructure and the Regional Development of Georgia.

2. IEE is part of the process of compliance with the Asian Development Bank (ADB) Safeguard Policy Statement (SPS) (2009) in relation to the construction of Water Supply System in Telavi city, herein referred to as the "Project".

3. The IEE provides a road map to the environmental measures needed to prevent and/or mitigate negative environmental effects associated with the project. More specifically, the IEE:

- Describes the existing socio-environmental conditions within the project area;
- Describes the project design, construction activities, and operational parameters;
- Examines alternatives to the proposed project site, technology, design, and operation;
- Describes the extent, duration, and severity of potential impacts on the environment; and
- Formulates the mitigation actions and presents it all in the form of an Environmental Management Plan (EMP).

4. Based on the existing ADB Environmental Safeguards Policy (2009), this Project falls under ADB's project Category B as the proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects.

II. Description of the Project

5. The implementation of the present project is necessary with the aim to improve water supply system in Telavi for the population of the city.

6. The Government of Georgia has requested assistance from the Asian Development Bank (ADB) for the Sustainable Water Supply and Sanitation Sector Development Program, formerly the Water Supply and Sanitation Service Improvement Project (the Project). The proposed sector development program (SDP) will assist the government achieve universal access to continuous and safe water supply and sanitation (WSS) service, and contribute to improved environmental and public health conditions of the Georgian citizens. The SDP comprises (i) a program, financed by a policy-based loan (PBL), to improve sector governance and institutions in support of the government's reforms; (ii) a

project, financed by a project loan, to increase WSS access and system efficiency in the service area of United Water Supply Company of Georgia (UWSCG).

7. The Ministry of Regional Development and Infrastructure is the Executing Agency and the "United Water Supply Company of Georgia", LLC is the Implementing Agency of the Investment Program. UWSCG is a 100% state-owned company.

8. The City of Telavi is located in Kakheti region, 160 km eastwards from the capital Tbilisi, at 500-800 meters above the sea level. Tsiv-Gombori Range borders to the south and south-west of the city and Alazani Valley to the north and east. Population of town Telavi is approx. 21000 inhabitants. It is the administrative center of the region, connected with the capital by two highways and railroad. The town is one of the centers of Georgia's wine industry. Proper water supply is very important for Telavi to increase production of wine and other agricultural spheres. Telavi is attracted to tourists as well with its various landmarks and cultural heritages.

9. **Water Sources and Transmission System.** Telavi water supply system was initially developed in the 30's of 20th century. The city water supply system was expanding during some decades, although fundamental reconstruction was undertaken in 1966. No major measures and/or old pipe replacement was conducted since 2000. In 2000-2002, some works were implemented: three new water supply sources with yield of 2 l/s were developed; water losses in the transmission mains were eliminated; in 2006-2008, a partial rehabilitation of the network of central part of the city was undertaken. In 2014-2017, a partial rehabilitation of network was undertaken (about 30 km).

10. Currently there are 5 boreholes in the Telavi city territory. Their yield ranges between 4-7 l/s. In Telavi, water flows from headwork's of "Turdos Khevi" (water supply is provided with underground water and drainage, which is fed by river "Turdos Khevi") and "Jvari Patiosani" and discharged into the Water Treatment Plant, clean water from the latter is flowing into the "central" reservoir №1 (2000 m3). The water from reservoir №1 is distributed in the reservoirs №2 (1000 m3) and №3 (2000 m3), located in the southern part of the city. Water from the reservoir №2 is distributed in the reservoirs №4 (350 m3) and №5 (400 m3) located in the central part of the city.

11. The distribution network receives water from the aforementioned reservoirs, about 21 km of which was reconstructed as part of the early implanted projects.

12. Currently only 18% of the population of Telavi are connected to the network and has 24 hours water supply, 20% - 12 hours and 62% - 2-3 hours a day.

13. According to the preliminary design, the new Telavi Water Supply System Project include the construction of:

    (i) Wells (8 existing, 3 new);

    (ii) New Transmission mains (length: ca. 1.450 km);

    (iii) Reservoirs (1 existing, 5 new);

    (iv) Rehabilitation of Chlorination Station near the Reservoir N3 - Gigo Gora;

    (v) Distribution network (Length: 59,55 km);

    (vi) Automation (SCADA).

14. The city water supply will be effectuated from both existing headwork's, from which the water is conveyed to existing treatment plant, and boreholes. The water will be accumulated in reservoirs placed at 7 different sites, from whence the water will be conducted to distribution network. Considering the city terrain, the distribution network, according to pressure, is divided into seven zones.

15. The future Water Supply System will cover only the need of the city of Telavi.

III. Analysis of Alternatives

16. The alternatives considered for the proposed Project include: i) 'No Project' Alternative, ii) Technical alternatives for construction of new water supply facilities of Telavi city, and iii) Alternative locations for reservoirs and networks.

17. The 'No Action' alternative addresses the likely consequences of not undertaking the proposed action. While it has no environmental and social impacts resulting from reconstruction works, the failure to construct new water supply system in Telavi city would result in the continued deterioration in water supply when only 18% of the population of Telavi are connected to the network and has 24 hours' water supply, 20% - 12 hours and 62% - 2-3 hours a day, thereby impeding the socio-economic development of the Project area.

18. Therefore, it can be determined that the 'No Action' alternative is not a reasonable option if the environmental and overall socio-economic situation in the city of Telavi is to be improved.

19. The expansion of current headwork of "Turdos Khevi" and "Jvari patiosani" was the second alternative also considered, but the water from these water intakes are very turbid and therefore needs treatment. This headwork may be used during the drought period as an additional water supply.

20. Alternative location - No alternative options were discussed for reservoirs and network outline, thus all reservoirs will be built on the territory of existing reservoirs owned by the United Water Supply Company of Georgia and the new network will mainly follow an old one outlined in urban areas of Telavi.

IV. Description of the Environment

21. The IEE report presents information about the physical, biological, and socio-economic characteristics of the environment in the Project area. The environmental baseline conditions in the Project area include:

22. **Climate and Meteorological Conditions.** Telavi Municipality is within a moderately humid subtropical climate zone. There is a moderately humid climate within Alazani Valley, with moderately cold winters and hot summers. The average annual temperature is 11-120C, in January – 0,20C, in July - 22-240C. The absolute maximum temperature is390C, while the absolute minimum -210C. Precipitation - 700-800 mm per year. Preliminary EIA Telavi WWTP Page 45 of 165Tables and diagrams below provide specific characteristics of the climate within the study area and parameters describing their recurrence, according to the data obtained from Telavi meteorological station (source: Construction Climatology PN 01.05-08).

23. **Relief.** Alazani Valley is an intermountain accumulative plain between Gombori range and Iori slope. It is located at 200–470 m a.s.l. The plain is inclined towards South-East and it is extended as Agrichai plainon the territory of Azerbaijan. The total length of the plain is 200 km. the length of the plain on the territory of Georgia is 110 km. Its greatest width is 28-30 km.

24. **Geology.** Geologically, Alazani Valley is very peculiar tectonic unit of Georgia. This is a zone of intense immersion - continental geosyncline accumulating sediments. Formation of geosyncline has begun since Pliocene. Evolution of Alazani-Agrichai depression began since Upper Pliocene. Immersion still continues, which is approved by the stratigraphic and geomorphological facts. Caucasus foothill is built up by folded Upper Jurassic and Cretaceous sediments. Gombori range is built up by Mesozoic and Cenozoic suits, which are clearly divided into two different complexes from tectonical and lithological point of view. Older complex combines formations of diverse composition (clays, sandstones, limestone's), while younger complex is represented Neogene (Sarmatian-Kimmerian) molasses series. The series is called Alazani Series.

25. **Hydrology.** The main artery of hydrographic network of the study area is Alazani River, which originates from the eastern slope of the Caucasus, near Mount Borbala. The River joins Mingechauri basin (Azerbaijan). The length of Alazani River is 351 km, basin area – 11 800 km2, average water flow– 98 m3/s. It is used for irrigation. The River is fed by groundwater, rain and snow waters. Approximately 40% of runoff is groundwater, while the rest 30%-30% is rain and snow waters. Floods are observed in the first half of spring and summer, high waters – in autumn. Low waters are observed in winters. 38,3% of runoff is observed inspiring, in summer - 29,1%, in autumn – 20,3%, in winter - 12,3%. It does not freeze.

26. Left tributaries of Alazani River are: Stori, Lopota, Intsoba, Cheleti, Duruji, Avaniskhevi, Kabali, Lagodekhistskali, Matsimistskali, Gishistskali (Agrichai), etc.Right tributaries of Alazani River are: Ilto, Turdo, Kisiskhevi, Cheremiskhevi, Fafriskhevi, etc.The project area is located on the right terrace of Alazani River, in 1,0-1,2 km from active riverbed. Project corridor does not cross any other significant surface water bodies. None of these rivers provide a source for the water supply.

27. **Soil.** Alluvial strongly calcareous clay soils are developed on the right plain of Alazani River, while on the right side - meadow-forest Alluvial not calcareous clay soils. The same type is developed in fragments in foothill zone, brown soil developed on conglomerates and sandstones weathering products. Forest brown soils are developed in Kakhetian Caucasus and lower part of Gombori range, under mixed deciduous forest, on clay shales and sandstones weathering crust; above the forest zone, under subalpine herbaceous vegetation - mountain meadow lawn, in some places peat soils and primitive mountain meadow soils.

28. **Seismic Condition.** According to the construction norms and rules - "Seismic Resistance Construction" (pn01.01-09), investigation territory Telavi and its surrounding areas are located in 9 scale (MSK 64) seismic region. Dimensionless ratio of seismicity within the settlements of the study area is: Telavi - 0,32 m/s2, Kurdghelauri village - 0,33 m/s2; Kondoli village - 0,36 m/s2 .

29. **Air quality.** The state of air pollution was assessed based on the results of the analysis carried out by the National Environmental Agency of the Ministry of Environmental Protection and Agriculture of Georgia on June 5, 2020. Based on this results the level of atmospheric air pollution of the city of Telavi in 2020 is within the standards proposed in the Section B – Policy, Legal and Administrative Framework of this report.

30. **Noise.** The state of noise propagation was assessed based on the results of the analysis carried out by the National Environmental Agency of the Ministry of Environmental Protection and Agriculture on June 5, 2020. Based on this results the noise level is within the national standards.

31. **Ecological resources.** Natural vegetation within Telavi Municipality area is heavily altered due to agricultural activities. Plains favorable for agricultural lands are cleaned up from forests, which led to a gradual decline in forest cover and sometimes to its disappearance. Major part of the area is covered by vineyards, corn fields and pastures.

32. ***Flora:*** Following plants are spread within the forested areas: Georgia Oak (Quercus iberica), Caucasian. Hornbeam (Carpinus caucasica), Oriental beech (Fagus orientalis), Black alder (Alnus barbata), Maple(Acer sp.), Oriental hornbeam (Carpinus orientalis), black locust (Robinia fseudoacacia), Gleditsia(Gleditschia triacanthos), etc.

33. ***Fauna:*** According to literary sources, following animal species can be found within the municipality area: Chamois, wolves, foxes, jackals, wild boars, rabbits, weasels, voles, the normal mouse, rat, etc. here are a lot of bird species. Following fish species can be found in Rivers: Cyprinid, ray-finned fish, Chub, Barbell, Catfish, Carp, Barbel, Asp, etc.

34. Despite the proximity to the river and the favorable environment condition for Otter - Lutra lutra (IUCN Red List), their existence has not been identified during the studies.

35. ***Birds:*** In spring and summer the area of interest is likely to be visited by different species of migratory birds. Water is available for the species inhabiting within the study area, as it is bordered by Alazani River. Therefore, it may be favorable habitat for waterfowl species. In addition, it's much more important for nesting and migratory birds, as a place for food extraction.

36. Based on literature data, the area is a favorable shelter for the following birds: Lesser Spotted Eagle - Aguila pomarina, Peregrine - Falco biarmicus VU, common kestrel - Falco tinnunculus, Black Kite – Milvus migrans, Tawny Owl - Strix aluco , Great Spotted woodpecker - Dendrocopos major , Lesser Spotted Woodpecker - Dendrocopos minor, Jays - Garrulus grandarius, , etc.

37. ***Amphibians:*** Green Toad - Bufo viridis, Common Toad - Bufo bufo, Caucasian Parsley Frog – Pelobates caucasicus, Forest Fog - Rana rididunda , etc.

38. ***Reptiles:*** Grass Snake - Natrix natrix, Water Snake - Natrix besselata, Large-headed Water Snake – Natrix megalocephala, Aesculapian Snake - Elaphe longissima, Slow Worm - Anguis fragilis, Testudo Graeca - Testudo pontica, Caucasian Lizard - Darevskia caucasica, Georgian Lizard - Darevskia rudis is more frequently found, Dagestan Lizard - Darevskia dagestanica , etc.

39. ***Fish.*** Information on fish species in Mtkvari basin and Alazani River is based on literary data and interviews with local communities and fishermen, according to which 29 species are found in the Caspian Sea area, out of which 12 species are found in Mtkvari River basin from which 9 are endemic species of Mtkavri River and its tributaries. Among them are several species of economic importance such as Kura barbell - Barbus lacerta cyri, ray-finned fish - Barbus mursa , Barbel - Barbus capito andSevan khramulya - Varicorhinus capoeta.

40. **Protected Areas:** There is no any protected area in the vicinity of the study corridor.

41. **Social and Economic Profile**: As Kakheti is an agricultural region, the share of non-agricultural economy in the gross value added (GVA) of the region and in the gross domestic product of the country is small. The level of urbanization is low in Kakheti due to the mono-agrarian character of the region which means that Kakheti will not shift its focus to industry in the near future. In 2011, agriculture accounted for 24% of the region's GVA, while the share of industry was only 9%, trade was 5%, transport and communication - 1,2% and construction - 1,7%. It is noteworthy that there are no data available about the share of tourism, whereas the share of various service sectors in 2011 was high (20%). The aggregate share of other sectors was 38%.

42. **Anticipated Environmental Impacts and Mitigation Measures:** Most of the predicted impacts are associated with the construction process. Impacts mainly arise from the generation of dust from soil excavation and refilling; disturbance of residents, traffic and activities in the town. These are common impacts of construction, and following methods are suggested for their mitigation: (i) Utilizing surplus soil for beneficial purposes; (ii) Measures to reduce/control dust generation (cover/damp down by water spray; consolidation of top soil, cover during transport etc); (iv) restoring the top soil after construction, (vi) avoiding tree cutting, and (vii) to avoid safety hazards construction site will be secured at critical segments.

43. As it was mentioned above, potential impacts will occur during the construction phase and will be satisfactorily addressed through appropriate mitigation measures. There will be no potential environmental impacts during the operation phase.

44. **Information Disclosure, Consultation, and Participation:** On June 23, 2017, a Public hearing was held in administrative buildings of Telavi. The meetings were attended by more than 30 participants from the city of Telavi. Among participants were Vise Mayor of Telavi, citizens from the relevant settlements and NGO representatives.

45. Additional Public Consultations IEE was conducted in 27 May 27 2020 within the framework of proposed project. The following issues were discussed during the meeting: what will be the tariff policy for water supply; whether the project work will be started as soon as possible, as people experience many problems due to the lack of quality drinking water; whether local people will be hired during construction work; what are the environmental and social impact of the project and proposed mitigation measures. Minutes of the meeting, signed list of participants and photos of the meeting are proposed in the Annexes G,F and E of this report.

46. An Environmental Management Plan (EMP) has been prepared and will be implemented during the project implementation. The EMP identifies the potential environmental impacts arising from the project along with a set of the mitigation measures to reduce the impacts to acceptable levels. It also includes the institutional arrangements for implementing the EMP to ensure its effectiveness.

47. **Conclusions and recommendations:** The overall conclusion of this IEE is that provided the mitigation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the water supply system in Telavi project. There should in fact be positive benefits through major improvements in quality of life and individual and public health once the scheme is in operation.

48. The environmental impacts of infrastructure elements proposed in the water supply system improvement in Telavi project will be assessed and described in the following sections of this document. Potential negative impacts were identified in relation to design, location, construction and operation of the sub project components. Mitigation measures have been developed to reduce all negative impacts to acceptable levels.

49. The main beneficiaries of the improved system will be the citizens of Zugdidi, who will be supplied by high quality drinking water 24 hours a day. This will improve the quality of life of people as well as raising the standards of both individual and public health as the improvements in hygiene should reduce the incidence of disease. This should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.

50. The recommendation of this Environmental Assessment process is that all mitigation, enhancement and monitoring activities proposed here shall be implemented in full. This is essential to ensure that the environmental impacts are successfully mitigated; this is the responsibility of United Water Supply System of Georgia.

A. INTRODUCTION

A.1 General

51. This section of the report; a) provides the background to the Sustainable Water Supply and Sanitation Sector Development Program, b) summarizes the Project need and objectives, c) outlines the purpose of the IEE, d) describes the Project Category and c) describes the scope of the IEE and the structure of the report.

A.2 Background

52. The Government of Georgia has requested assistance from the Asian Development Bank (ADB) for the Sustainable Water Supply and Sanitation Sector Development Program, formerly the Water Supply and Sanitation Service Improvement Project (the Project). The proposed sector development program (SDP) will assist the government achieve universal access to continuous and safe water supply and sanitation (WSS) service, and contribute to improved environmental and public health conditions of the Georgian citizens. The SDP comprises (i) a program, financed by a policy-based loan (PBL), to improve sector governance and institutions in support of the government's reforms; (ii) a project, financed by a project loan, to increase WSS access and system efficiency in the service area of United Water Supply Company of Georgia (UWSCG).

53. Sector Development Program Description. **Output 1:** Sector governance and institutional capacity for urban and rural water supply and sanitation services strengthened. The following will be delivered under the PBL: (i) a new WSS policy featuring gender- and climate-sensitive provisions to provide a strategic anchor to WSS goals set forth in the national strategies and programs, (ii) the Law on Electricity and Natural Gas (renamed to Energy and Water Law) amended to strengthen WSS utility licensing and investment monitoring rules, and (iii) improved corporate governance and change management for UWSCG to become more autonomous, accountable, efficient and sustainable, including (a) a new supervisory board with new charter established; (b) organization and resources realigned; (c) human resources management improved including job descriptions defined and performance management system established; (d) corporate policies and strategies for asset management, nonrevenue water reduction, metering, and public communications developed; (e) a PPP roadmap prepared, and (f) WSS tariff rationalized for cost recovery.

54. **Output 2:** Water supply and sanitation access and system efficiency increased. The project seeks to secure direct benefits to the target population, and environmental and climate change impacts. It will include (i) water supply infrastructure in Telavi constructed and rehabilitated; (ii) operations and maintenance of the existing facilities improved including support for energy efficiency; (iii) a strategy and investment plan for rural WSS developed; (iv) capacity development and project management strengthened; and (v) public awareness on health, hygiene, sanitation and water conservation increased.

A.3 Purpose of the Report

55. The present IEE report covers construction of Water Supply System in Telavi city with the aim to:

- describe the existing socio-environmental conditions within the Project area;
- identify potential direct, indirect, cumulative, and induced environmental impacts and risks that may emerge due to Project implementation;
- analyse Project's alternatives of location, design and technological solutions, including "no project" option;
- develop Environmental Management Plan (EMP) that will include proposed mitigation measures, monitoring program and reporting requirements, institutional and organizational arrangements, capacity development and training provisions;
- describe grievance redress procedures under the Project.

A.4.Category of Project

56. Based on the existing ADB Environmental Safeguards Policy (2009), this Project falls under ADB's project Category B. According to ADB SPS 2009 proposed project can be classified as Category B due to the following reasons:

- adverse environmental impacts are less adverse than those of category A projects;
- these impacts are site-specific, few if any of them are irreversible, and
- in most cases mitigation measures can be designed more readily than for category A projects.

57. An initial environmental examination is required for category B projects. A category is assigned to a project by its most sensitive component, therefore, all of the outputs and activities to be undertaken under the Project fall under Category B as well.

58. No EIA is required for Telavi WS project according to the Georgian legislation as it is not subject to the activities envisaged by the Annex I of Environmental Assessment Code which was adopted in June 2017 and the activities envisaged by the Annex II of the same Code, which will be subject to EIA on the basis of screening procedure set out in Article 7 of this Code.

59. Public consultations within the Telavi Water Supply Project was conducted in June 2017 and 27 May 2020. Minutes of the meeting, relevant photos and signed lists of participants are proposed in Annexes E, F and G of this report.

A.5. Project Proponent

60. The Ministry of Regional Development and Infrastructure is the Executing Agency and the "United Water Supply Company of Georgia", LLC is the Implementing Agency of the Investment Program. UWSCG is a 100% state-owned company.

A.6. Nature, size, and location of the Project

61. The City of Telavi is located in Kakheti region, 160 km eastwards from the capital Tbilisi, at 500-800 meters above the sea level. Tsiv-Gombri Range borders to the south and south-west of the city and Alazani Valley to the north and east. Population of town Telavi is approx. 21000 inhabitants. It is the administrative center of the region, connected with the capital by two highways and railroad. The town is one of the centers of Georgia's wine industry. Proper water supply is very important for Telavi to increase production of wine and other agricultural spheres. Telavi is attracted to tourists as well with its various landmarks and cultural heritages.

62. According to the preliminary design, the project measures for the New Telavi Water Supply System project will include the construction of:

    (i) Wells (8 existing, 3 new));

    (ii) New Transmission mains (length: ca. 1.450 km);

    (iii) Reservoirs (1 existing, 5 new);

    (iv) Distribution network (Length: 59,55 km); (v) Automation (SCADA).

63. The city water supply will be effectuated from both existing Headworks, from which the water is conveyed to existing treatment plant, and boreholes. The water will be accumulated in reservoirs placed at 7 different sites, from where the water will be supplied to distribution network. Considering the city terrain, the distribution network, according to pressure, is divided into seven zones.

64. All components of Telavi WS projects, including well fields and reservoirs will be built on the land plots located in Telavi and registered at the National Agency of Public Registry of the Ministry of Justice of Georgia under the ownership of UWSCG and therefore no additional land will be needed.

65. Based on preliminary design, all water pipes including transmission lines will be installed in trenches alongside the state-owned existing motor roads, which should not cause any loss of income or assets. No private land or household will be affected and will not to be acquired for the construction of the Project. There is also no population cultivating the proposed land for construction of Reservoir, well fields and water supply network.

A.7. Methodology applied

66. The methodology is based on the ADB SPS (2009) and the joint experience of the International and National environmental consultants involved in the IEE. It included following tasks:
    - to collect baseline data
    - to conduct public consultation
    - to assess impacts
    - to analyse alternatives
    - to conduct baseline analysis

67. Environmental assessment was made through desk studies and field visits, quantitative data were preferred where possible. Background data and information was obtained from published and unpublished sources, (e.g., on climate, topography, hydrology, geology and soils, natural resources, flora and fauna, agriculture, and socio-economic data).

A.8. Structure of the report

68. The report is organized to comply with ADB Safeguard Policies (2009) as follows:

- **Section A: Introduction** – The section in hand provides the introductory information about the Project.
- **Section B: Legal, Policy and Administrative Framework** - This section presents an overview of the policy/legislative framework as well as the environmental assessment guidelines of Georgia that apply to the proposed project. The section also identifies relevant Asian Development Bank Safeguard Policies that will apply.
- **Section C: Description of the Project –** Section C describes the Project and the need for the Project. A detailed scope of works is also provided indicating the type of engineering works required.
- **Section D: Analyses of Alternatives** - This section discusses various Project alternatives including the 'no project' option.
- **Section E: Description of the Environment** – This section of the report discusses the regional and local environmental baseline conditions.
- **Section F: Anticipated Environmental Impacts and Mitigation Measures** – Section F outlines the potential environmental impacts and proposes mitigation measures to manage the impacts.
- **Section G: Information Disclosure, Consultations and Participation -** Section G provides a summary of all of the stakeholder consultation activities undertaken.
- **Section H: Grievance Redress Mechanism** – A grievance redress mechanism for project affected persons is also provided along with information regarding the disclosure process.
- **Section I: Environmental Management Plan & Institutional Requirements** – This section provides the Environmental Management Plan and an Environmental Monitoring Plan for the design, construction and operational phases of the Project.
- **Section K: Conclusions and Recommendations** – The final section of the report provides the report conclusions and any necessary recommendations.

B. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

B.1. General

69. This section presents an overview of legal, policy and administrative framework of the subproject, including national requirements for environmental assessment and water resources management, as well as ADB's requirements that will be applicable to the subproject. The subproject will be required to comply with all applicable international agreements, national legislation, and ADB's requirements.

ADB Policy

70. Superseding the previous safeguard policies (the Involuntary Resettlement Policy, 1995, the Policy on Indigenous Peoples, 1998, and the Environment Policy 2002), ADB, has adopted a comprehensive Safeguard Policy Statement in 2009 (SPS, 2009). This Statement describes common objectives of ADB's safeguards, lays out policy principles, and outlines the delivery process for ADB's safeguard policy. It applies to all ADB-financed and administered projects, and their components including investment projects funded by a loan, grant or other means.

71. Aiming on promotion and sustainability of project outcomes by protecting the environment and people from projects' potential adverse impacts, the objectives of ADB's safeguards are to:

- avoid adverse impacts of projects on the environment and affected people, where possible;
- minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
- help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

72. The objective of environmental safeguards is to ensure the environmental sound- ness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. All ADB funded projects are screened at initial stages of preparation and categorized according to significance of the project's potential environmental impacts. Projects are assigned to one of the following three categories:

Category A - Projects likely to have significant adverse environmental impacts, which are irreversible, diverse or unprecedented and may affect an area larger than the lo- cation subject to physical works. An Environmental Impact Assessment is required.

Category B –. Projects with adverse environmental impacts that are less significant than those of Category A projects, are site-specific,

generally not irreversible, and in most cases can be mitigated more readily than for Category A projects. An Initial Environmental Examination (IEE) is required.

Category C - likely to have minimal or no adverse environmental impacts; EIA is not required.

73. The Telavi WS subproject has been classified as environmental assessment category B (some negative impacts but less significant than category A) according to the criteria laid down in the checklist for water supply projects of the ADB's Environmental Assessment and Review Framework (November 2010) that was especially prepared for the environmental assessment of the Georgia Urban Services Improvement Investment Program.

74. ADB Review and Approval. For Category B projects the Draft IEE report is re- viewed by ADB's Operational Department (in this case Central & West Asia Department) and after addressing their comments, if any, the EA then officially submits the IEE reports to ADB. Completed reports are made available on the ADB website.

Georgian Law

75. Environmental legislation of Georgia comprises the Constitution, environmental laws, international agreements, by-laws, presidential 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.

76. A table 1 below presents a list of Georgia's environmental legislation as it pertains to the proposed project.

Table 1: List of laws relevant to environmental protection

Framework Legislation	
1995	Constitution of Georgia (as amended 04.10.2013) Reg. No - 010.010.000.01.001.000.116
1996	Environmental Protection (as amended 26.12.2014) Reg. No - 360.000.000.05.001.000.184
Permitting Legislation	
2005	Licensing and Permitting (as amended 18.09.2014)
Specific Environmental Laws	
1994	Soil Protection (as amended 26.12.2014 ფ) Reg. No - 370.010.000.05.001.000.080
1996	System of Protected Ares (as amended 30.04.2014) Reg. No - 360.050.000.05.001.000.127
2007	on Status of the Protected Areas (as amended 30.04.2014) Reg. No - 360.050.000.05.001.003.060

Framework Legislation	
2014	Waste Management Code 26.12.2014 Reg. No -360160000.05.001.017608
1996	Minerals (as amended 26.12.2014) Reg. No - 380.000.000.05.001.000.140
1997	Wildlife (as amended 26.12.2014) Reg. No - 410.000.000.05.001.000.186
1997	Water Protection (as amended 26.12.2014) Reg. No - 400.000.000.05.001.000.253
1997	Transit and Import of Hazardous Waste within and into the Territory of Georgia as amended 11.03.2011) Reg. No - 300230000.05.001.016218
1998	Pesticides and Agrochemicals as amended 08.05.2012) Reg. No - 340120000.05.001.016723
1999	Atmospheric Air Protection as amended 5.02.2014) Reg. No - 420.000.000.05.001.000.595
1999	Forest Code as (amended 6.09.2013) Reg. No - 390.000.000.05.001.000.599
2003	Red List and Red Data Book of Georgia (as amended 6.09.2013) Reg. No - 360.060.000.05.001.001.297
Relevant Laws	
2007	On Cultural Heritage (as amended 26.12.2014) Reg. No - 450.030.000.05.001.002.815
2007	On Public Health (as amended 29.05.2014) Reg. No - 470.000.000.05.001.002.920
2005	On Fire Protection and Safety 24.06.2005 Reg. No - 140.060.000.05.001.000.355
2006	on Regulation and Engineering Protection of Coasts of Sea, Water Reservoirs and Rivers of Georgia – 27.12.2006 Reg. No - 330.130.000.11.116.005.130
2014	Technical Regulations: “on Drinking Water standard”. Approved by the Government decree № 58 Reg. No- 300160070.10.003.017676
2014	Environmental Technical Regulations. Approved by the Government decree № 17 Reg. No- 300160070.10.003.017608

77. Brief summaries of the listed documents are given below.

78. The basic legal document is “The Constitution of Georgia”, which was adopted in 1995. While the Constitution of Georgia does not directly address environmental matters, it does lay down the legal framework that guarantees environmental protection and public access to information with regard to environmental conditions.

79. Article 37, Part 3 states that “any person has the right to live in a healthy environment, use the natural and cultural environment. Any person is obliged to take care of the natural and cultural environment.” Article 37, Part 5 states that: “an individual has the right to obtain full, unbiased and timely information regarding his working and living environment.”

80. Article 41, Part 1 states that “a citizen of Georgia is entitled to access information on such citizen as well as official documents available in State Institutions provided it does not contain confidential information of state, professional or commercial importance, in accordance with the applicable legal rules.

81. **Environmental Assessment Code (EAC)** was adopted in June 2017 and entered into force from January 2018. The new code replaced law on Environmental Impact Permit and Ecological Expertise. Environmental Assessment Code sets up regulations and procedures for Environmental Impact Assessment, Strategic Environmental Assessment, Trans-boundary Environmental Assessment, Public Participation and Expertise in the Decision-Making Process. The EIA shall be subject to the activities envisaged by the Annex I of this Code and the activities envisaged by the Annex II of the same Code, which will be subject to EIA on the basis of screening procedure set out in Article 7 of this Code (Article 5 of Chapter 2).

82. **The Law of Georgia on Environment Protection (1996)** regulates the legal relations between the state establishments and physical or legal entities in the field related to the use of territorial waters, air space, including continental shelf and special economic zones, environmental protection and natural resources on the territory of Georgia. The Law regulates the standards of the environmental protection and issues of environmental management; it describes the economic sanctions, standards and issues of environmental impact, different issues of protection of the natural eco-systems and biodiversity, and global and regional management issues. In addition to the above-mentioned, the Law considers the major principles of waste management. The law defines the ecological requirements for the waste (Article 34). According to the provision of the given Article, an entrepreneur is obliged to reduce the origination of industrial, domestic and other types of waste, ensure their treatment, utilization, placement or burying by considering the environmental, sanitary-hygienic and epidemiological standards and rules. The Law defines the requirements for the placement of toxic, radioactive and other hazardous waste and prohibits their discharge in the surface water sources.

83. **The Law of Georgia on Licenses and Permits (2005)** defines the list of activities needing licenses or permits, including so called “Environmental Decision”. It also defines the requirements for the license or permit issue. The Law, together with the normative by-laws, regulates such organized activity or action, which relates to an indefinite circle of entities, is characterized by increased hazard to the human life or health, affects particularly important state or public interests or is related to the use of a state resource. The given Law regulates the field regulated by a license or permit; it gives a thorough list of licenses and permits, and establishes the rules to issue the licenses and permits, 28 makes amendments to them or abolish them. Under the Law, a state regulation of the activity or action through a license or permit is undertaken only when the given activity or action is directly associated with the increased hazard to the

human life or health or fields of state or public interests. The state regulation is undertaken only when the issuance of a license or permit is a real means to reduce the hazard in question or consider state or public interests. The aim and major principles of regulating the activity or action via licenses or permits are as follows:

- Provision and protection of human life and health
- Safety and protection of a human's residential and cultural environment
- Protection of state and public interests

84. The state ensures protection of the environment and, correspondingly, protection of water as its main component in **the Law of Georgia on Water (1997).** All residents of Georgia are liable to ensure the rational and sustainable use and protection of water. They have to prevent its contamination, pollution and depletion. The dumping of industrial, household and other garbage and wastes in water bodies is prohibited according to this act. The disposal of industrial, household and other effluents into water bodies is permitted on the basis of a license by the Ministry. With the objective of protecting the Black Sea and preserving its ecological system, all natural and legal persons (including foreigners) are obliged to take measures for preventing pollution of the sea with wastewater from the sources of pollution located on the land. The use of a surface water body for discharging industrial, communal-household, drainage and other wastewater is allowed only under a water use license issued on the basis of the Ministry-approved multipurpose water utilization plans and water management balance-sheet.

85. Under the law, purification of the waste water discharged in a water body is required up to the fixed standard. In order to protect the quality of water resources, the law requests creation of sanitary protection zone that consists of three belts, each having a special regime. The procedure fixing the water quality standards, the maximum permissible rates of emission of harmful substances (including microorganisms) into ambience, the water abstraction quotas, and the temporary rates (limits) of emission of harmful substances (including microorganisms) into water is defined by the Law of Georgia on the Environmental Protection.

86. Georgian legislation may provide liability for other violations of law in the water protection use sphere. Water users shall compensate for damages caused by violation of the law on Water in the amount and under procedure established by legislation of Georgia. Under Article 17 (Protection of natural resources of the Black Sea), anadromous fish species (fish species seasonally migrating upstream of a river against the current) within the rivers of Georgia shall be protected by creation of conditions necessary for their reproduction, through conservation of the habitat, determination of procedures for regulating the fishing industry, determination of a total permissible amount of catching these species within the territorial waters, and within and outside special economic zones of Georgia, also through implementation of other measures defined by the legislation of Georgia. Article 20 (River water protection zone) defines protection zone of a river shall be its adjacent territory, where a special regime is established to protect water resources from pollution, littering, fouling, and depletion. This zone may include its dry bed, adjacent terraces, natural elevated and steep riversides, as well as gullies directly adjacent to riversides. The width of a river water protection zone shall be measured in meters from the edge of a riverbed to both sides under the following procedure:

- 10 meters - in the case of a river up to 25 kilometres long,
- 20 meters - in the case of a river up to 50 kilometres long,
- 30 meters - in the case of a river up to 75 kilometres long,

- 50 meters - in the case of a river over 75 kilometres long.

87. Within this zone, it is prohibited to: (i) construct, expand or reconstruct functioning enterprises, except for cases directly determined by law; (ii) spray, by air atomization, perennial plants, sown crops, and forest lands with toxic chemicals; and (iv) keep, collect or place toxic chemicals and mineral fertilizers, as well as any other wastes as defined in the legislation of Georgia. It is requested that hydraulic structures located within a water protection zone shall be normally equipped with appropriate technical facilities to completely exclude the possibility of river pollution and littering.

88. The aim of new law on Waste Management – Waste Management Code (January 2015) – is to provide for the legal conditions for implementation of measures aiming at prevention of generation of waste and increased re-use, environmentally-sound treatment of waste (including recycling and extraction of secondary raw materials, energy recovery from waste, as well as safe disposal). The objective of this Law is to protect the environment and human health: by preventing and reducing the adverse impacts of the generation of waste; by introducing effective mechanisms of management of waste; by reducing damage caused by resource use and improving the efficiency of such use. In accordance with the new Waste Management Code in Georgia, any individual and legal entity that produces more than 200 tons of non-hazardous and/or more than 1,000 tons of inert waste or 120 kilograms of hazardous waste is required to prepare a waste management plan that must be submitted to Ministry of Environmental Protection and Agriculture of Georgia for approval. It is also necessary to identify an environmental manager and provide information to MEPA. The rule for collecting and processing municipal waste is determined by the Code, as well as the prohibitions related to the management of hazardous waste. The Code obliges to develop a system of segmentation and collection of hazardous waste in the case of the production of more than 2 tons of hazardous waste during the year.

89. The following summarizes the key points of the code.

Article 7 - General waste management requirements

- Waste, depending on its type, properties and composition, shall be collected, transported and treated in a manner not impeding its further recovery.
- Waste shall be collected, transported and treated in a manner which excludes, to the maximum extent possible, pollution of the environment and risks for human health.
- In case of waste pollution caused by waste transport activities, the waste transporter shall be responsible for taking clean up measures.
- The producer and holder of waste is obliged to treat their waste
- on their own or hand it over for collection, transport and treatment to persons entitled to carry out such operations in accordance with this Law and legislation of Georgia.
- Where waste has been submitted for recovery or disposal, the original producer's and/or holder's responsibility shall remain until recovery or disposal is completed.
- Persons who collect and transport waste shall hand it over for treatment to appropriate facilities, holding the relevant permit or registration.
- The burning of waste outside permitted incinerators shall be prohibited.

Article 14 - Company waste management plan

- Legal and natural persons that produce more than 200 tonnes of non-hazardous waste or 1000 tonnes of inert waste or any amount of hazardous waste annually, shall prepare a company waste management plan.

Article 15 – Environmental Manager

- The persons under Article 14 of this Law shall nominate a suitable person as a company environmental manager.

Article 17 - General obligations for hazardous waste management

- The production, collection and transportation of hazardous waste, as well as its storage and treatment, shall be carried out in conditions providing protection for the environment and human health. It shall be prohibited to
  a) discard hazardous waste outside waste collection containers;

  b) discharge it into the sewerage systems or underground or surface waters, including the sea;

  c) burn it outside waste incinerators permitted for that purpose;

  d) treat it outside waste treatment facilities permitted to treat such type of waste

Article 18 - Special obligations for hazardous waste management

- Waste producers that produce more than 2 tons of hazardous waste per year shall
  a) create and implement a suitable separation and collection system for such waste;

  b) designate an environmental manager, pursuant to Article 15 of this Law, responsible to make arrangements for the safe management of said waste;

  c) make arrangements for briefing and training for staff handling hazardous waste.

- Until the exact content of waste is unknown, the waste shall be regarded as hazardous.
- Hazardous waste for which no appropriate treatment techniques and/or technologies are available in accordance with the requirements of this Law within the territory of Georgia shall be exported for treatment. Until the export is carried out, the waste shall be safely stored at temporary storage facilities.
- The Ministry may exceptionally once allow for an extended storage period of up to one year if this is justified and does not harm human health or the environment.
- Hazardous waste may only be collected and transported by a natural or legal person after its registration pursuant to this Law.

Article 29 - Obligations for keeping records and reporting on waste

- Records on waste shall be kept and waste reports shall be submitted to the Ministry by natural and legal persons:
  a) dealing professionally with collection, transport and/or treatment of waste;

  b) which produced more than more than 2 tones non-hazardous (excluding municipal waste) waste or any amount of hazardous waste per year.

90. **The Law of Georgia on Cultural Heritage (2007).** Article 14 of the Law specifies the requirements for 'large-scale' construction works. According to this Article, a decision on career treatment and or extraction on the whole territory of Georgia, as well as on construction of an object of a special importance as it may be defined under the legislation of Georgia, is made by a body designated by the legislation of Georgia based on the positive decision of the Ministry of Culture and Monument Protection of Georgia. The basis for the conclusion is the archaeological research of the proper territory to be carried out by the entity wishing to accomplish the ground works. The entity wishing to do the ground works is obliged to submit to the Ministry the documentation about the archaeological research of the territory in question. The preliminary research should include field-research and laboratory works. In case of identifying an archaeological object on the territory to study, the conclusion of the archaeological research should contain the following information: (a) a thorough field study of the archaeological layers and objects identified on the study territory by using modern methodologies, (b) recommendations about the problem of conservation of the identified objects and planning of the building activity on the design territory, on the basis of the archaeological research.

91. **The Law of Georgia "On the Red List and Red Book" (2003)** regulates the legal relations in the field of developing the Red List and Red Book, protecting and using the endangered species, except the legal issues of the international trade with endangered wild animals and wild plants, which within the limits of the jurisdiction of Georgia are regulated by virtue of the Convention 'On the international trade with the endangered species of wild fauna and flora' concluded on March 3 of 1973 in the city of Washington. According to Article 10 of the Law, any activity, including hunting, fishing, extraction, cutting down and hay-mowing, except particular cases envisaged by the present Law, Law of Georgia 'On animal life' and legislation of Georgia, which may result in the reduction in number of the end. Endangered species, deterioration of the breeding area or living conditions, is prohibited. The Red List of Georgia was approved by the Presidential Decree No. 303 'On approving the Red List of Georgia' (May 2, 2006). The law defines special cases when removal of individuals of the Georgian Red List species from their habitats is allowed. Decisions are made by the Government of Georgia.

92. **The Forest Code (1999**) regulates the legal relations to the maintenance, protection, restoration and use of forest resources of Georgia. The Forest Code of Georgia aims to: maintenance, protection and restoration of forests for the maintenance and improvement of climate, water regulation, protective, cultural, recreational and other useful natural properties; It allows only those activities, which are related to forest resource protection or use such as timber logging, collection of non-timber resources, use of area for agriculture or recreation, establishment of hunting farms, etc. State forestry fund may be used for a special purpose in urgent cases. Decisions are made by the Government of Georgia.

93. **Law on Atmospheric Air Protection (1999)** regulates the protection of atmospheric air from the harmful anthropogenic influence on the entire territory of Georgia. The objective of the law is to ensure the safe environment for the atmospheric air of human health and the natural environment. Four types of pollution are considered (Part II, Chapter IV, Article II.2): (i) Pollution of environment with hazardous matter; (ii) Radiation pollution of atmospheric air; (iii) Pollution with microorganisms and biologically active matter of microbial origin; and (iv) Noise, vibration, electromagnetic fields, and other physical impact. Maximum permitted limits for concentration of hazardous substances into the atmospheric air are defined for each contaminant and represent maximum concentration of hazardous pollutants, in averaged time span, recurring action of which has not have negative impact on human health and environment. Maximum permitted levels of emission of hazardous matters into the atmospheric air are defined with allowance of prospective of development of the enterprise, physical, geographical and climatic conditions, dispersion of emitted substances, background concentration of pollutants emitted from other neighboring enterprises, taking into account inter-location of existing or planned dwellings, sanatoria and recreation zones. In compliance with the law (Clause 28), in order to restrict pollution from the stationary sources21 of hazardous emissions the limits of emissions are to be set. The limit of pollution from the stationary source of emission is permitted quantity (mass) of emitted hazardous matters (Clause 29). Maximum annual emission level means the maximum permitted limit of discharge. This is annual permitted quantity of emission predetermined by technology in conditions of standard permitted capacity of discharge. Annual maximum capacity is defined for each hazardous substance and is calculated so that for each stationary source of emission cumulative emission from all registered sources of discharge does not exceed relevant maximum permitted value. Discharge of hazardous emissions from the stationary sources of emission without approved limits of discharge is forbidden. The standards of emissions (Clause 30) are to be worked out by the enterprise itself. According to the law (Clause 38) the enterprise is responsible for conducting self-monitoring which includes measurement of emission (evaluation), recording/registration and accounting. Emission which has not been recorded in self-monitoring record is considered illegal. As mentioned in the Clause 51 results of the monitoring and information on pollution of the air with hazardous substances is transparent and accessible for the public.

94. The aim of the **Law of Georgia on Public Health (2007)** is as follows: Promotion of the introduction of a good health and healthy lifestyle of the population; Creation of the environment, which is safe for a human health; Promotion of the protection of the reproductive health of a family; Prevention of infectious and non-infectious diseases. The Law defines the rights and obligations of the population and legal entities in the field of public health. Aiming at establishing the environment safe to the public health, the Ministry sets the qualitative standards for the environment safe for a human health (atmospheric air, water, soil, noise, vibration, electromagnetic radiation), including maximum permissible concentrations and rates of harmful impact. The standards are mandatory. Every person on the territory of Georgia is obliged not to carry out the activity, which causes a hazard of the infectious and non-infectious diseases to spread and helps the origination of the risks to human health; protect the sanitary and epidemiological standards; to supply the information to the public health department about all emergencies caused by the violation of the sanitary norms in the production or technological process, etc. The observance of the standards is controlled by appropriate state structures. The responsibility for the internal and external audits rests with a certified, independent laboratory.

95. **Law on Soil Protection:** The law provides the policy requirements and principles of the protection and preservation of fertility soil resources against negative impacts. Soil protection is the state problem since correct and rational use of all types of soil,

including barren soil, saline soils, swamped soil, alkali soil, and aqueous soil are the main reserve of dynamic development of agriculture and of the national economy as a whole. The purpose of the present Law is to establish the rights and the duties of landholders, landowners, and the state in the field of soil protect. The law defines soil protection measures and methods and prohibits certain activities, e.g. use of fertile soil for non-agricultural purposes; implementation of non-agricultural activity without topsoil removal and conservation; any activity, which results in deterioration of soil properties, etc. In addition to this law soil protection issues are regulated by order #2-277 (25.11.2005) of the Minister of Agriculture on approving Recommendations for Complex Measures for Soil Protection from the Erosion.

96. Laws and regulations related to social aspects and land ownership applicable to the project are presented below.

97. **Law on Agricultural Land Ownership.** Objective of the law is to ensure improvement of the structure of agricultural land based on rational use of resources, avoidance of splitting and unsustainable use of the land plots. The law defined the rules for acquisition and selling the land, participation of the state in agricultural land related relations. The law deals with land ownership issues, restrictions of land alienation in case of co-ownership, sets priority of the state in buying out the agricultural land plots.

98. **Civil Code** regulates contractual relations, describes the rights and responsibilities of natural and legal persons, defines the penalties in the case of violations of the requirements set out in the document. The Civil Code differentiates between movable and immovable property and provides rules for acquiring title over property, as well as any proprietary or obligatory rights thereto. This piece of legislation must be taken into account when entering into contracts in Georgia.

99. **Law on Rules for Expropriation of Property for Public Needs** outlines respective procedures and conditions for expropriation of private property as well as procedures for compensation payment for expropriated property or the transfer of other property with the same market value.

100. **Law on Cultural Heritage** sets out procedures for protection of cultural heritage and permitting arrangements for archaeological investigations.

101. **Law on Public Health** regulates legal relations for ensuring a safe environment for human health. It indicates quality norms of for air, soil and water pollution and restrictions related to ionized radiation, noise, and vibration. The limits must be complied with. Section 7 of the law is dedicated to safety of technological processes.

102. **Law on State Property** regulates relationships on state property management and transfer for use by others, defines special requirements and procedures for transfers. The Ministry of Economy and Sustainable Development is the state authority in charge of the property.

103. **Labor Code** regulates employment relations, unless such relations are otherwise regulated by international treaties that have been implemented in Georgia. Employers are obliged to comply with requirements and clauses of the document for the purpose of ensuring that the rights of employees are protected.

104. **Law of Georgia on Labor Safety** define basic requirements and preventive measures in terms of workplace safety for the employers. The Law applies to jobs considered to be of increased danger, hard, harmful and hazardous. The employer's compliance with the labor safety regulations in Georgia are overseen by the Ministry of Health, Labor

and Social Affairs of Georgia through its respective departments.

105. **Environmental Assessment and Review Framework** (November 2010, updated in November 2013 due to changes in the scope of the USIIP, EARF) was established for the Asian Development Bank funded Georgia Urban Services Improvement Investment Program (or the Investment Program). This is prepared to adequately address the ADB Safeguard Policy Statement (2009) requirements and is to be endorsed by the Georgian government. Projects have to be assigned to Categories A, B, and C. General Mitigation measures are listed for anticipated impacts.

B.1.2 Environmental Regulations and Standards

106. Project will be implemented in compliance with the national regulations and also in line with the ABD SPS 2009 requirements. Therefore, more stringent requirements of the two are applicable. Georgia has a large set of specific standards that refer to emission, effluent, and noise standards, as well as standard to handle and dispose specific wastes ranging from sewage to hazardous wastes. The following summarizes these laws and standards along with IFC and EU standards.

B.1.2.1. Ambient Air Quality Standards

107. In accordance with the Law of Georgia on Public Health, the environmental qualitative norms are approved by Decrees of the Minister of Labor, Health and Social Affairs of Georgia (Decrees Nos. 297/N of 16.08.2001, including the changes made to it by further decrees of the Ministry Nos. 38/N of 02.24.2003, 251/N of 09.15.1006, N of 12.17.2007). The quality of atmospheric air (pollution with hazardous matter) is also defined by the order of the Minister of Environment Protection and Natural Resources (#89, 23 October 2001) on approval of the rule for calculation of index of pollution of atmospheric air with hazardous pollution.

108. Georgian and IFC guidelines for ambient air quality guidelines are presented in Table 2 and Table 3.

Table 2: Georgian Standards for Ambient Air Quality

Parameter	**Maximum Permissible Concentration (MAC) mg/m^3 average time**
Nitrogen Dioxide	0.085/30 minutes
	0.04/24 hours
Sulphur Dioxide	0.5/30 minutes
	0.05/24 hours
Carbon oxide	5.0/30 minutes
	3.0/24 hours
Inorganic Dust	0.5

Table 3: IFC Ambient Air Quality Guidelines

Parameter	**Averaging Period**	**Guideline value in µmg/m^3**
Sulphur dioxide (SO_2)	24-hour	125 (Interim target-1)

Parameter	Averaging Period	Guideline value in µmg/m^3
		50 (Interim target-2)
		20 (guideline)
	10 minute	500 (guideline)
Nitrogen dioxide (NO_2)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM_{10}	1-year	70 (Interim target-1)
		50 (Interim target-2)
		30 (Interim target-3)
		20 (guideline)
	24-hour	150 (Interim target-1)
		100 (Interim target-2)
		75 (Interim target-3)
		50 (guideline)
Particulate Matter $PM_{2.5}$	1-year	35 (Interim target-1)
		25 (Interim target-2)
		15 (Interim target-3)
		10 (guideline)
	24-hour	75 (Interim target-1
		50 (Interim target-2)
		37.5 (Interim target-3)
		25 (guideline)
Ozone	8-hour daily	160 (Interim target-1)
	maximum	100 (guideline)

Note: World Health Organization (WHO) Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile. Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

109. In general, Georgian standards for ambient air correspond to international IFC/WB standards, however in relation with particular substances there can be minor differences and in that case more stringent standards are applicable.

B.1.2.2.Noise Standards:

110. Admissible noise standards of the IFC and Georgian national standards for residential areas are similar. The national standards for noise are set according to the Technical regulation – Acoustic noise limits for rooms/premises in residential houses and public establishments (Document #300160070.10.003.020107, Date 15/08/2017) see Table 4.

111. For IFC noise impacts should not exceed the levels presented in Table 4 or result in a maximum increase in background levels of 3 decibels (dB) at the nearest receptor location off site. This project will comply with both IFC Guidelines and Georgian Standards. Note that Georgian standards refer to the allowable limits indoors, not at the building façade.

Table 4: Georgian Standards for Noise Levels

Purpose/use of area and premises	**Allowable limits (A-Weighted Decibels (dBA))**		
	L_{day}		**23:00 – 08:00 L_{night}, Night**
	08:00 - 19:00, Day	**Evening 19:00-23:00**	
Educational facilities and library halls	35	35	35
Medical facilities/chambers of medical institutions	40	40	40
Living quarters and dormitories	35	30	30
Hospital chambers	35	30	30
Hotel/motel rooms	40	35	35
Trading halls and reception facilities	55	55	55
Restaurant, bar, cafe halls	50	50	50
Theatre/concert halls and sacred premises	30	30	30
Sport halls and pools	55	55	55
Small offices (≤100m^3) – working rooms and premises without office equipment	40	40	40
Small offices (≤100m^3) – working rooms and premises without office equipment	40	40	40
Conference halls /meeting rooms	35	35	35
Areas bordering with houses residential, medical establishments, social service and children facilities (<6 story buildings)	50	45	40
Areas bordering with houses residential, medical establishments, social service, and children facilities (>6 story buildings)	55	50	45
The areas bordering with hotels, trade, service, sport, and public organizations	60	55	50

Note: 1. in case noise generated by indoor or outdoor sources is impulse or tonal, the limit must be 5dBA les than indicated in the table.
2. Acoustic noise limits given above are set for routine operation conditions of the 'space', i.e. windows and door are closed (exception – built-in ventilation canals), ventilation, air conditioning, lighting (in case available) are on; functional (baseline) noise (such as music, speech) not considered.

Table 5: IFC Noise Level Guidelines

Receptor	One-hour L_{aeq} (dBA)	
	Daytime 07.00-22.00	**Night-time 22.00 – 07.00**
Residential; institutional; educational	55	45
Industrial; commercial	70	70

112. For workplace noise the following IFC standards are applicable.

Table 6: IFC Environnent Noise limites

Type of Work, workplace	IFC General EHS Guidelines
Heavy Industry (no demand for oral communication)	85 Equivalent level Laeq,8h
Light industry (decreasing demand for oral communication)	50-65 Equivalent level Laeq,8h

113. For baseline monitoring, and construction and operational phase noise assessment, IFC guideline limits will be followed. For workplace noise, IFC guidelines shall be followed.

B.1.2.3. Vibration Standards

114. The Georgian Standards for vibration are designed for human comfort. These are shown in table 7. Note that no Georgian standards for building damage exist.

Table 7: Georgian General Admissible Vibration Values in Residential Houses, Hospitals and Rest Houses, Sanitary Norms 2001

Average Geometric Frequencies of Octave Zones (Hz)	Allouable Values X0, Y0, Z0			
	Vibro-acceleration		Vibro-speed	
	m/sec^2	dB	m/sec 10^{-4}	dB
2	4.0	72	3.2	76
4	4.5	73	1.8	71
8	5.6	75	1.1	67
16	11.0	81	1.1	67
31.5	22.0	87	1.1	67
63	45.0	93	1.1	67

Average Geometric Frequencies of Octave Zones (Hz)	Allouable Values X0, Y0, Z0			
	Vibro-acceleration		Vibro-speed	
	m/sec^2	dB	m/sec 10^{-4}	dB
Corrected and equivalent corrected values and their levels	4.0	72	1.1	67

Note: It is allowable to exceed vibration normative values during daytime by 5 dB during daytime In this table of inconstant vibrations, a correction for the allowable level values is 10dB, while the absolute values are multiplied by 0.32. The allowable levels of vibration for hospitals and rest houses have to be reduced by 3dB.

115. The American Association of State Highway and Transportation Officials (AASHTO) (1990) identifies maximum vibration levels for preventing damage to structures. Table 8 summarizes the maximum levels.

Table 8: AASHTO Maximum Vibration Levels for Preventing Damage

Type of Situation	Limiting Velocity (in/sec)
Historic sites or other critical locations	0.1
Residential buildings, plastered walls	0.2-0.3
Residential buildings in good repair with gypsum board walls	0.4-0.5
Engineered structures, without plaster	1.0-1.5

116. German Standard DIN 4150-3 will be followed during the construction phase.

B.1.2.4. Soil Quality

117. In Georgia, soil quality evaluation criteria are determined by instructions on “Level of Chemical Contamination of Soil” (MM 2.1.7. 004-02). Information on maximum admissible concentrations of various substances and elements in soils are given in the Table 9.

Table 9: Maximum admissible concentrations of various substances and elements in soils

Component	Unit	Level	IFC
Arsenic	mg/kg	2-10	There are no detailed numerical requirements to soil quality established
Copper	mg/kg	3	
Mercury	mg/kg	2.1	
Nickel	mg/kg	4	
Lead	mg/kg	32	
Zinc	mg/kg	23	
Compound Hydrocarbons	mg/kg	0.1	
Phenol	mg/kg	-	

(Compound)			by IFC's guidance documents
Cyanide	mg/kg	-	
Sulphate	mg/kg	-	
Chloride	mg/kg	-	
Ammonium Nitrogen	mg/kg	-	
Evaporable Organic Compounds			
Benzoyl	mg/kg	0.3	
Toluol	mg/kg	0.3	
Ethylbenzene	mg/kg	-	
Compound Xylene (ortho,meta, para)	mg/kg	0.3	
semi-Evaporable Compounds			
Benzoapiren	mg/kg	0.02	
Izopropilen-benzol	mg/kg	0.5	
Pesticides			
Atrazin	mg/kg	0.5	
Linden	mg/kg	0.1	
DDT (and its metabolite)	mg/kg	0.1	

B.1.2.5. Water Quality Standards

118. **Groundwater quality standards**: Georgian legislation does not regulate quality standards for groundwater. Quality of groundwater is regulated by norms set for potable water.

119. Potable water quality criteria are determined by technical regulations on potable water (Government Regulation N 58 from January 15, 2014 Potable water quality criteria are given in Table 10.

Table 10: Potable Water Criteria

Index	Measuring unit	Standard not more than:	WHO[1]
Common characteristics			
Hydrogen index	PH	6-9	6.5-8.5
Permanganate oxidation	mg O2 /L	3,0	
Nonorganic substance			
Barium (Ba^{2+})	mg/L	0.7	0.7
Boron (B,total)	mg/L	0.5	2.4

[1] WHO, Guideline for drinking-water quality, Fourth Edition, 2017

Index	Measuring unit	Standard not more than:	WHO[1]
Arsenic (As,total)	mg/L	0.01	0.01
Quicksilver (Hg, nonorganic),	mg/L	0.006	-
Cadmium (Cd, total)	mg/L	0.003	0.003
Mangan (Mn, total)	mg/L	0.4	-
Molibden (Mo, total)	mg/L	0.07	-
Nickel(Ni, total)	mg/L	0.07	0.07
Nitrate(short impact by NO^-_3)	mg/L	50	-
Nitrite (long impact by NO^-_2)	mg/L	0.2	-
Selenium(Se, total)	mg/L	0.01	0.04
Copper(Cu, total)	mg/L	2.0	2.0
Lead (Pb, total)	mg/L	0.01	0.01
Flourine (F^-)	mg/L	0.7	-
Chromium (Cr^{6+})	mg/L	0.05	0.05
Antimony(Sb)	mg/L	0.02	0.02
Cyanide(CN^-)	mg/L	0.07	0
Organic substance			
Total content of pesticides	mg/L	O,05	

Surface Water Quality Standards

120. The values of Maximum Admissible Concentrations of the harmful substances in surface are provided in the Environmental Quality Norms approved by the Order #297N (16.08.2001) of the Ministry of Labor, Health and Social Protection (as amended by the Order No 38/n of the same Ministry of 24.02.2003). The categories are: (a) For centralized or decentralized drinking water supply, as well as for food industry enterprises; (b) for swimming, sports and recreation purposes. However certain parameters are not specified in the national standards for these IFC Guidelines are being used as shown in the Table 11 below.

Table 11: Applicable Standards for Surface Water Quality

Parameter	Maximum Permissible concentration	Source
pH	6.5-8.5	National
Diluted Oxygen, mg/l	4-6	National
BOD5, mg/l	30	IFC
COD, mg/l	125	IFC
Total Nitrogen, N, mg/l	10	IFC
Total Phosphate, mg/l	2	IFC
Chlorides, mg/l	350	National
Oil Products, mg/l	0.3	National
Zinc (Zn^{2+})	1g/kg	National
Lead (Pb total)	23.0	National

Parameter	Maximum Permissible concentration	Source
Chrome (Cr^{6+})	32.0	National
Cadmium (Cd, total)	6.0	National
Total Suspended Solids, mg/l	50	IFC

121. Quality requirements depend on category of water body (ref. Technical regulations of protection of surface water from pollution, approved by decree #425 of the government of Georgia, 31/12/2013). The categories are: (a) household water use; (b) domestic water use; and (c) fisheries. The latter, in its turn, splits in highest, first and second categories.

Table 12: Water Quality Requirements By Water Use Category

<table>
<tr><th rowspan="3"></th><th colspan="4">Water use category</th></tr>
<tr><th rowspan="2">Household water use</th><th rowspan="2">Domestic water use</th><th colspan="2">Fisheries</th></tr>
<tr><th>Highest and first</th><th>Second</th></tr>
<tr><td></td><td colspan="4">Increase not higher that listed below is allowed</td></tr>
<tr><td rowspan="3">Suspended solids</td><td>0.25 mg/l</td><td>0.75 mg/l</td><td>0.25mg/l</td><td>0.75 mg/l</td></tr>
<tr><td colspan="4">For rivers with natural content of suspended solids 30mg/l, around 5% increase is allowed</td></tr>
<tr><td colspan="4">If waste water contains suspended particles with deposition rate above 0.2mm/sec discharge in water reservoirs is not allowed. Discharge of effluents containing suspended particles with deposition rate above 0.4mm/sec is prohibited.</td></tr>
<tr><td>Floating matter</td><td colspan="4">Patches and films of oil, petroleum products, fats must not be detectable</td></tr>
<tr><td rowspan="2">Colour</td><td colspan="2">Must not be visible in water column</td><td colspan="2">Water must not have unusual colour</td></tr>
<tr><td>20 cm</td><td>10 cm</td><td colspan="2">-</td></tr>
<tr><td rowspan="2">Odour, taste</td><td colspan="2">Water must not have odour and taste of higher than 1-unit intensity</td><td colspan="2">Water must not result in unusual odour and taste in fish</td></tr>
<tr><td>After chlorination of other treatment</td><td>Without treatment</td><td colspan="2">-</td></tr>
<tr><td>Temperature</td><td colspan="2">After discharge of waste water, temperature in water reservoir must not exceed by more than 5 percent compared to the natural value</td><td colspan="2">For water bodies where cold water lowing fish is found (Acipenseridae, Coregonidae) maximum allowable temperatures in summer and winter are 20°C and 5°C respectively, for other water bodies 28°C (in summer), 8°C (in winter)</td></tr>
<tr><td>pH</td><td colspan="4">Must be in 6.5 - 8.5 interval</td></tr>
<tr><td>Water mineralisation</td><td><1000mg/l,

Incl. chlorides – 350mg/l;</td><td>To comply with requirement given in section related to taste</td><td colspan="2">In accordance with taxation</td></tr>
</table>

	Water use category			
	Household water use	**Domestic water use**	**Fisheries**	
			Highest and first	**Second**
	sulphates - 500mg/l	(see above)		
Dissolved oxygen	Must not be lower than			
	4 mg/l	4 mg/l	6 mg/l	6 mg/l
Biological oxygen demand	At 20°C must not exceed			
	3 mg/l	6 mg/l	3 mg/l	6 mg/l
Chemical oxygen demand	Must not exceed			
	15 mg/l	30 mg/l	-	-
Chemical substances	Must not exceed maximum permissible limits			
Pathogens	Must be free for pathogens, including viable helmint eggs, tenia oncosperes and viable cysts of pathogen organisms			
Toxicity	-	-	At the point of discharge and control section of the river toxic impact must not be observed.	

Sanitary Wastewater

122. Sanitary wastewater from industrial facilities may include effluents from domestic sewage, food service, and laundry facilities serving site employees. Miscellaneous wastewater from laboratories, medical infirmaries, water softening etc. may also be discharged to the sanitary wastewater treatment system. Recommended sanitary wastewater management strategies include:

- Segregation of wastewater streams to ensure compatibility with selected treatment option (e.g. septic system which can only accept domestic sewage);
- Segregation and pre-treatment of oil and grease containing effluents (e.g. use of a grease trap) prior to discharge into sewer systems;
- If sewage from the industrial facility is to be discharged to surface water, treatment to meet national or local standards for sanitary wastewater discharges or, in their absence, the indicative guideline values applicable to sanitary wastewater discharges shown in Table 13;

123. If sewage from the industrial facility is to be discharged to either a septic system, or where land is used as part of the treatment system, treatment to meet applicable national or local standards for sanitary wastewater discharges is required. Sludge from sanitary wastewater treatment systems should be disposed in compliance with local regulatory requirements, in the absence of which disposal has to be consistent with protection of public health and safety, and conservation and long term sustainability of water and land resources. It should be mentioned also that the most stringent standards will apply during construction.

Table 13: Indicative Values for Treated Sanitary Sewage Discharges

Pollutant	Unit	Standards		
		GEO	WB	EU
pH	pH	6-9	6-9	
Biochemical oxygen demand (BOD)	mg/l	35	30	25
Chemical Oxygen Demand (COD)	mg/l	125	125	125
Total Phosphorus	mg/l	2	2	2
Total Nitrogen	mg/l	15	10	15
Total Suspended Solids	mg/l	60	50	35
Coliform bacteria	[1]MPN[b]/100ml		400[a]	

124. Baseline and construction phase water quality monitoring will be assessed against national standards.

125. Waste water discharge from construction sites and yards shall be assessed against IFC values (for any treated sanitary sewage discharge).

B.1.3.Licenses & Approvals Required

126. Environmental Assessment Code was adopted in June 2017 and entered into force from January 2018. The new code replaced law on Environmental Impact Permit and Ecological Expertise. Environmental Assessment Code sets up regulations and procedures for Environmental Impact Assessment, Strategic Environmental Assessment, Trans-boundary Environmental Assessment Public Participation and Expertise in the Decision-Making Process. The EIA shall be subject to the activities envisaged by the Annex I of this Code and the activities envisaged by the Annex II of the same Code, which will be subject to EIA on the basis of screening procedure set out in Article 7 of this Code (Article 5 of Chapter 2).

127. Some of the International Treaties and Conventions Ratified or Signed by Georgia are provided in the list below:

- Short List of the Ratified or Signed Conventions:
- Ramseur Convention on Wetlands (1996);
- United Nations Framework Convention on Climate Change (UNFCC) (1994);
- Kyoto Protocol (1994);
- Kyoto Protocol (1999);
- Basel Convention on the Control of Transboundary Movement of Hazardous Waste and Their Disposal (1999);
- Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) (1999);
- Convention on Biological Diversity (1994);

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1996);
- Convention on Long-range Trans boundary Air Pollutants (1999);
- Stockholm Convention on Persistent Organic Pollutants (2006);
- Convention on the Conservation of European Wildlife and Natural habitats (2008);
- The Vienna Convention for the Protection of the Ozone Layer (1995);
- Montreal Protocol on Substances that Deplete the Ozone Layer (1995).

B.2 ADB Policy

128. Superseding the previous safeguard policies (the Involuntary Resettlement Policy, 1995, the Policy on Indigenous Peoples, 1998, and the Environment Policy 2002), ADB, has adopted a comprehensive Safeguard Policy Statement in 2009 (SPS, 2009). This Statement describes common objectives of ADB's safeguards, lays out policy principles, and outlines the delivery process for ADB's safeguard policy. It applies to all ADB-financed and administered projects, and their components including investment projects funded by a loan, grant or other means.

129. Aiming on promotion and sustainability of project outcomes by protecting the environment and people from projects' potential adverse impacts, the objectives of ADB's safeguards are to:

- avoid adverse impacts of projects on the environment and affected people, where possible;
- minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is not possible; and
- help borrowers/clients to strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

130. The objective of environmental safeguards is to ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process. All ADB funded projects are screened at initial stages of preparation and categorized according to significance of the project's potential environmental impacts. Projects are assigned to one of the following three categories:

Category A - Projects likely to have significant adverse environmental impacts, which are irreversible, diverse or unprecedented and may affect an area larger than the location subject to physical works. An Environmental Impact Assessment is required.

Category B –.Projects with adverse environmental impacts that are less significant than those of Category A projects, are site-specific, generally not irreversible, and in most cases can be mitigated more readily than for Category A projects. An Initial Environmental Examination (IEE) is required.

Category C - likely to have minimal or no adverse environmental impacts; EIA is not required.

131. The Telavi WS subproject has been classified as environmental assessment category B) according to the criteria laid down in the checklist for water supply projects of the ADB's Environmental Assessment and Review Framework (November 2010, Updated in May 2015) that was especially prepared for the environmental assessment of the Georgia Urban Services Improvement Investment Program.

132. ADB Review and Approval. For Category B projects the Draft IEE report is reviewed by ADB's Operational Department (in this case Central & West Asia Department) and after addressing their comments, if any, the EA then officially submits the IEE reports to ADB. Completed reports are made available on the ADB website.

B.3 Comparison of the National legislation and ADB Requirements

133. The above accounts of national environmental low and ADB policy indicate that the two systems are similar but then there are some aspects in which ADB policy is more specified than the Georgian procedure. The main differences are as follows.

134. Considering ecological risk, cultural heritage, resettlement and other factors, the Bank classifies projects supported by them under categories A, B, C and FI. In the Georgian legislation, EIA is carried out within the scope of the activities provided for by Annex I to the New Environmental Assessment Code, and of the activities provided for by the Annex II to the same Code, according to a screening decision. Asian Development Bank guidelines requires EIA for category A projects, IEE for the B category projects, and an environmental review of projects that are not expected to produce environmental impacts (category C), while According to the Georgian legislation IEE is not required.

135. Georgian legislation does not specify the format of environmental management plans as well (EMPs) and the stage of their provision for projects requiring EIA and does not require EMPs for projects not requiring EIAs. The Asian Development Banks guidelines requires EMPs for all categories of projects and provides detailed instructions on the content.

136. According to Georgian legislation MEPA is responsible for monitoring of project implementation and compliance with the standards and commitments provided in the EIA, and the role of the EMP is less clearly is defined. The IPMO or "Project Proponent" is responsible for implementing "self-monitoring" programs for projects requiring EIA. In contrast ADB guidelines stress the role of EMPs, which are important for all categories of projects, and the Project Proponent (in our case – UWSCG) is required to ensure inclusion of a monitoring scheme and plans into EMPs. Monitoring of performance compliance against EMPs is important element of ADB requirements.

137. The national legislation also does not take into account the issue of involuntary resettlement at any stage of environmental permit issuance. The Georgian legislation considers social factors only in regard to life and health safety (e.g. if a project contains a risk of triggering landslide, or emission/discharge of harmful substances or any other anthropogenic impact). While the Bank's document establishes the responsibility of a Borrower for conducting an environmental assessment, the national legislation provides for the responsibility of a project implementing unit to prepare EIA and ensure public consultation.

138. Ministry is participating in public consultation required for the adoption of a decision on issuing an EIA permit as established under the new Code of Georgia. ADB carry out project screening and categorization at the earliest stage of project preparation when sufficient information is available for this purpose, also according ADB's Public

Communications Policy, ADB is committed to working with the borrower/client to ensure that relevant information (whether positive or negative) about social and environmental safeguard issues is made available in a timely manner.

139. In regard with consultation: The Bank provides for consultations for A and B Category projects (at least two consultations for Category A projects) and requires a timetable of consultations from the Borrower. The national legislation until recently contained only a brief reference to this issue without providing real tools of its fulfillment.

140. The Bank's guidelines provide a detailed description of procedures for screening, scoping and conducting EIA and explain a complete list of stages, which are not specified under the national legislation.

141. The Environmental Assessment Code, which was adopted in June 2017 and entered into force in January 2018 includes screening, scoping, preparing an EIA report, public participation, carrying out consultations and preparing an expert opinion on the basis of the evaluation of the results obtained, and taking account of the expert opinion in issuing an environmental decision under this Code and/or a respective enabling administrative act as provided for by the legislation of Georgia.

142. Environmental impact assessment falls within the scope of the activities provided for by Annex I to this Code, and of the activities provided for by the Annex II to the same Code, according to a screening decision.

143. Screening Stage: A person carrying out activities shall, as early as possible at the stage of planning an activity, submit to the Ministry an application for the screening of the planned activity and obtain from the Ministry a decision on whether the planned activity is subject to an EIA

144. Within three days after a screening application has been registered, the Ministry shall have the application placed on its official website and on the notice board of the executive body and/or representative body of a respective municipality, and upon request, shall make a printed copy available under a procedure established by the legislation of Georgia. The public may, within seven days after the screening application has been placed on the website and the notice board, submit to the Ministry opinions and comments with respect to the application under the procedure established by Article 34(1) of this Code. The Ministry shall review the opinions and comments submitted by the public and, if there are appropriate grounds, shall take them into account when making a decision on the screening.

145. Scoping Stage: A person carrying out activities shall, as early as possible at the stage of planning an activity, file with the Ministry a scoping application along with a scoping report.

146. Within three days after a scoping application has been registered, the Ministry shall have the scoping application and the scoping report placed on its official website and on the notice board of the executive body and/or representative body of a respective municipality, and upon request, shall make printed or electronic copies available under a procedure established by the legislation of Georgia.

147. The public may, within 15 days after the placement of the scoping application submit to the Ministry opinions and comments with respect to the scoping report. When issuing the scoping opinion, the Ministry shall ensure a review of the opinions and comments submitted by the public and, if there are appropriate grounds, take them into account.

148. Not earlier than the 10th day and not later than the 15th day after the placement of the scoping application under the procedure established by Article 8(2) of this Code, the Ministry shall ensure the holding of a public review of the scoping report. The Ministry shall be responsible for organizing and holding public reviews. Public reviews shall be led, and the minutes of public reviews shall be drafted, by a representative of the Ministry. Information on the public review shall be published not later than 10 days before the public review is held, in accordance with Article 32 of this Code. Public reviews shall be open and any member of the public may participate in them.

149. After the Ministry approves the scoping opinion, the person carrying out activities and/or an adviser shall ensure the preparation of an EIA report. The person carrying out activities shall ensure the reimbursement of the costs necessary for preparing an EIA report. the Ministry shall have EIA information on its official website and on the notice board of the executive body and/or representative body of a respective municipality.

150. The public may, within 40 days after the placement of the application, submit to the Ministry opinions and comments under the procedure established by Article 34(1) of this Code with respect to the EIA report, the planned activity and the conditions to be included in the environmental decision. When making an environmental decision or a legal act refusing the carrying out of the activity, the Ministry shall ensure the review of the opinions and comments submitted and, if there are appropriate grounds, take them into account.

151. Not earlier than the 25th day and not later than the 30th day after the placement of the application under the procedure established by Article 11(3) of this Code, the Ministry shall hold a public review of the EIA report. The Ministry shall be responsible for organizing and holding reviews. Public reviews shall be led, and the minutes of public reviews shall be drafted, by a representative of the Ministry. The Ministry shall be responsible for the accuracy of the minutes. Information on the public review shall be published not later than 20 days before the public review is held, in accordance with Article 32 of this Code.

152. Not earlier than the 51st day and not later than the 55th day after the registration of an application for obtaining an environmental decision, the Minister shall issue an individual administrative act on the issuance of an environmental decision or, if there exist grounds provided for by Article 14 of this Code, on the refusal of the carrying out of the activity. When making environmental decisions, the guideline document on Environmental Impact Assessment may be used.

Table 14: Activities and responsibilities in IEE/EIA for national law and ADB policy

#	Action	Georgian Legislation	ADB Requirements
1	Screening	Consultant hired by Project Proponent	Bank and Consultant hired by Project Proponent
2	Scoping	Consultant hired by Project Proponent.	Obligatory. Bank and Consultant hired by Project Proponent
3	Draft IEE/EIA	To be prepared by Environmental Consultant.	To be prepared by Environmental Consultant.

#	Action	Georgian Legislation	ADB Requirements
4	Public Consultations	Not earlier than the 25th day and not later than the 30th day after the placement of the application under the procedure established by Article 11(3) of this Code, the Ministry shall hold a public review of the EIA report. Public reviews shall be led, and the minutes of public reviews shall be drafted, by a representative of the Ministry. Information on the public review shall be published not later than 20 days before the public review is held, in accordance with Article 32 of this Code.	At least two consultations for Category A projects – one at the scoping stage and one for the draft EIA. The borrower/client will carry out meaningful consultations for Category A and B projects with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation.
5	Final IEE/EIA	Consider all comments received during public consultations, incorporate accepted remarks and explain rational when the comments are disregarded.	Consider all comments from Bank and public. Agree with the Bank on each raised point. Incorporate accepted public comments and explain rational when the comments are disregarded.
6	Management Plans	clear guidelines on format, content and timing	Incorporate Monitoring
7	Review and Approval	MEPA	Bank and separately – MEPA (if the EIA is required by Georgian legislation).
8	Disclosure Of the final IEE/EIA	Not requested	Publication (mainly electronic) of the final IEE/EIA.

B.3.1 Harmonization of the ADB and Georgian Legislation Requirements

153. In order to comply with the both regulations – the ADB and Georgian legislation – the content of the IEE/EIA should comprise issues required in both regulations, thus complementing each other. The EMPs should therefore be elaborated in details as required by the ADB regulations. The assessment of the stationary sources of emission (e.g. diesel generators) should be executed according to Georgian regulations: “Inventory of the Stationary Sources of Emission” and “Approval of the Emission Limits”. For the category a projects the first public consultation (requested by ADB guidelines but not by Georgian regulations) will be held at the Scoping stage. The second one will be executed according to Georgian requirements. Disclosure will be conducted as required by ADB.

C. description of the project

C.1. Background

154. The Government of Georgia has requested assistance from the Asian Development Bank (ADB) for the Sustainable Water Supply and Sanitation Sector Development Program, formerly the Water Supply and Sanitation Service Improvement Project (the Project). The proposed sector development program (SDP) will assist the government achieve universal access to continuous and safe water supply and sanitation (WSS) service, and contribute to improved environmental and public health conditions of the Georgian citizens. The SDP comprises (i) a program, financed by a policy-based loan (PBL), to improve sector governance and institutions in support of the government's reforms; (ii) a project, financed by a project loan, to increase WSS access and system efficiency in the service area of United Water Supply Company of Georgia (UWSCG).

C.2. Need for the Project

155. The service level of urban water supply and waste water treatment at present is not satisfactory in Georgia. Services are not available to the entire population and the serviced areas suffer with inefficient service levels. Systems are old and inefficient. The situation is no different in the program town of Telavi. The Water Supply project is needed because the present water supply infrastructure in Telavi is inefficient and inadequate to the needs of the growing population and tourists.

156. At present, only 18% of the population is connected to the network and has 24 hours water supply every day, 20% - 12 hours and 62% - only 5-6 hours. In some parts of the city, water is supplied only 2-3 hours during the 2-3 days. During base flow (in summer), the water flow is reduced to 200m3/h, which results in decreased water supply in the area and the population has intermittent water supply.

157. Water infrastructure data are provided in the **Table 15** below.

Table 115: Water infrastructure data

Telavi service center			
Definitions	Measuring Unit	Quantity	Note
Population (quantity) # of population connected to the network	inhabitant/household	17859/7915	
Length of the distribution network	km	120	
Average age of the network	age	50-60	Except newly rehabilitated districts
Material of the network		Cast iron, steel and polyethylene	

Telavi service center			
Water consumption per person	liter/per day	190	

158. Currently, in terms of ensuring effective water supply system for the city population, together with rehabilitation measures vertical zoning of the system as well as water meter installation for each service connection are the most critical issues.

C.3. Project location

159. The City of Telavi is located in Kakheti region, 160 km eastwards from the capital Tbilisi, at 500-800 meters above the sea level. Tsiv-Gombri Range borders to the south and south-west of the city and Alazani Valley to the north and east. Population of town Telavi is approx. 21000 inhabitants. It is the administrative center of the region, connected with the capital by two highways and railroad. The town is one of the centers of Georgia's wine industry. Proper water supply is very important for Telavi to increase production of wine and other agricultural spheres. Telavi is attracted to tourists as well with its various landmarks and cultural heritages.

Figure 1: Location of Telavi

C.4. Existing Situation

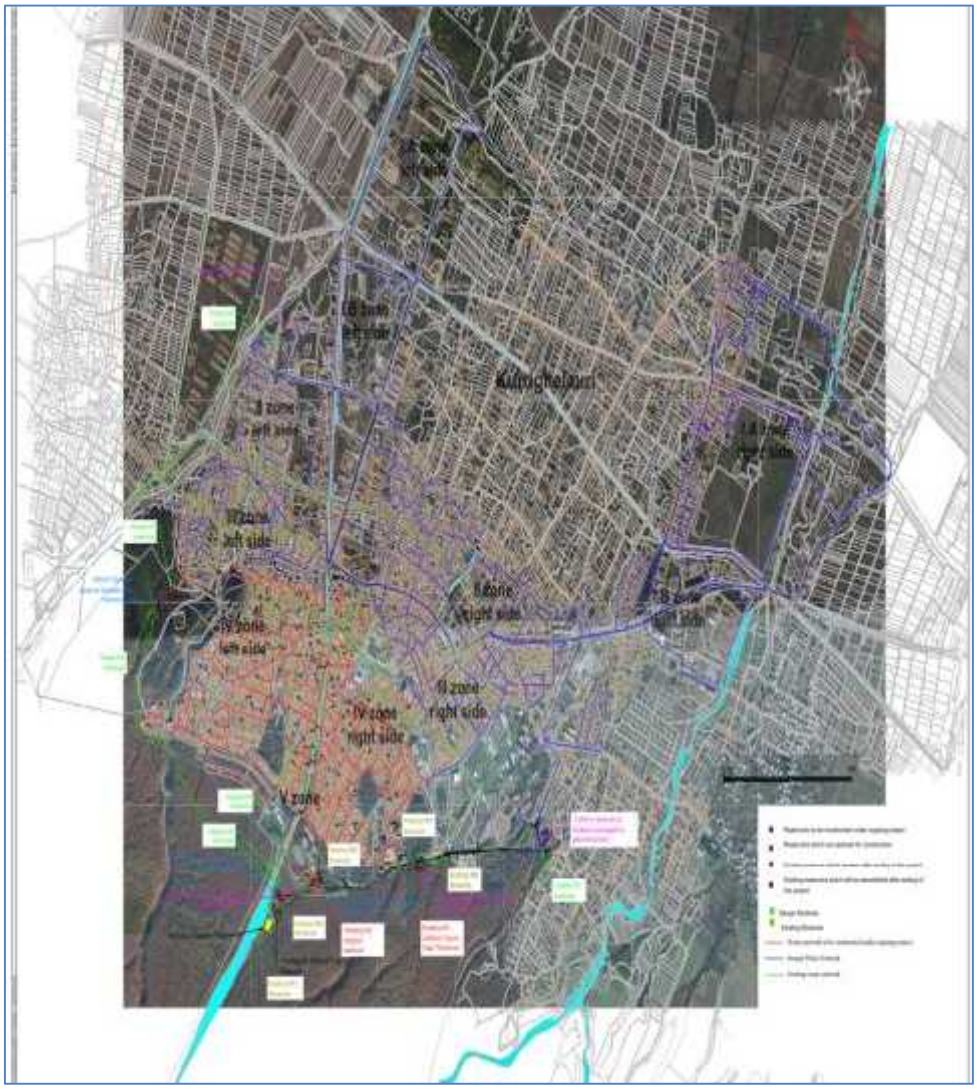
160. Telavi water supply system was initially developed in the 30's of 20th century. The city water supply system was expanding during some decades, although fundamental reconstruction was undertaken in 1966. No major measures and/or old pipe replacement was conducted since 2000. In 2000-2002, some works were implemented: three new water supply sources with yield of 2 l/s were developed; water losses in the transmission mains were eliminated; in 2006-2008, a partial rehabilitation of the network of central part of the city was undertaken. In 2014-2017, a partial rehabilitation

of network was undertaken (about 30 km).

161. At present, there are 5 boreholes in the city territory. Their yield ranges between 4-7 l/s. in Telavi, water flows from “Turdo Valley” and “Jvar-Patiosani” headworks and is discharged into the Telavi Water Treatment Plant, where the treated water discharges into the central city Reservoir #1 (2000 m3) located in the southern outskirts of the city. From here water is supplied to other Reservoir #2 (1000 m3) and Reservoir#3 (2000 m3) located in the southern part of the city. Reservoirs #4 and #5 (350 m3 and 400 m3) located in the central part are supplied from the Reservoir #2.

162. Figure 2 below presents Telavi water supply system:

Figure 2: Telavi Water Supply System



163. Partial rehabilitation of water supply system is underway In Telavi with the financial support of the European Investment Bank (EIB). This project envisages rehabilitation of water supply network - IV and V zones, with the total length of 34 km; Construction of the new 2000 m3 reservoir №1 (2000 m3) adjacent to the "central" reservoir; Construction of the new 1000 m3 reservoir instead of the existing reservoir N2; Construction of 500m3 reservoir in "Zuzumbo", which will be located on the western side of the city; Metering of customers in rehabilitation zone. More detail description of

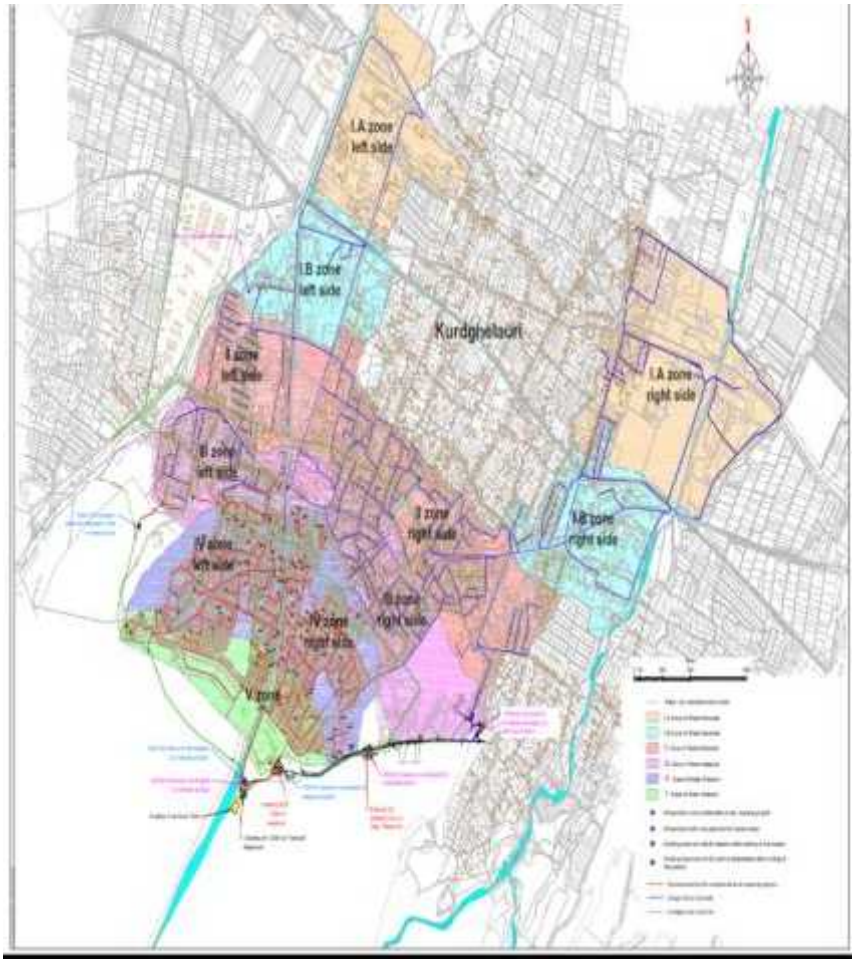
water supply interventions in Telavi are provided in Table 16 below:

Table 16: Finalized and on-going Projects in Telavi

#	Name of the Project	Date of completion of the project	Donor
1	Rehabilitation of water supply system of town Telavi	15.03.2011 25.07.2012	EIB
2	Rehabilitation of water supply system of Telavi-Kurdgelauri	4.05.2015-ongoing	EIB

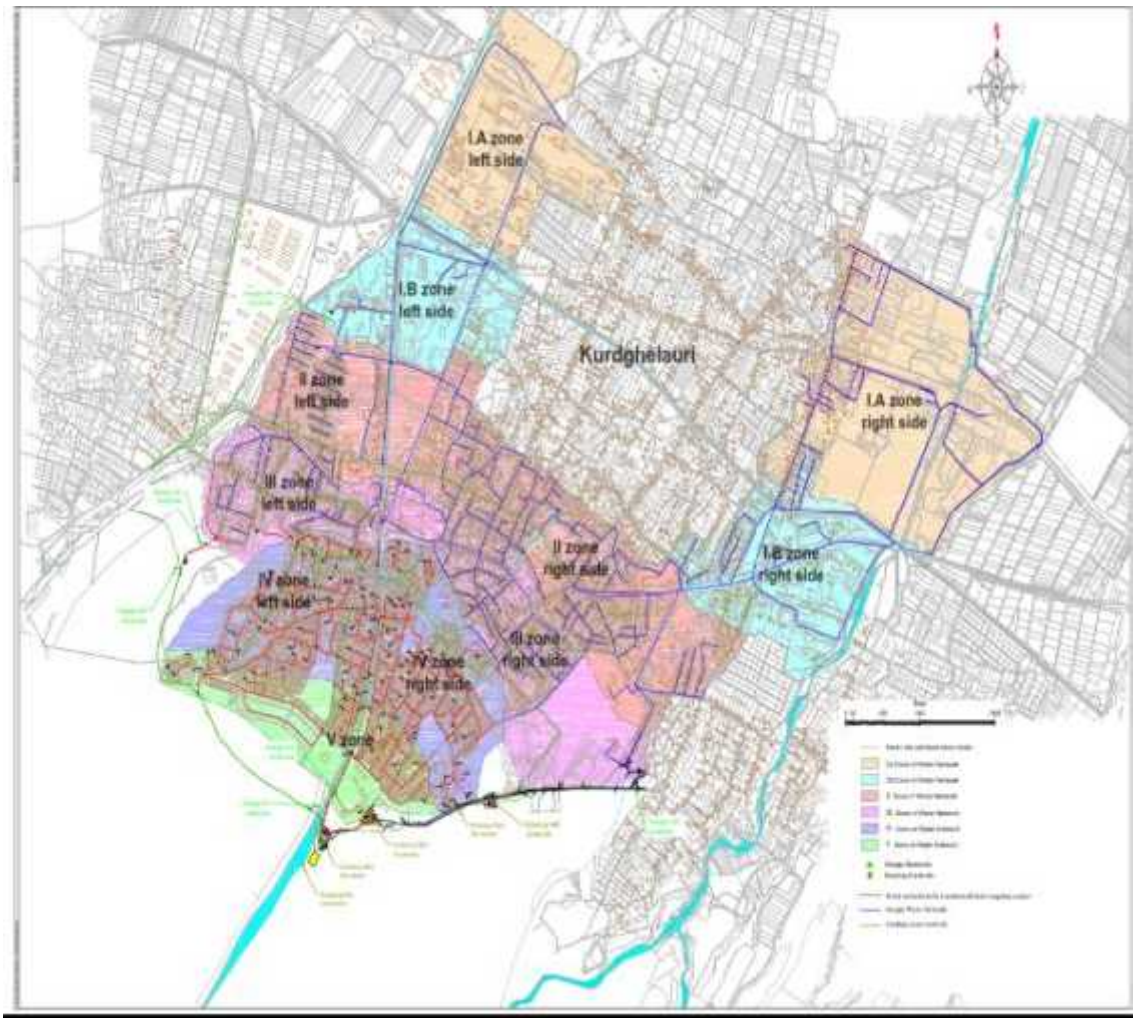
164. A scheme of Telavi Water Supply System including reservoirs is reported in the figure below.

Figure 3: Telavi Water Supply System – Reservoirs



165. A scheme of Telavi Water Supply System including Boreholes is reported in the Figure 4 below.

Figure 4: Telavi Water Supply System Boreholes



166. Current water consumptions per inhabitants is provided in Table 17 below.

Table 17: Water consumptions data

Definitions	Measuring Unit	Quantity	Note
Current water consumption per person (inhabitants)	l/d	190	
Produced amount of drinking water	m^3/d	7 776	

C.4.1 Water quality

167. Water samples were taken by the laboratory of the Water Quality Department of UWSCG from the "Turdos Khevi" headworks in May 2017 and was presented in original IEE which was prepared in November 2017. A sample report from the laboratory is shown in Table 14.

168. In this table, the second column indicates the test parameter and the last column

indicates the method used to determine the test result (sometimes, more than one method may be used to determine residuals). The third column indicates the measurement unit, the fifth column gives the actual test result which may then be compared to the values in the fourth column. The values in the fourth column are national standards, limits set by Government of Georgia by the Order #58, on the "Technical Regulations for Drinking Water", January 15, 2014. The values in the fourth column should not exceed those in the fifth column.

169. The analysis of water samples taken at the production sites and in the network shows good quality of the water which is compliant with the drinking water national standards. Frequency of sampling in Telavi is 802 in total. The sampling is conducted from 6 points of the networks (10-13 times per month) plus 2 headworks (1 time per month) and 2 reservoirs (1 times per month). From this total number of sampling only 3% does not meet the water quality standards (which have no risk for the health). Further there is necessity for the mobile microbiological laboratory.

Table 18: Sample Water Analysis Report – "Turdos Khevi" Raw Water

№	Index	Measuring unit	Standard not more than:	Test results	Method
1	2	3	4	5	6
	Physical & Chemical				
1	Odour 20^0C	Scale	2	0	GOST 3351-74
2	Odour 60^0C	Scale	2	0	
3	Taste	Scale	2	0	
4	Color	Degrees	15	0	ISO 7887-1:2010
5	Turbidity	Turbidity Unit	3.5	0	ISO 7027:2010
6	pH	-	6-9	7.9	ISO 10523:2010
7	Residual free Chlorine (Headworks)	mg/l	0,2-1		GOST 18190-72
8	Residual free Chlorine (Network)	mg/l	0,2-0,5		GOST 18190-72
9	Fluoride	mg/l F	0.7	0.01	ISO 11885:2007
10	Chloride	mg/l Cl	250	6.65	ISO 11885:2007
11	Nitrite	mg/l ONO_2	0.2	0.002	ISO 11885:2007
12	Bromide	mg/l Br	-	0	ISO 11885:2007
13	Nitrate	mg/l $NONO_3$	50	1	ISO 11885:2007
14	Sulphate	mg/l SO_4	250	35.6	ISO 11885:2007

№	Index	Measuring unit	Standard not more than:	Test results	Method
1	2	3	4	5	6
15	Phosphate	mg/l PO_3	3.5	0.05	ISO 11885:2007
16	Total Anions	mg/l Total anion		43.312	ISO 11885:2007
17	Hardness	mg Equiv./l	7-10	4.6	
18	Electrical conductivity	mS/cm		4.62	Laboratory Conductometer model-910/8
19	Total Dissolved Solids	TDS g/l	-	2.3	Laboratory Conductometer model-910/8
20	Salts	%	-	0.24	Laboratory Conductometer model-910/8
21	Aluminium (Al^{3+})	mg/l	0.1	0.01	ISO 10304-1:2007
22	Arsenic (As, Total)	mg/l	0.01	0.004	ISO 10304-1:2007
23	Bore (B, Total)	mg/l	0.5		ISO 10304-1:2007
24	Barium (Ba^{2+})	mg/l	0.7	0.1	ISO 10304-1:2007
25	Cadmium (Cd, Total)	mg/l	0.003	0.001	ISO 10304-1:2007
26	Cobalt (Co)	mg/l	-	0	ISO 10304-1:2007
27	Chrome (Cr^{6+})	mg/l	0.05	0.008	ISO 10304-1:2007
28	Copper (Cu, Total)	mg/l	2.0	0.001	ISO 10304-1:2007
29	Iron Total	mg/l	0.3	<0.3	ISO 10304-1:2007
30	Potassium	mg/l	-	0.13	ISO 10304-1:2007
31	Manganese (Mn, Total)	mg/l	0.4	0.006	ISO 10304-1:2007
32	Molybdenum (Mo, Total)	mg/l	0.07	<0.07	ISO 10304-1:2007
33	Nickel (Ni, Total)	mg/l	0.07	0.0057	ISO 10304-1:2007
34	Lead (Pb, Total)	mg/l	0.01	0.002	ISO 10304-1:2007
35	Stibium (Sb)	mg/l	0.02	0.0014	ISO 10304-1:2007
36	Selenium (Se, Total)	mg/l	0.01	<0.01	ISO 10304-1:2007
37	Stroncium	mg/l	-	0.56	ISO 10304-1:2007

№	Index	Measuring unit	Standard not more than:	Test results	Method
1	2	3	4	5	6
38	Zinc (Zn^{2+})	mg/l	3.0	0.0040	ISO 10304-1:2007
	Microbiology				
39	Mesopoly aerobes and Facultative **anaer obes**	Colony origin. Unit in 1 mL 370C	20	12	ISO 6222:2008
40	Total Coliform Bacteria	per 300 ml	Not acceptable	Negative	ISO 9308-1:2008
41	E. Coli	per 300 ml	Not acceptable	Negative	ISO 9308-1:2008

170. Water sample report taken by the laboratory of the Water Quality Department of UWSCG from the **Reservoir #1 (Central 2000 m^3), Reservoir #2 (6th Zone 1000m^3)** and **Reservoir #3 (Gigo Gora 2000m3)** during the year of 2019 is presented in the **Table 19 below**.

171. The analysis of water samples taken at the Reservoirs shows good quality of the water which is compliant with the drinking water national standards.

Table 19: Sample Water Analysis Report – Reservoirs

Number	Name of the person who took the sample Place and Data	Water temperature	The smell	Taste	Color	turbulence	Transparency	Hydrogen rate	Permanent oxygen	Chloride	Residual chlorine (in the network)	Residual chlorine (on borehole)	Sulfate	Ammonium ion	Nitrite	Nitrate	Electrical conductivity	Common iron	Hardness	Mesophilic aerobes and facultative aerobes in 1 ml 37 *	Total coliform bacteria in 300 ml	E.coli in 300 ml
№	N. Natsvlishvili, Reservoirs, 2019	Degree	2 points	2 points	15 points	3.5 FAU	30 cm	9 PH	3 mg/l	250 mg/l	0.2-0.5 mg/l	0.5-1,0 mg/l	250 mg/l	1 mg/l	0.2 mg/l	50 mg/l	mS/cm	–	10 mg. eqv/l	20	not allowed	not allowed
Reservoir #1 (Central 2000m3)																						
1	22.01	12,9	0	0	0	0	30	7,9	1,33	1-10	0,39		–	0.04	0,002	0,1	450	–	–	0	Not fixed	
	07.02	12,9	0	0	0	0	30	7,9	0,94	1-10	0,39		–	0.04	0,002	0,1	460	–	–	0	Not fixed	
	04.03	11,1	0	0	0	0	30	7,9	0,71	7,1	0,48		–	0,04	0,001	0,1	470	–	–	0	Not fixed	
	22.04	12.6	0	0	0	0	30	7,9	1,25	1-10	0,35		60	0,04	0,001	0,1	450	0,1	4,87	0	Not fixed	

	22,05	14,8	0	0	0	0	30	7,9	0,92	5,20	0,33		–	0,04	0,001	0,1	470	–	–	0	Not fixed
	19.06	18,6	0	0	0	0	30	7,9	0,92	1-10	0,39		–	0,04	0,001	0,1	470	–	–	0	Not fixed
	15.07	17,6	0	0	0	0	30	7,9	1,07	10	0,50		–	0,04	0,001	0,1	440	–	–	0	Not fixed
	12.08	18,1	0	0	0	0	30	7,9	1,13	6,7	0,41		–	0,04	0,001	0,1	450	<0,05	4,61	0	Not fixed
	27.09	19.6	0	0	0	0	30	7,9	0,97	8,6	0,43		–	0,04	0,001	1,0	460	0,1	4,65	0	Not fixed
	16.10	15.2	0	0	0	0	30	7,9	1,29	10	0,30		–	0,04	0,001	0,5	450	–	–	3	Not fixed
Reservoir #2 (6th Zone 1000m3)																					
2	09.01	13,6	0	0	0	0	30	7,8	1,41	1-10	0,37		–	0.08	0,002	0,1	460	–	–	1	Not fixed
	12.02	10,4	0	0	0	0	30	7,9	0,78	1-10	0,33		–	0,06	0,002	0,1	460	–	–	0	Not fixed
	28.03	11,8	0	0	0	0	30	7,9	1,02	1-10	0,39		–	0,04	0,001	0,1	460	–	–	0	Not fixed
	10.04	15,9	0	0	0	0	30	7,9	1,02	4,75	0,37		–	0,04	0,001	0,1	450	–	–	0	Not fixed
	06.05	15,1	0	0	0	0	30	7,9	1,49	10	0,24		–	0,04	0,001	0,1	430	–	–	3	Not fixed
	27.05	16,2	0	0	0	0	30	7,9	1,15	10	0,37		70	0,04	0,001	0,1	450	–	5,4	0	Not fixed
	10.06	21,5	0	0	0	0	30	7,9	0,99	10	0,33		–	0,04	0,001	0,1	470	–	–	2	Not fixed

	29.07	24,1	0	0	0	0	30	7,9	1,21	1-10	0,35		–	0,04	0,001	0,1	460	–	–	0	Not fixed
	22.08	22,3	0	0	0	0	30	7,9	1,21	1-10	0,33		–	0,04	0,001	0,1	450	–	–	0	Not fixed
	24.09	21	0	0	0	0	30	7,9	1,29	10	0,30		–	0,04	0,001	0,1	450	–	–	1	Not fixed
Reservoir #3 (Gigo Gora 2000m3)																				
3	11.01	8,4	0	0	0	0	30	7,8	1,41	1-10	0,35		62	0.08	0,002	<4	490	–	–	3	Not fixed
	04.02	12,3	0	0	0	0	30	7,9	0,94	1-10	0,33		–	0.04	0,002	0,1	460	–	–	1	Not fixed
	20.03	10,6	0	0	0	0	30	7,9	1,18	10	0,30		–	0,04	0,001	0,1	470	–	–	0	Not fixed
	01.04	9,8	0	0	0	0	30	7,9	0,94	1-10	0,33		–	0,04	0,001	0,1	460	–	–	0	Not fixed
	17.05	13,2	0	0	0	0	30	7,9	1,1	1-10	0,3		77	0,04	0,001	0,1	460	0,1	5,4	1	Not fixed
	24.06	18,9	0	0	0	0	30	7,9	0,99	10	0,37		–	0,04	0,001	0,1	470	–	–	0	Not fixed
	23.07	20,0	0	0	0	0	30	7,9	1,21	1-10	0,35		–	0,04	0,001	0,1	450	–	4,89	0	Not fixed
	19.08	21,8	0	0	0	0	30	7,9	1,21	1-10	0,15		–	0,04	0,001	0,1	450	–	–	1	Not fixed
	03.10	19,6	0	0	0	0	30	7,9	1,21	10	0,35		–	0,04	0,001	0,1	440	–	–	3	Not fixed

172. Water samples were taken by the laboratory of the Water Quality Department of UWSCG from the Telavi Water Supply Headworks, including "**Burus Nakalakari" and "Jvaripatiosani"** during the year of 2019. A sample report including place and data of sampling from the laboratory is shown in **Table 20**. The analysis of water samples taken at the Reservoirs shows good quality of the water which is compliant with the drinking water national standards.

Table 20: Sample Water Analysis Report - Headworks

Number	Who took the sample, Place and Data	Water temperature	The smell	Taste	Color	turbulence	Transparency	Hydrogen rate	Permanent oxygen	Chloride	Residual chlorine (in the network)	Residual chlorine (on borehole)	Sulfate	Ammonium ion	Nitrite	Nitrate	Electrical conductivity	Common iron	Hardness	Mesophilic aerobes and facultative aerobes in 1 ml 37 *	Total coliform bacteria in 300 ml	E.coli in 300 ml
№	N. Natsvlishvili, Reservoirs, 2019	Degree	2 points	2 points	15 points		3,5 FAU	30 cm	9 PH	3 mg/l	250 mg/l	0.2-0.5 mg/l	0.5-1,0 mg/l	250 mg/l	1 mg/l	0.2 mg/l	50 mg/l	mS/cm	–	10 mg. eqv/l	20	not allowed	not allowed
	22.01																						
1	"Burus Nakalakari" Headworks	11,9	0	0	0		2	30	7,8	2,04	1-10	0		64	0,08	0,002	0,1	480	–	4,86			
2	"Jvaripatiosani" Headworks	11,0	0	0	0		1	30	7,9	1,88	1-10	0		23	0,08	0,002	0,1	380	–	3,89			
	07.02																						
3	"Burus Nakalakari" Headworks	16,8	0	0	0		0	30	7,8	1,96	1-10	0		–	0,08	0,002	0,1	480	–	–			

4	“Jvaripatiosani” Headworks	19,0	0	0	0		0	30	7,9	1,65	1-10	0		–	0,08	0,002	0,1	390	–	–			
	04..03																						
5	“Burus Nakalakari” Headworks	10,8	0	0	0		0	30	7,8	1,1	9,0	0		–	0,04	0,001	0,1	480	–	–	32	Fixed	Not Fixed
6	“Jvaripatiosani” Headworks	10,7	0	0	0		0	30	7,9	1,18	3,32	0		–	0,04	0,001	0,1	380	–	–	36	Fixed	Not Fixed
	22.05																						
7	“Burus Nakalakari” Headworks	15,8	0	0	0		0	30	7,8	1,69	7,12	0		90	0,04	0,001	0,1	480	–	5,5			
8	“Jvaripatiosani” Headworks	15,1	0	0	0		0	30	7,9	1,77	3,80	0		10	0,04	0,001	0,1	380	–	3,95			
	19.06																						
9	“Burus Nakalakari” Headworks	18,2	0	0	0		0	30	7,8	1,31	7,6	0		85	0,08	0,001	0,1	480	–	5,45	80	Fixed	Not Fixed
10	“Jvaripatiosani” Headworks	18,1	0	0	0		0	30	7,9	1,23	4,3	0		10	0,08	0,001	0,1	360	–	3,99	65	Fixed	Not Fixed
	15.07																						
11	“Burus Nakalakari” Headworks	22,2	0	0	0		4	30	7,9	1,38	8,0	0		–	0,06	0,001	0,1	470	–				
12	“Jvaripatiosani” Headworks	22,1	0	0	0		4	30	7,9	1,46	4,7	0		–	0,06	0,001	0,1	340	–				
	12.08																						

13	"Burus Nakalakari" Headworks	16,8	0	0	0		0	30	7,9	1,45	10	0		–	0,08	0,001	0,1	470	<0,05	4,94	48	Fixed	Not Fixed
14	"Jvaripatiosani" Headworks	19,1	0	0	0		0	30	7,9	1,53	10	0		–	0,08	0,001	0,1	380	<0,05	4,10	54	Fixed	Not Fixed
	27.09																						
15	"Burus Nakalakari" Headworks	19,3	0	0	0		0	30	7,9	1,54	10	0		–	0,08	0,001	1,0	470	–	4,97			
16	"Jvaripatiosani" Headworks	19,4	0	0	0		0	30	7,9	1,62	10	0		–	0,08	0,001	1,0	370	–	4,10			

C.5 Projected Water Demand up to 2044

173. The major outcomes of the proposed project is to increase the quality of life for the population of Telavi. High quality drinking water will be supplied 24 hours for 100% of the consumers; Risk of contamination will be eliminated; 100% of the consumers will be connected to the network and metered.

Table 21: Water demand projection

Year	Population served	Domestic water consumption per person-day	Domestic consumption	Commercial and other consumption	Total water consumption	Network leakage
	No	l/c.d	m3/y	m3/y	m3/y	m3/y
2012	17505	210	1341742,92	94 072	1 435 815	646 117
2013	17707	210	1357209,43	95 429	1 452 639	435791,58
2014	17795	210	1363995,477	97 013	1 461 009	438302,63
2015	17884	190	1240261,602	98 624	1 338 885	334721,33
2016	17974	180	1180859,599	100 261	1 281 120	320280,11
2017	18063	170	1120832,569	102 266	1 223 099	269081,70
2018	18154	160	1060175,748	110 696	1 170 872	234174,37
2019	18244	160	1065476,627	119 821	1 185 298	213353,57
2020	18336	150	1003878,759	122 217	1 126 096	168914,43
2025	18799	140	960612,7588	133 086	1 093 699	153117,80
2030	19273	140	984869,4347	137 127	1 121 996	134639,52

C.6 Design of New Telavi Water Supply System

174. According to the preliminary design, the project measures for the new Telavi Water Supply System project will include the construction or rehabilitation of:

- Wells (8 existing, 3 new);
- New Transmission mains (length: ca. 1.450 km);
- Reservoirs (1 existing, 5 new);
- Distribution network (Length: 59,55 km);
- Rehabilitation of Chlorination Station in Gigo Gora Reservoir

- Automation (SCADA).

175. The city water supply will be effectuated from both existing headworks, from which the water is conveyed to existing treatment plant, and boreholes. The water will be accumulated in reservoirs placed at 7 different sites, from whence the water will be conducted to distribution network. Considering the city terrain, the distribution network, according to pressure, is divided into seven zones. The details on each measure for the new water supply system of project are presented below and the general scheme of water distribution in the reservoirs and distribution network are indicated in Figure 1.

176. **Well Field.** In total 11 are included in the project, out of which 3 new wells will be newly constructed, 5 will be fully rehabilitated and new buildings will be constructed for 3 existing wells, that presently being built by UWSCG. In order to guarantee sufficient supply, 3 new wells will be placed in the vicinity of new reservoirs, which will convey water to the respective reservoirs.

177. It is envisaged to drill 200m-deep boreholes, with diameter of 394mm. The expected flow per well is 10 l/s. The project also envisages the rehabilitation of existing boreholes, including replacement/laying of pump, fittings, valves, control and monitoring devices.

178. Transmission Mains. In the project area, there are three new PE transmission mains. The diameters of transmission mains very from OD-160 to OD-315. Summarized information about the length and diameter of the pipes is given in the Table 22 below.

Table 22: Pressure pipe of reservoirs

Des. Well №	To the	Pipe diameter, mm	Length, m
Well-3	"1st Zone" Reservoir (№7)	OD160	8
Well-2	"Zuzumbo" Reservoir (№6)	OD160	178
Well-1	"Zuzumbo" Reservoir (№6)	OD160	84

179. **Reservoir**. In total, 6 reservoirs will be rehabilitated and constructed in the Project, 1 existing and 5 new reservoirs will be constructed. The "6th Zone" reservoir will be placed at the place of existing 1000m3 reservoir, while the other new reservoirs will be placed on unoccupied premises. The new and existing reservoirs in total amount to 11.000 m3, of which total volume of new reservoirs is 7,000 m^3.

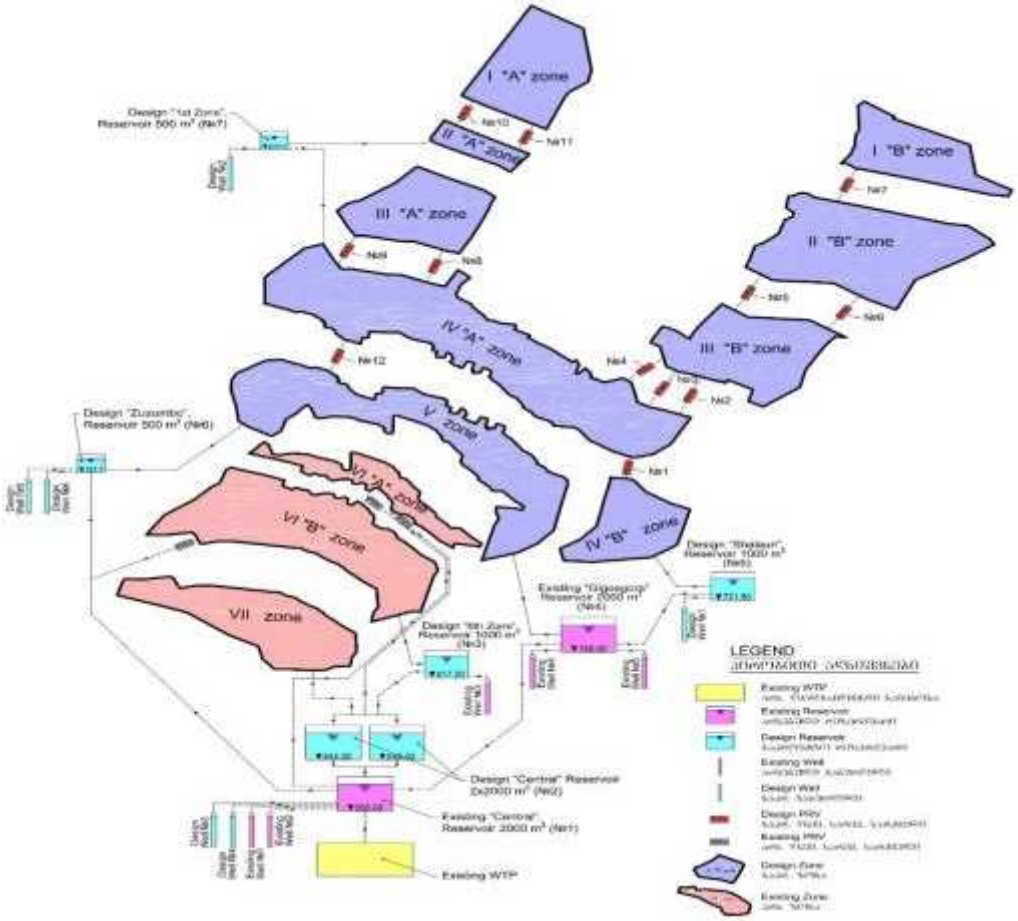
Table 23: The New and Existing Reservoirs

№	Name	Status	Volume (m^3)	Bottom Level, (m.a.s.l.)	Maximum water level (m)
1	"Central" Reservoir	Existing	2000	855.00	-
2	"Central" Reservoirs	New	2x2000=4000	844.50	4.05
3	"6th Zone" Reservoir	To be built a	1000	817.20	4.35

		new			
4	“Gigosgora” Reservoir	Existing	2000	748.00	-
5	“Shalauri” Reservoir	New	1000	721.50	4.15
6	“Zuzumbo” Reservoir	New	500	747.70	4.20
7	“1st Zone” Reservoir	New	500	622.00	4.20
		Total	11 000		

180. The water distribution in the reservoirs and feeding of the distribution network shall occur by the scheme given below in Figure 5.

Figure 5: Water Distribution Scheme



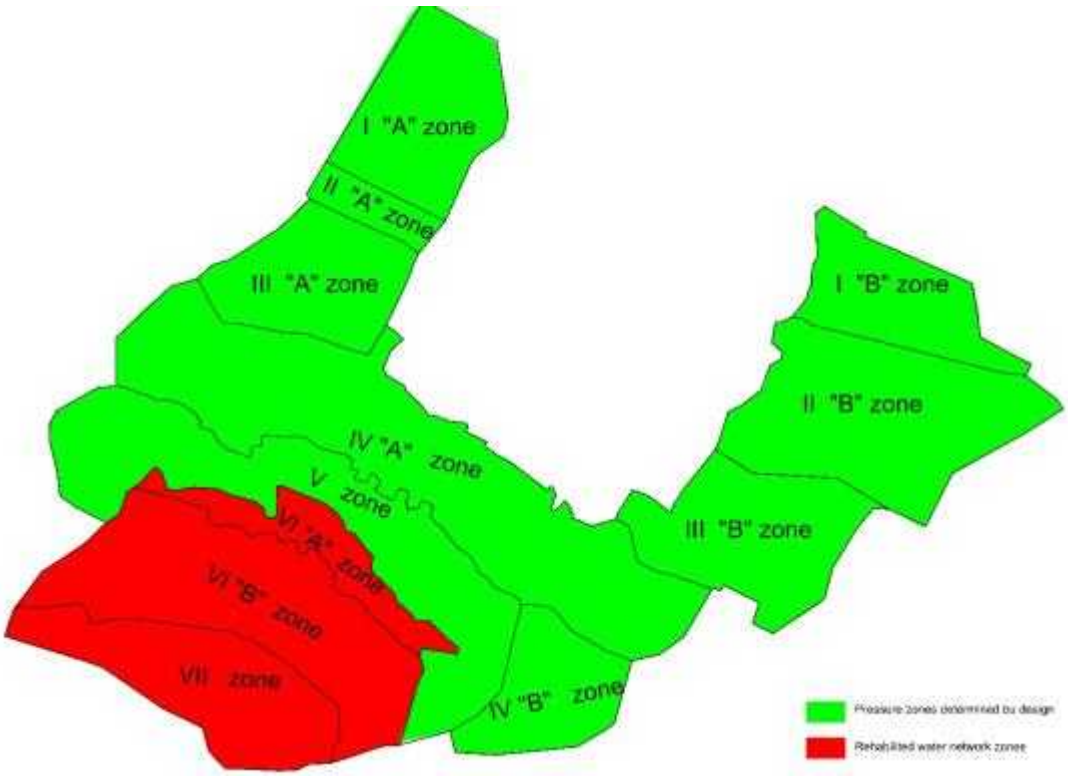
2

181. **Distribution Network**. The distribution network includes the replacement of the old pipes, as well the extension of the network to all residential areas of Telavi. The new network will supply the design population projected for 2040. The distribution network will be divided into eight pressure zones (out of them 3 within the rehabilitated network and 5 within design network). It ensures water supply pressure range of 2-6 bars for most water supply areas. Due to city configuration, the first four zones are divided into subzones, and the sixth zone was divided into two zones (during 2006-2008 rehabilitation), taking into

[2] PRV – Pressure regulatory valve

account, that VI “A” zone represents a touristic zone and it is supplied independently from the central reservoirs. Within this project, the feeding system of rehabilitated zones remains the same.

Figure 6: Pressure Zones



182. The total length of the designed network is 61 km. The outer diameters vary from 110 mm to 315 mm in the main distribution network. In the tertiary network, it is up to minimum OD 63.

Table 24: Pipe Lengths and Diameters

Pipe Material, Diameter	Pipe Length [km]
PE 100, OD 63	9.55
PE 100, OD 90	4.21
PE 100, OD 110	36.86
PE 100, OD 160	6.72
PE 100, OD 225	1.00
PE 100, OD 315	2.64

183. Rehabilitation of chlorination Station in Gigo Gora reservoir. The chlorination facility will be a small unit to administer the chlorine into filtered water.

C.7. Land Acquisition

184. All components of Telavi WS projects, including well fields and reservoirs will be built on the land plots located in Telavi and registered at the National Agency of Public Registry of the Ministry of Justice of Georgia under the ownership of UWSCG.

185. Based on preliminary design, all water pipes including transmission lines will be installed in trenches alongside the state-owned existing motor roads, which should not cause any loss of income or assets. No private land or household will be affected and will not to be acquired for the construction of the Project. There is also no population cultivating the proposed land for construction of Reservoir, well fields and water supply network.

186. As it was mentioned above no land acquisition and resettlement related impacts are expected to this subproject, if the preliminary proposal for infrastructure improvement does not change substantially, for instance realignment of water transmission lines or selection of new spot for locating the Reservoirs/Wells. Thus, if such changes will occur the Resettlement Due Diligence Report will be updated accordingly upon detailed design finalization.

C.8. Access Roads

187. No additional roads are planned to be built within the proposed project, since all project components will be located on the existing water supply facilities that currently operate and have their own access roads, however, if any additional road is required to built, this will be appropriately mitigated and described in detail in the corresponding SSEMP.

C.9. Construction Activities

188. The following is a sequential description of the potential activities associated with the construction of the Project.

C.9.1. Methods to accomplish main works

189. Before the construction of the main facilities, there comes a mobilization phase with the aim to provide the conditions for the successful implementation of the construction works. The following works will be accomplished at the mobilization phase:
    - The works related to the development of the construction site;
    - The works to equip the park of construction machinery and vehicles;
    - Preparation for the construction site, and
    - Construction of temporary buildings and structures and temporary and permanent roads.

C.9.2. Earthworks

190. In the mobilization phase, before the excavation of the pits, the following works must be performed:
    - Break-down of the pits by fixing their axes and sizes to the batter boards;
    - Layout of the territory and equipment to drain surface and ground waters from the construction ground.
    - Moving underground and above-ground utilities.

C.9.3. Concrete works (Monolithic foundations, frames of buildings)

191. The following preparatory works are necessary to perform before the main works to provide the monolithic foundations:

1. Delivery and storage of false work;
2. Procurement of reinforcing nets and frames.
3. Break-down of the foundations.

192. All concrete and reinforced concrete structures located in the ground must be made of concrete on sulfate-resistant cements, waterproof grade W-6.

193. The surface of concrete and reinforced concrete structures in contact with the ground must be painted with 3 layers of hot bituminous cement. When concreting the foundations, the concrete mixture will be laid in layers of 20-30 cm and they must not exceed 1.25 of the length of the working section of the vibrator.

194. The complex process to produce monolithic reinforced concrete structures consists of the following processes:

- Installation of formwork and scaffolding;
- Installation of reinforcement;
- Placement of concrete mixture in the structure;
- Concrete curing;
- Form stripping.

195. For concreting wall structures, columns and coatings, an inventory movable panel formwork, with its parts connected with bolts will be used. The formwork will be delivered to the installation site with a crane. After the concreting of structures is over and the concrete is duly cured to the required strength, the formwork is disassembled and moved with a crane to the new sites. The formwork must be lubricated or watered before the placement of concrete.

196. The concrete must be delivered to the site of its placement with a concrete pump with the capacity of (3=51 m'/hour ensuring not overloaded and continuous supply of the concrete mix.

197. The concrete mix must be placed in the columns with their height exceeding 5 m directly from the top, for the entire height of the columns. If there are overlapping clamps in the reinforcing cage, the concrete mixture must be placed through the windows provided in the formwork in every 1.5-2 m for the height.

198. Every next layer of the concrete mixture must be placed before the setting of concrete of the previous layer. The duration of the interval between placing adjoining layers of the concrete mixture without the formation of a construction joint is determined by the construction laboratory. Reinforcing frames must be made on the reinforcement square of the construction site and the preformed frames must be delivered to the operation zone of the tower crane with a truck crane.

C.9.4 Site selection of sources of materials

199. Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts relevant permits and licensees should be obtained from the Agency of Environmental Protection under the MoENRP of Georgia for the quarry sites and borrow sites. Quarry sites will be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage systems. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval and/or permit from the Ministry of Environment and Natural Resources Protection of Georgia and/or procure materials from licensed sources/traders. The construction contractor shall use the mentioned criteria to select quarry sites.

200. Estimated number and type of personal who will do the work is provided in the Table 25 below.

Table 25: Number and Type of Personal on Construction Sites

Sub-project components	Number of personal	Type of personal	Type of Equipment	Planned timing of the works
Reservoir	35-30	Workers, Site manager/Forman. Engineer/SC	Mini Excavator Bob Cat Mini Loader Saw cut machine Loader 1.5 yd3 Grader 3.7 m Mobile Compressor Hydromac Excavator Backhoe loader Dumper Truck Tower Crane Dynamic Cylinder 15t Water Tanker 5t Hand Compactors Concrete Batching Plant Transmixer Water/Crush/Screen Pl. Concrete Pump Vibrator Pick-up Water Tank 12t Asphalt Plant	Day time 09:00 - 18:00
Boreholes	5-6	Workers, Site manager/Forman. Engineer/SC,		
Pumping Station	15-18	Workers, Site manager/Forman. Engineer/SC		
Transmission main	10-12	Workers, Site manager/Forman. Engineer/SC,		
Network	7-8	Workers, Site manager/Forman. Engineer/SC,		

D. ANALYSIS OF ALTERNATIVES

201. The alternatives considered for the proposed Project include: i) 'No Project' Alternative, ii) Technical alternatives for construction of new water supply facilities of Telavi city, and iii) Alternative locations for reservoirs and networks.

202. The 'No Action' Alternative addresses the likely consequences of not undertaking the proposed action. While it has no environmental and social impacts resulting from reconstruction works, the failure to construct new water supply system in Telavi city would result in the continued deterioration in water supply when only 18% of the population of Telavi are connected to the network and has 24 hours' water supply, 20% - 12 hours and 62% - 2-3 hours a day, thereby impeding the socio-economic development of the Project area.

203. Therefore, it can be determined that the 'No Action' alternative is not a reasonable option if the environmental and overall socio-economic situation in the city of Telavi is to be improved.

204. The expansion of current headworks of "Turdos Khevi" and "Jvari patiosani" was the second alternative also considered, but the water from these water intakes are very turbit and therefore needs treatment. This headworks may be used during the drought period as an additional water supply.

205. Alternative location - No alternative options were discussed for reservoirs and network outline, thus all reservoirs will be built on the territory of existing reservoirs owned by the United Water Supply Company of Georgia and the new network will mainly follow an old one outlined in urban areas of Telavi.

E. DESCRIPTION OF THE ENVIRONMENT (BASELINE DATA)

E.1 General Overview

206. Environmental and social baseline of Telavi Municipality is described in this paragraph. From physical and geographical point of view, project area lies within the western part of Kakheti plain included in Iberian region (according to L.I.Maruashvili). Physiographic units of Alazani Valley are: From north and northeast side - Kakhetian Caucasus, from south and southwest side - less steep northern slopes of Gombori.

207. The project area is included within the boundaries of Telavi Municipality, Kakheti region. Telavi municipality is bordered by Akhmeta Municipality from west side, by Kvareli Municipality from eastside and by Sagarejo Municipality from southwest side.

E.2 Physical-Geographical Environment

E.2.1 Climate and Meteorological Conditions

208. Telavi Municipality is within a moderately humid subtropical climate zone. There is a moderately humid climate within Alazani Valley, with moderately cold winters and hot summers. The average annual temperature is 11-120C, in January – 0,20C, in July - 22-240C. The absolute maximum temperature is 390C, while the absolute minimum - 210C. Precipitation - 700-800 mm per year. Preliminary EIA Telavi WWTP Page 45 of 165Tables and diagrams below provide specific characteristics of the climate within the study area and parameters describing their recurrence, according to the data obtained from Telavi meteorological station (**source**: Construction Climatology PN 01.05-08).

Table 26: Ambient air temperature

month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	**Average**	**Abs. min.**	**Abs. max.**
^0C	0.5	1.9	5.7	11.	16	19.	22.9	23	18.	13.	7	2.5	11.8	-23	38

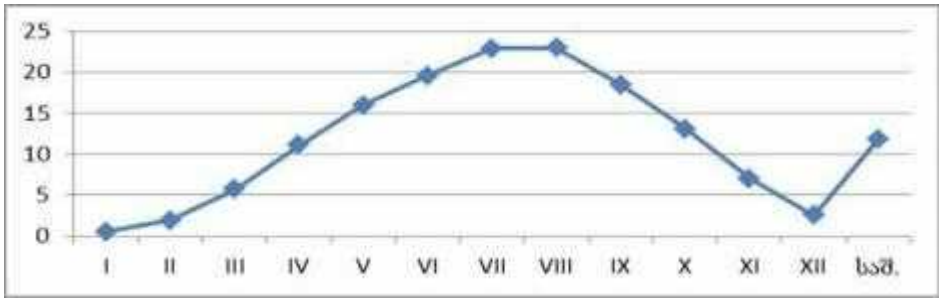
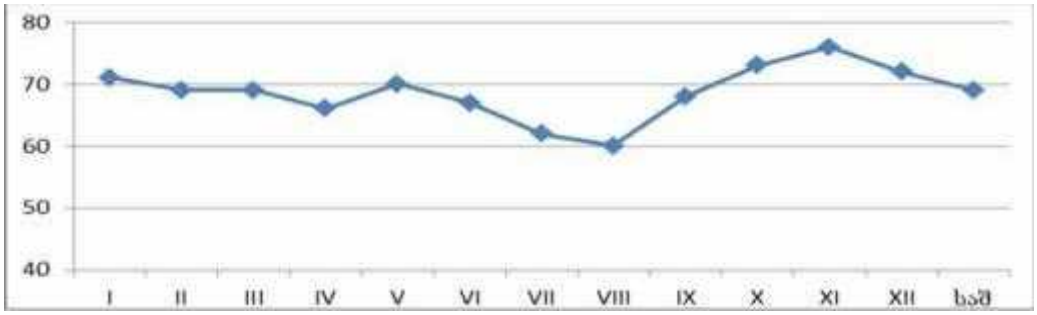


Table 27: Relative humidity - %

Mont	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Avera
%	71	69	69	66	70	67	62	60	68	73	76	72	69



Average relative humidity at 13:00		Average daily amplitude of relative humidity	
The coldest month	The hottest month	The coldest month	The hottest month
69	46	14	31

Table 28: Precipitation, mm

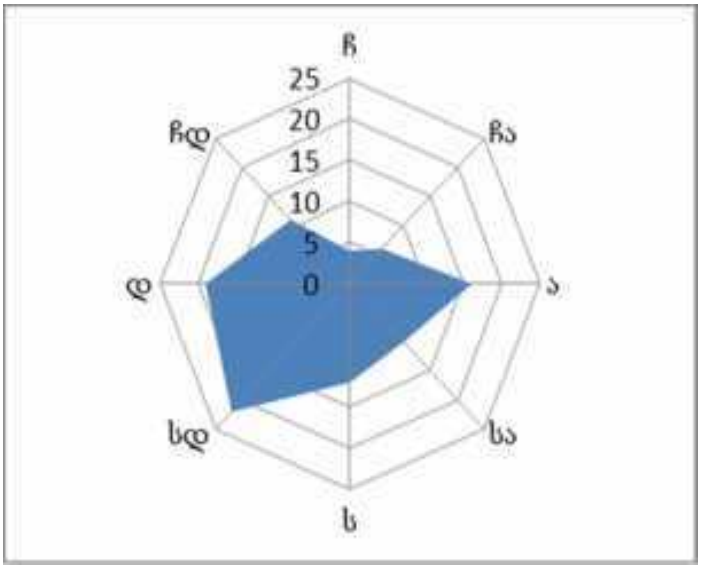
Annual precipitation, mm	Daily maximum of precipitation
79	14

Table 29: Wind characteristics

Highest wind speed, possible once in 1,5,10,15,20 years. m/s				
1	5	10	1	20
1	21	23	2	25

Average highest and lowest wind speed, m/s	
January	July
3,3/0,7	3,2/1,

Annual repeatability of wind direction and calm (%)								
Nort	Northea	East	Southe	Sout	Southw	Wes	Northwe	Cal
4	6	16	10	12	22	19	11	23



E.2.2 Geology

E.2.2.1 Relief

209. Alazani Valley is an intermountain accumulative plain between Gombori range and Iori slope. It is located at 200–470 m a.s.l. The plain is inclined towards South-East and it is extended as Agrichai plain on the territory of Azerbaijan. The total length of the plain is 200 km. the length of the plain on the territory of Georgia is 110 km. Its greatest width is 28-30 km.

210. The major characteristic of physiographic unit of Alazani Valley is its relief, which is typical continental geosyncline. Alazani Valley is a flat plain, but in fact it is complicated by fans of left and right tributaries of Alazani River and by formations with little depth and rare erosions.

211. Telavi is located at 550-800 m a.s.l. relief of the city (mostly its southern part) is inclined and deeply fragmented by V-shaped steep valleys. Absolute elevations of the relief decrease consistently towards the north of the city and are 350-360 m a.s.l. near Alazani riverbed. Sharply expressed negative or positive forms of relief have not been observed along the study corridor.

212. From Geomorphological point of view, the project area is included in Transcaucasian intermountain zone. Folded complex, Alpine, late orogenic (collisional), the late collisional (Quaternary) slightly folded. It is a geological complex of sedimentary rocks. Geologically it is built up by Alluvial-Proalluvial sediments, rocky and semi-rocky sediments of Cretaceous age.

E.2.2.2 Geological and Tectonic Conditions

213. Geologically, Alazani Valley is very peculiar tectonic unit of Georgia. This is a zone of

intense immersion - continental geosyncline accumulating sediments. Formation of geosyncline has begun since Pliocene. Evolution of Alazani-Agrichai depression began since Upper Pliocene. Immersion still continues, which is approved by the stratigraphic and geomorphological facts. Caucasus foothill is built up by folded Upper Jurassic and Cretaceous sediments. Gombori range is built up by Mesozoic and Cenozoic suits, which are clearly divided into two different complexes from tectonical and lithological point of view. Older complex combines formations of diverse composition (clays, sandstones, limestones), while younger complex is represented Neogene (Sarmatian-Kimmerian) molasses series. The series is called Alazani Series.

214. Accumulative plain of Alazani, which is located between already mentioned two geomorphological elements is built up by Quaternary alluvial, proluvial and proalluvial-dealluvial cobbles, sandstone and clay. Based on stock material and reconnaissance works it can be said that Quaternary sediments (gravel, sandstone) are represented within the study corridor. Areas adjacent to the corridor are extensively used for agricultural purposes and therefore surface layer is represented by quite productive topsoil.

E.2.2.3 Hydrogeology

215. Central part of Georgia is covered by hydrogeological district of Georgian and Azerbaijan belts. The major aquifers are Tertiary rocks, which built up artesian basins of Alazani and Iori. Among Tertiary sediments highest waters are observed in continental series of Aghchagil Apsheron and in loose formations of Middle Miocene. Aghchagil Apsheron series have been studied in artesian basins of Alazani and Iori. It contains a large amount of calcium bicarbonated fresh water. The second one is common in artesian basin of Kartli and from hydrogeological point of view, it is less well studied. The study area is located near the active riverbed of Alazani, in 1,0-1,2 km distance. It should be also noted that moisture and marsh-loving plants are common within this area.

216. The purpose of the project is to finalize water supply system rehabilitation measures commenced at early stages and provide Telavi city with 24 hour water supply for population. To achieve this goal following works will be carried out:

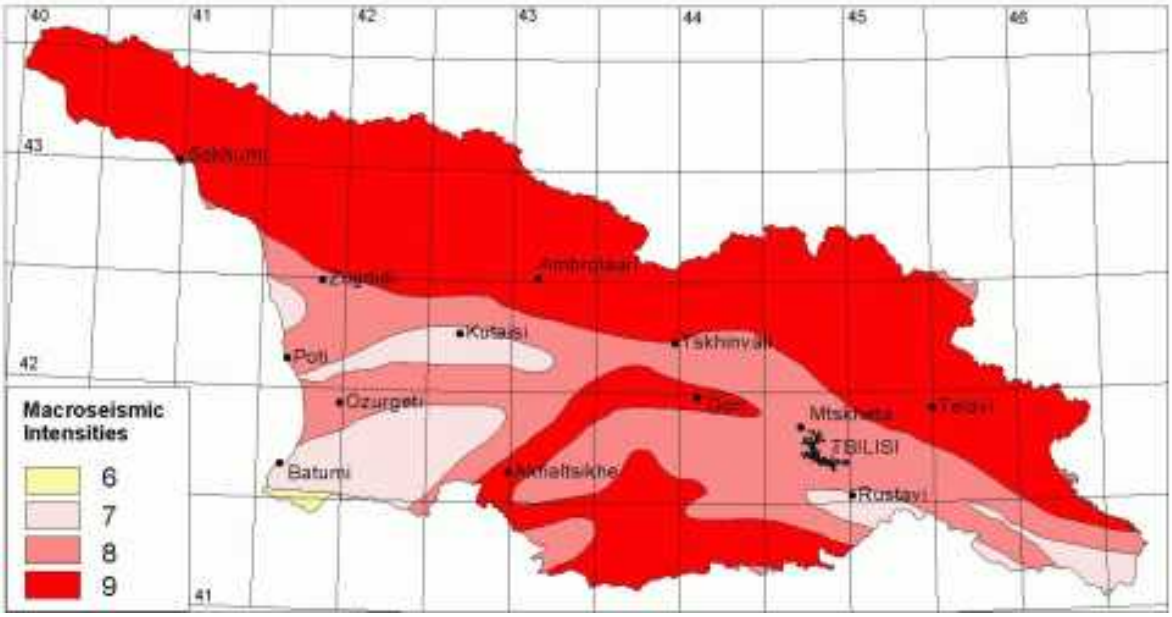
- ✓ Rehabilitation/Construction of water supply network;
- ✓ Construction of Water Producing Boreholes;
- ✓ Reconstruction/Rehabilitation of exiting water producing boreholes;
- ✓ Construction of the Chlorination Building;
- ✓ Construction of Transmission Main;
- ✓ Construction of new reservoirs;
- ✓ Metering of the customers;

217. Reconstruction of existing five boreholes and construction of five new boreholes, with the depth of 200-220 m. with the capacity of 8-10 l/s each will improve water supply to the town and ensure 24 hours supply of high quality drinking water to the 100% of consumers . 100% of the consumers will be connected to the network and metered.

E.2.2.4 Seismic Conditions

218. According to the Annex #1 of the construction norms and rules - "Seismic Resistance Construction" (pn01.01-09), investigation territory Telavi and its surrounding areas are located in 9 scale (MSK 64) seismic region. Dimensionless ratio of seismicity within the settlements of the study area is: Telavi - 0,32 m/s2, Kurdghelauri village - 0,33 m/s2; Kondoli village - 0,36 m/s2 .

Figure 7: Seismic map of Georgia



E.2.3 Hydrology

219. The main artery of hydrographic network of the study area is Alazani River, which originates from the eastern slope of the Caucasus, near Mount Borbala. The River joins Mingechauri basin (Azerbaijan). The length of Alazani River is 351 km, basin area – 11 800 km2, average water flow– 98 m3/s. It is used for irrigation.

220. The River is fed by groundwater, rain and snow waters. Approximately 40% of runoff is groundwater, while the rest 30%-30% is rain and snow waters. Floods are observed in the first half of spring and summer, high waters – in autumn. Low waters are observed in winters. 38,3% of runoff is observed inspiring, in summer - 29,1%, in autumn – 20,3%, in winter - 12,3%. It does not freeze.

221. Left tributaries of Alazani River are: Stori, Lopota, Intsoba, Cheleti, Duruji, Avaniskhevi, Kabali, Lagodekhistskali, Matsimistskali, Gishistskali (Agrichai), etc. Right tributaries of Alazani River are: Ilto, Turdo, Kisiskhevi, Cheremiskhevi, Fafriskhevi, etc.The project area is located on the right terrace of Alazani River, in 1,0-1,2 km from active riverbed. Project corridor does not cross any other significant surface water bodies. None of these rivers provide a source for the water supply.

222. The reservoir number 1 is supplied from the "Turdos Khevi" Headwork, water supply

Pipe from the “Turdos Khevi” is crossing the Telavi Ravine (Dry Gorge, which is filled only during floods or mudflows). The water coming out of “Turdos Khevi” is very Turbit and therefore it needs treatment before the discharge into the reservoir. The new network will cross the Telavi Ravine and will be installed in parallel of the existing pipe.

E.3 Description of Biological Environment

E.3.1 Vegetation Cover – Local Context

223. In order to identify plants with high conservation value and determine potential affect by the project on these species, background data was collected from construction sites and results are presented in proposed IEE.

224. On July 13-14, 2017 an expedition consisting from botanist Mr.Gigo Deisadze and technical staff of Telavi service center carried out baseline botanical survey of vegetation on pre-selected locations of the project components. The GPS coordinates were fixed in UTM 38 T system, with a GPS device.

225. According to the above-mentioned baseline survey, Red Listed species of Georgia are observed only on one location – Reservoir with the capacity of 2000m3 (UTM 38 N0538625 / E4639598). Those are about 9 self-seedlings small elms (Ulmus minor) from 0.5 to 2 meters in height and 2-5 cm. diameter, in other proposed areas there are no significant environmental sensitive features and it is expected that the proposed Water Supply components will not cause long-term or significant environmental impacts.

226. During construction, the contractor will be instructed to avoid removing of Red listed trees or to reduce the number of trees to be cut to the maximum available. All trees will be marked, fenced and properly protected, but in case of inevitable tree cutting the contractor must comply with all procedures stipulated by the legislation of Georgia. In particular, Government’s resolution No.242 “On the Rules of Forest Use”, sets the procedures for issuing permit for cutting red listed trees, in case of construction of the state importance. According to these rules compensatory sums should be payed, the amount of which is determined by the MoENRP in accordance with the volume of species to be cut.

227. More detailed description of botanical survey of the project areas are presented below:

228. No1 - planned borehole near Telavi State University; Coordinates:UTM 38 N0538664/E4639800. Area 20 sq.m; The area is covered with a secondary, ruderal grass cover (Verbascum sp .; Origanum vulgare; Agropyron repens; Calamagrostis arundinacea; Poa bulbosa; Cichorium intibus; Knautia Montana; Lactuca sericea;), Blackberry (Rubus sp.) and rosa (Rosa canina) Shrubs, huzelnuts (Corylus avellana), Sambucus ebulus. Out of the site area grows yang growths of elms (Ulmus minor),-1-2 m. Height and 2-3 cm Diameter. They do not face injury.

Figure 8: Photo of No1 - planned borehole near Telavi State University

229. No2 - The construction of a 2000 m³ capacity reservoir is planned to be located near the previous location. Locations coordinates: UTM 38 N0538625 / E4639598; The construction area is 0.4 ha area, which is also covered as a secondary ruderal plants. Here, together with the above-mentioned beads, grows about 9 self-seedligs small Elms from 0.5 to 2 meters in height and 2-5 cm. Diameter.

Figure 9: Photo of No2 – Reservoir with capacity of 2000 m³

230. No.3 In the vicinity of the previous locations, site for borehole (boreholes No. 3, company materials) is located on the second bank of the river, on the area covered by inert materials, which are only fragmented by the rudder herbaceous plants. Locations coordinates: UTM 38 N0538591 / E4639725; Building Area 20m².

Figure 10: Photo of Borehole No.3

231. №4- Place to build a borehole.-20 m² area, roadside secondary meadows, company materials borehole №5; Coordinates: UTM 38 N0540670 / E4639848. There are no woody plants here, the crops in the cereal-subdivided secondary meadows are represented by Agropyron repens; Lolium perenne; Calamagrostis arundinacea; Poa bulbosa; Cichorium intibus; Knautia Montana; Lactuca sericea; Dorycnium intermedium; Achillea setacea; Scabiosa columbaria;Gypsophilla bicolor and so on.

Figure 11: Photo of Borehole №4

232. №5 - The construction of 1000m³ water capacity reservoir is planned to be constructed near the previous location. Coordinates: UTM 38 N0540681 / E4639847. Construction area 0,4 ha; The plot represents a roadside secondary meadow, surrounded by black pine plantation; Forest derivatives and blossoming shrubbery. The threat of damage to the space for construction is threatened by one single black pin, which is quite suppressed - with a height of 2 m. And diameter - 9 cm.

Figure 12: Photo of Borehole №5

233. №6 - On the roadside secondary meadows, 20m² area is intended to construct a borehole. Coordinates: UTM 38 N0537776 / E4641125; Company materials, -№1 boreholes. Vegetation is represented by weeds and invasive herbs: Ambrosia artemisifolia; Erigeron Canadensis; Chaerophillum aureum and others.

Figure 13: Photo of Borehole №6

234. №7- The construction of a reservoir of 500m³ capacity has already begun in front of the previous location. "Zuzumbo" reservoir, coordinates UTM 38 N0537632 / E4641059. In the existing area (0,2 ha), soil cover has already been removed and no timber plant is observed. The Georgian Oak and 2 Vine are only in the borders of the plot, which are not in danger.

Figure 14: Photo of Borehole №7

235. №8 UTM 38 N0538636 / E4642404 is the coordination of the North East of Telavi, 500 m³ reservoir and company materials are planned - Arrangement of N6 borehole. The total area is 0.4 ha. It is represented by secondary meadows, blackbarrys and some self-growth plums that are not in danger.

Figure 15: Photo of Borehole №8

236. The vegetation identified in the study areas is of secondary nature (developed by naturally occurring vegetation and subsequently replaced by replacement weeds and / or invasive, unnatural groups). They do not represent any conservation value. Red list species of Georgia are observed only on one location – reservoir with the capacity of 2000m^3, near the central reservoir #1, these are 9 self-inflated elms (Ulmus minor).

E.3.1.1 General Description of Vegetation Cover in the Region

237. Natural vegetation within Telavi Municipality area is heavily altered due to agricultural activities. Plains favorable for agricultural lands are cleaned up from

forests, which led to a gradual decline in forest cover and sometimes to its disappearance. Major part of the area is covered by vineyards, corn fields and pastures.

238. Following plants are spread within the forested areas: Georgia Oak (Quercus iberica), Caucasian.

239. Hornbeam (Carpinus caucasica), Oriental beech (Fagus orientalis), Black alder (Alnus barbata), Maple(Acer sp.), Oriental hornbeam (Carpinus orientalis), black locust (Robinia fseudoacacia), Gleditsia(Gleditschia triacanthos), wych elm (Ulmus scabra), Ash tree (Fraxinus excelsior), wild pear (Pyruscaucasica), wild apple (Malus orientalis), Common nut (Corylus avellana), Plums (Prunus divaricata),Pomegranate (Punica granatum); Thorny and liana plants spread in forests and remote areas: Medlar (Mespilus germanica) Hawthorn (Crataegus sp.), Dog-rose (Rosa canina), Peripcola (Periploca graeca), Blackberry (Rubus), Catbriers (Smilax excelsa), Clematis (Clematis vitalba), etc.

240. Grain crops are sown in small quantities within this zone. Priority is given to vines and fruit crops. Asfor the pastures, they are widespread on the river banks and along the forests.

E.3.2 Fauna

E.3.2.1 Wildlife of the Region

241. According to literary sources, following animal species can be found within the municipality area: Chamois, wolves, foxes, jackals, wild boars, rabbits, weasels, voles, the normal mouse, rat, etc. here area lot of bird species. Following fish species can be found in Rivers: Cyprinid, ray-finned fish, Chub, Barbell, Catfish, Carp, Barbel, Asp, etc.

242. According to the locals, there are many wolves - *Canis lupus*, Jackals *Canis aureus*, Pine marten - *Martes*, Least Weasel - *Mustela nivalis*, Fox - *Vulpes vuples*, Badger - *Meles*, European Hedgehog - *Erinaceus concolor* , Caucasian Mole - *Talpa caucasica*, Small Forest Mouse - *Sylvaemus uralensis*; During snowfall local population has observed Roa - *Capreolus* and Wild Boar - *Sus scrofa*. However, this consultation data is not enough to determine species existence and density.

243. Despite the proximity to the river and the favorable environment condition for Otter - *Lutra* (IUCN Red List), their existence has not been identified during the studies.

244. **Birds:** In spring and summer the area of interest is likely to be visited by different species of migratory birds. Water is available for the species inhabiting within the study area, as it is bordered by Alazani River.Therefore, it may be favorable habitat for waterfowl species. In addition, it's much more important for nesting and migratory birds, as a place for food extraction.

245. Based on literature data, the area is a favorable shelter for the following birds: Lesser Spotted Eagle - *Aguila pomarina*, Peregrine - *Falco biarmicus* VU, common kestrel - *Falco tinnunculus*, Black Kite – *Milvus migrans*, Tawny Owl - *Strix aluco* , Great Spotted woodpecker - *Dendrocopos major* , Lesser Spotted Woodpecker -

Dendrocopos minor, Jays - *Garrulus grandarius*, Common Cuckoo - *Cuculus canorus*, Common Blackbird - *Turdus merula* , Wood Pigeon - *Columba palumbus*, Great Tit - *Parus major*, Eurasian Wren - *Troglodytes* , Common Chaffinch - *Fringilla coelebs*, Magpie - *Pica*, Rook - *Corvus frugilegus*, Spades - *Corvus cornix*, Seagull - *Larus sp.*, Hoopoe - *Upupa epops*, European bee-eater - *Merops apiaster*, Quail - *Coturnix*, Maybe Pheasant - *Phasianus colchicus* , etc.

246. **Amphibians:** Green Toad - *Bufo viridis*, Common Toad - *Bufo*, Caucasian Parsley Frog – *Pelobates caucasicus*, Forest Fog - *Rana rididunda* , etc.

247. **Reptiles:** Grass Snake - *Natrix*, Water Snake - *Natrix besselata*, Large-headed Water Snake – *Natrix megalocephala*, Aesculapian Snake - *Elaphe longissima*, Slow Worm - *Anguis fragilis*, Testudo Graeca - *Testudo pontica*, Caucasian Lizard - *Darevskia caucasica*, Georgian Lizard - *Darevskia rudis* is more frequently found, Dagestan Lizard -*Darevskia dagestanica* , etc.

248. **Fish.** Information on fish species in Mtkvari basin and Alazani River is based on literary data and interviews with local communities and fishermen, according to which 29 species are found in the Caspian Sea area, out of which 12 species are found in Mtkvari River basin from which 9 are endemic species of Mtkavri River and its tributaries. Among them are several species of economic importance such as Kura barbell - Barbus lacerta cyri, ray-finned fish - Barbus mursa , Barbel - Barbus capito andSevan khramulya -Varicorhinus capoeta.

249. Freshwater fishes are widespread within the section of Alazani River where it is bordered to the project area. Alazani River in the upstream is a mountain river, which according to the inclination is anecosystem zone of trout.

250. The following fish species have been identified in Alazani River: Alazani Nase - *Ghondrostoma nasus*, Ray-finned fish - *Barbus mursa*, Common carp - *Cyprinus carpio*, Barbel - *Barbus capito*, Sevan khramulya - *Varicorhinus capoeta*, Barbel - *Barbus barbus* Danube bleak - *Chalcalburnus chalcoides*, Chub - *Leuciscus cephalus*, Bleaks - *Alburnus filippi*, Roach - *Rutilus rutilus*, River Goby – *Gobius cephalarges*, Common carp - *Cyprinus carpio*, Barbel - *Barbus capito*, Catfish - *Silurus glanis*, Trout Salmo fario , etc.

251. **Invertebrate animals:** following groups of invertebrate animals are represented within the study area: Nematodes - Nematoda, Oligocheta, Leeches - Hirudinea, Molluscs - Mollusca, Crustacea, Arachnida and Insects - insecta.

E.3.3 Protected Areas

252. There is no any protected area in the vicinity of the study corridor.

E.3.4 Soils

253. Alluvial strongly calcareous clay soils are developed on the right plain of Alazani River, while on the right side - meadow-forest Alluvial not calcareous clay soils. The same type is developed in fragments infoothill zone, brown soil developed on conglomerates and sandstones weathering products. Forestbrown soils are developed in Kakhetian Caucasus and lower part of Gombori range, under mixeddeciduous forest, on clay shales and sandstones weathering crust; above

the forest zone, under subalpineherbaceous vegetation - mountain meadow lawn, in some places peat soils and primitive mountainmeadow soils.

254. Telavi Municipality area is combined into moderately humid subtropical plains and hilly foothill, moderately humid mountain forest and mountain-meadow landscapes, where the landscapes are the following types: Land plots adjacent to the study area are agricultural lands and they are actively processed. Therefore, the topsoil within the influence zone is of high conservation value. This issue should be considered within the framework of further studies.

E.3.5 Baseline Survey

E.3.5.1. Regulatory Requirements

255. The environmental quality standards on the territory of Georgia are regulated by Decree No 287N of August 16, 2001 of the Minister of Labor, Health and Social Affairs of Georgia "On the approval of the environmental quality standards" (State Registration Code 470.230.000.11.119.004.920).

256. Noise impacts should not exceed the levels presented in Table 2, of World Health Organization (WHO) 1999, or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

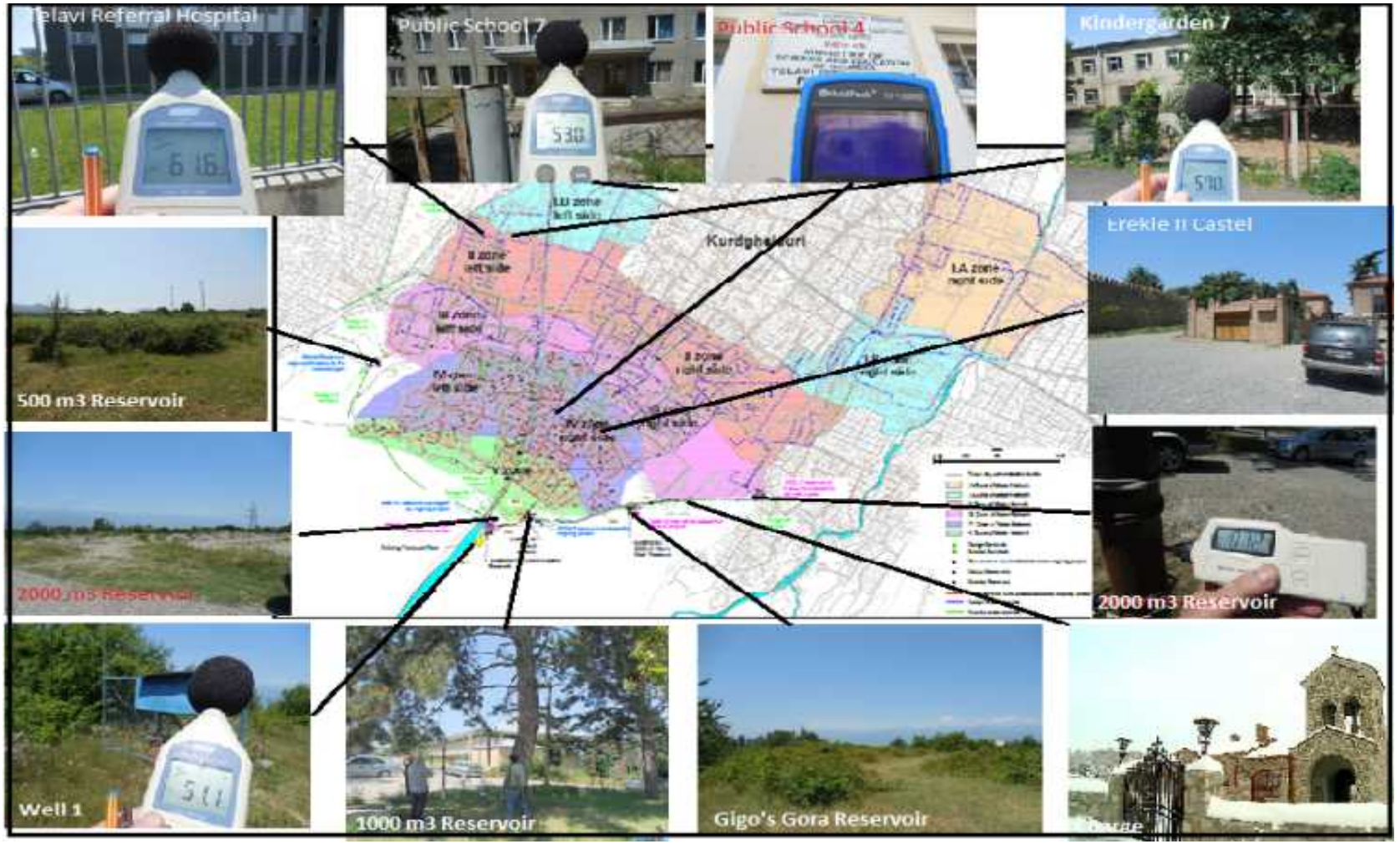
E.3.5.2. Accomplished measurements and results

257. The basic measurements of Dust, Noise, Radiation and Vibration were done both at the construction site and near the sensitive receptors of the proposed project at the following locations on the territory of the city of Telavi:

1. Public School no. 4. (on the territory adjacent to Erekle II street)
2. 2000 m^3 adjacent to the central Reservoir;
3. Adjacent to existing Borehole No. 1
4. Adjacent to Georgian University;
5. Adjacent to Gigo's Gori reservoir;
6. Adjacent to the Church of Easter;
7. Adjacent to Shalauri Reservoir;
8. Adjacent to public school no. 7;
9. Adjacent to Telavi Referral Hospital;
10. Adjacent to Kindergarten #9;
11. Adjacent to 500 m^3 reservoir, in Caucasioni street;
12. On the territory adjacent to Erekle's Palace (Hotel Erekle II).

258. All measurements were carried out during the day time 12:00-16:00 and were temporary. For The locations of these points see Figure 16.

Fig 16: Sampling points



259. Under the project, the new Reservoirs and Boreholes as well as new water-supply network will be installed in the city. The project also envisages the rehabilitation of the existing water-supply infrastructure. The major impact on the local population is expected both, in the rehabilitation and construction phases of the existing reservoirs and wells. Following the fact that the construction/rehabilitation of these objects will take place on one location, for some months.

260. As for the installation of the new water-supply pipelines, this process will have an impact on the local population for 2 or 3 days. The process of digging the trenches for the pipes, laying the pipes and backfilling with soil is short. As the practice shows, following the subjective and objective reasons, the Construction Company installs 50-150 m pipelines a day.

261. Neither site where the rehabilitation or construction of the reservoirs and boreholes are planned, is located in a densely populated area. The nearest buildings and premises are located minimum 100 m from them.

262. The basic measurements were done in June 2017 for noise, vibration, dust and radiation levels. See Table 30 for the results of basic measurements.

Table 30: Results of the Measurement

#	Place of Measurement	Dust Mg/m^3		Noise db		Radiation mR/h		Vibro-acceleration m/sek	
		Standard	Result	Standard	Result	Standard	Result	Standard	Result
1	4 Public school $41^0 55^1 05.95^{11}$ N $45^0 28^1 17.27^{11}$ E	0.5	0.03	55	55	30	10	4.0	0.5
2	2000 m^3 reservoir $41^0 54^1 26.12^{11}$ N $45^0 27^1 55.206^1$ E		0.01		51		11		1.2
3	Well 1 $41^0 54^1 19.20^{11}$ N $45^0 27^1 48.89^{11}$ E		0.01		52		11		2.0
4	1000 m^3 reservoir $41^0 54^1 28.45^{11}$ N $45^0 28^1 08.22^{11}$ E		0.015		52		12		1.0
5	"Gigos Gora" Reservoir $41^0 54^1 30.23^{11}$ N $45^0 28^1 41.33^{11}$ E		0.01		51		10		0.5
6	Charch $41^0 54^1 32.01^{11}$ N $45^0 28^1 59.56^{11}$ E		0.01		53		12		0.2
7	"Shaluri Reservoir" $41^0 54^1 31.36^{11}$ N $45^0 29^1 29.86^{11}$ E		0.1		52		11		1.2

#	Place of Measurement	Dust Mg/m^3		Noise db		Radiation mR/h		Vibro-acceleration m/sek	
		Standard	Result	Standard	Result	Standard	Result	Standard	Result
8	#7 Public School $41^0 55^1 37.30^{11}$ N $45^0 08^1 29.86^{11}$ E		0.02		53		11		1.0
9	Telavi Referral Hospital $41^0 55^1 18.51^{11}$ N $45^0 28^1 10.13^{11}$ E		0.03		55		12		1.5
10	Kindergarden 9 $41^0 55^1 16.19^{11}$ N $45^0 28^1 18.02^{11}$ E		0.05		57		11		1.0
11	500 m^3 Reservoir $41^0 55^1 47.42^{11}$ N $45^0 28^1 08.70^{11}$ E		0.02		52		11		0.5
12	Erekle II Castel $41^0 55^1 03.86^{11}$ N $45^0 28^1 34.93^{11}$ E		0.1		55		12		1.4

263. Due to the changes in the scope the of work of the Telavi WS project and in accordance with the Safeguard Policy Statement (SPS) (2009), IEE was updated and an additional environmental quality measurements related to dust, noise and air pollution were conducted on June 5, 2020, by the National Environmental Protection Agency of the Ministry of Environment Protection and Agriculture of Georgia. The measurement data are presented in the Table 31 below. According to this data air pollution and noise propagation are within the framework of existing standards and, therefore, no additional mitigation measures are required.

Table 31: Results of the Environmental Quality Measurements, 5 June 2020

N	X	Y	Location	Address	Dust mg/m³	[3]Noise dBA (MAX) (1-hour)	NO_2 mg/m³	CO mg/m³	SO_2 mg/m³	$PM_{2.5}$	PM_{10}	Time:
National Standards					0,5	55 Residential; Institutional; Educational 70 Industrial; Commercial	0,2	5,0	0,5	0,025 mg/m³	0,04 mg/m³	
1	538685.4	4639759.1	Reservoir N2 53.19.31.362 Near the Telavi Gogebashvili University (100-150 meters from reservoir)	Street, Georgian University	0.08	52.1	0.14	0.09	<0.1	0.015	0.032	13:05
2	538931.6	4639765.7	Reservoir N3 53.20.42.244 Near the college	Street Georgian University	0.056	52.9	0.018	0.37	<0.1	0.019	0.017	13:17

[3] Residential; institutional; educational – 55 (Daytime - 07:00 - 22:00); Residential; institutional; educational – 45 (Nighttime - 22:00 - 07:00). Industrial; commercial 70 (Daytime, Nighttime)

N	X	Y	Location	Address	Dust mg/m^3	[3]Noise dBA (MAX) (1-hour)	NO_2 mg/m^3	CO mg/m^3	SO_2 mg/m^3	$PM_{2.5}$	PM_{10}	Time:
3	540051.3	4639817.4	Reserve N5 53.20.43.097, Near the church (150 meters from the reservoir)	Street Georgian University	0.069	50.5	0.021	0.11	<0.1	O,005	0.027	13:31
4	537772.3	4641000.5	Design reservoir N6 53.20.39.084, 180 meters from the nearest residential house.	Street Georgian University	0.075	47.9	0.015	0.12	<0.1	0.014	0.026	13:43
5	538677.6	4642402.8	Design reservoir N7 53.20.31.655, Near the residential building (70 meters away from the reservoir).	N 51a Caucasus Street,	0.049	46.8	0.01	0.15	<0.1	0,006	0.037	13:53
6	538873.0	4642136.3	Network, Near the Nursery management	Caucasus Street	0.063	51.1	0.014	0.08	<0.1	0.008	0.017	14:00

N	X	Y	Location	Address	Dust mg/m^3	[3]Noise dBA (MAX) (1-hour)	NO_2 mg/m^3	CO mg/m^3	SO_2 mg/m^3	$PM_{2.5}$	PM_{10}	Time:
			Agency									
7	539071.8	4642581.7	Network, there are residential buildings near the pipeline	Near Alazani Avenue	0.058	48.8	0.013	0.09	<0.1	0,017	0,023	14:07
8	540736.7	4640870.1	The network, near the pipe are the residential buildings	N 79 Rustaveli Avenue	0.067	53.9	0.016	0.29	<0.1	0,004	0,010	14:22
9	539319.1	4641125.2	The network, the pipe runs near the houses	Chavchavadze Avenue	0.074	54.8	0.023	0.28	<0.1	0,016	0,015	14:31
10	539474.8	4640869.1	The network, pipeline passes by the Telavi Historical Museum	N 31 Tunnel Street	0.047	49.9	0.019	0.17	<0.1	O,003	0,016	14:47

E.4 Description of the Socio-Economic Environment

264. Environemntal measurements were carried out for proposed IEE to be reflected in design process and identified mitigation measures.

E.4.1 Population

265. Based on the data of the National Statistics Office, the approximate population of Telavi Municipality is 70 900 people and the majority lives in villages. In the municipality density is 84/km2.

Table 32: The number of population in Georgia, in a research region and municipality (thousand persons).

	2009	2010	2011	2012	2013	2014
Georgia	**4385.4**	**4436.**	**4469.**	**4497.6**	**4483.8**	**4490.**
Kakheti region	401,4	404,5	406,2	407,1	405,1	405,0
Telavi Municipality	69,8	70,5	71,0	71,2	70,9	70,9

266. According to the 2002 census, number of population in Telavi was 21.8 thousand people. Prognostic number of population within the area served by the proposed treatment plant is given in Table 33 below.

Table 33: Prognostic number of population within the area served by the proposed treatment plant

	Phase 1 – 2030		Phase 2 – 2040	
Town/village	Number of populatio	Associated with the treatment plant	Number of populatio	Associated with the treatment plant
Telavi	23,065	Yes	23,461	Yes
Kurdghelauri	5,096	Yes	5,183	Yes
Chinandali	3,843	Yes	3,909	Yes
Vardisubani	3,270	Yes	3,326	Yes
Shalauri	2,902	Yes	2,952	Yes
Kodoli	2,772	Yes	2,820	Yes
Kisiskhevi	2,524	Yes	2,567	Yes
Nasamkhrali	637	Yes	648	Yes
Karajala	9,123	No	9,279	Yes
Rusipiri	3,213	No	3,268	Yes
Ikalto	2,985	No	3,036	Yes
Akura	2,536	No	2,579	Yes
Kvemo Khodasheni	1,829	No	1,860	Yes
Gulgula	1,527	No	1,553	Yes
Busheti	1,419	No	1,443	Yes
Vanta	1,276	No	1,298	Yes

E.4.2 Internally Displaced Persons

267. There is a natural decrease of population in Kakheti, both in cities and villages. The death rate was higher than the birth rate in 6 regions of Georgia, while the natural decrease of population in cities was registered in three regions: Kakheti, Samegrelo-Zemo Svaneti and Racha-Lechkhumi.Therefore, in- and out-migration of the population is obvious. Migration statistics for the region is unavailable but according to the information obtained during studies, there is a whole number of deserted villages in Kakheti (in Akhmeta and Dedoplistskaro municipalities). A large part of employable workforce migrates to other cities of Georgia or abroad.

268. Due to the lack of prospects for finding a job, young people often leave the region. This leads to the ageing of population, especially in villages. Stopping the migration of young people and increasing the birth-rate is a challenge facing the region. If the ageing trend continues, the economy will not develop, the standard of living will not improve and, as a result, the government's social and healthcare spending will increase considerably.

E.4.3 Employment Rate

269. The table given below shows the level of the economic activity of Kakheti region. The figures are obtained from HIS (Integrated Household Survey).

Table 34: Economic Activity Level in Kakheti Region for 2014

Total active population (workforce)	196,4
Employed	183,9
Hired	47,2
Self-employed	136,6
Undefined	0,1
Unemployed	12,5
Population out of the workforce	73,4
Unemployment Rate (%)	**6,4**
Activity Rate (%)	**72,8**
Employment Rate (%)	**68,2**

E.4.3.1 Number of Employed in the Region by Activity

270. Kakheti region population employment rates by their activities are given in the Table 35.

Table 35: Number of Employed by Activity

Employment	Number of Employ
Agriculture, hunting and forestry	1369

Fishing, fishery	50
Mining Industry	567
Processing	4548
Power, gas and water production and distribution	1158
Construction	2378
Trade: cars, household goods and personal item repair	4167
Hotels and restaurants	671
Transport and communications	197
Real estate operations, renting and customer service	643
Education	252
Healthcare and social assistance	995
Community, social and personal service provision	795

E.4.4 Production

271. As Kakheti is an agricultural region, the share of non-agricultural economy in the gross value added(GVA) of the region and in the gross domestic product of the country is small. The level of urbanization is low in Kakheti due to the mono-agrarian character of the region which means that Kakheti will not shift its focus to industry in the near future. In 2011, agriculture accounted for 24% of the region's GVA, while the share of industry was only 9%, trade was 5%, transport and communication - 1,2% and construction - 1,7%. It is noteworthy that there are no data available about the share of tourism, whereas the share of various service sectors in 2011 was high (20%). The aggregate share of other sectors was 38%.

272. The recent growth of construction has spurred the production of local construction materials (bricks, tiles, building blocks, etc.). There are mining and processing industries in the region: mining and processing of slate and marble, mining of limestone in the municipalities of Telavi and processing of limestone in the municipalities of Dedoplistskaro.

E.4.5 Agriculture

273. 38% of Georgia's agricultural land is in the Kakheti region, where arable lands and pastures occupy the largest area. Kakheti ranks first in Georgia in this category of lands and is therefore a leading region in the production of cereals and livestock. Dedoplistskaro is the largest municipality in Kakheti with the largest area of agricultural lands, followed by Akhmeta, Sagarejo and Signagi.

274. It is noteworthy that farmers do not take good care of soil and do not enrich it with a sufficient amount of mineral or organic fertilizers. Due to the poor management of soil, lands are often infested with weeds. Due to a large number of animals grazing on pastures there is a process of desertification, especially in Sagarejo and Dedoplistskaro. Most agricultural lands are affected by soil erosion caused by wind and water.

275. The greatest threat to the agricultural lands of Kakheti is posed by the Alazani River in the area of Georgia-Azerbaijan border. For the past 15 years the river has flooded more than 100 hectares of arable and pasture land, and such losses increase annually. As a result, the local population loses a significant part of incomes from livestock and agricultural crops. The massive spread of pests (especially Caucasian Marble Chafer

(Polyphylla olivieri) in the soils of Kakheti that damage the new vineyards has also become dangerous.

E.4.5.1 Viticulture and Wine-making Sector

276. Kakheti is a unique ancient vine-growing and wine-producing region. It has unique micro zones that traditionally produce wines of origin appellations and other high-quality Georgian wines. Today, around 65–70 % of all vineyards in Georgia are concentrated in the Kakheti Region. Kakheti ranks first in the area of vineyards (33,582 ha), followed by Imaret and Shida Kartli.

277. The total area of vineyards in Kakheti is 33,582.5 ha. Gurjaani has the largest vineyards in Kakheti with the total area of 7,618 ha, followed by Kvareli - 6,382 ha, and Telavi - 6,048 ha. The smallest area of vineyards is in Dedoplistskaro - 1,499 ha, and Akhmeta - 1,747 ha.It is noteworthy that 14 out of 18 appellations of wine, registered in Georgia are produced in Kakheti.

278. There was a considerable decline in the export of Georgian wines in 2006 and 2009 due to the embargo imposed by the Russian Federation, followed by a relatively steady upward trend in 2010.

279. Georgian wines are exported primarily to the post-Soviet countries. In 2005-2012, the largest quantity of wine was exported to Ukraine, Kazakhstan and Belarus, and the least quantity was exported to the Kyrgyz Republic, Turkmenistan, Uzbekistan and Moldova. The wines produced in Kakheti account for 79-82% in total exports of appellation wines.

E.4.5.2 Cereal Production Sector

280. Kakheti has a long history of cereal production thanks to the fertility of land and diversity of cereal crops. Kakheti is a leading wheat-producing region with a large area of land under wheat. Kakheti has the largest area of land under wheat compared to other regions but this area has been decreasing year by year. In 2007, Kakheti had the largest crop of wheat - 62 thousand tons; in 2009-2010there was a sharp decline in wheat yields which increased again in 2012.

E.4.5.3 Livestock

281. Livestock has traditionally been an important component of the agricultural industry of Kakheti. Large areas of pastures and grasslands, favorable agricultural and climatic conditions are major factors contributing to the development of this sector. Kakheti ranks fifth with a share of 9% after Imaret, Samegrelo, Kvemo Kartli and Samtskhe-Javakheti.Cattle-farming is an important part of Kakheti's livestock sector. Among the other municipalities of Kakheti, Telavi has the smallest stock of cattle, and Sagarejo has the largest stock. Kakheti ranks fourth in meat production after Imereti, Samegrelo, Kvemo Kartli and Shida Kartli.

E.4.6 Healthcare

282. The standard of living in the region is largely dependent on the efficiency of the healthcare sector. Effective from 1 April 2013 the government-funded comprehensive healthcare program has been launched in Kakheti, as well as in Georgia, with the purpose of providing the population with access to free primary and emergency care. 122 rural outpatient clinics operate in Kakheti. In 2011, Kakhetiranked fourth at 1.3%

among other regions of Georgia in the number of referrals to medical assistance on per person basis, the lowest level for the past 6 years. Primary care facilities are in a very poor state. Most of the facilities do not meet international standards. Very often, despite the efforts of medical staff, hygienic condition is very bad.

283. In the primary care sector of Kakheti there is one doctor for 1,000 people which is a quite high ratio. At the same time, there is a lack of paramedical personnel (0.9 medical assistants per doctor). The educational level of doctors is satisfactory: 198 primary care doctors and 209 medical assistants were retrained as family physicians, i.e. 49% of the total medical staff in Kakheti. Renovated and properly equipped hospitals are available in every municipality. Based on the data of the Ministry of Labor, Healthcare and Social Protection (MoLHSP), the hospital bed-population ratio in Kakheti is 95.4 per100,000 people, which is the lowest level in Georgia after Mtskheta-Mtianeti.

E.4.7 Education

284. All levels of the educational system are present in Kakheti. In 2013 there were 206 child day care centers, 192 schools (mostly public schools including several private schools), 2 state vocational colleges and 1 state university in the region. 18% of population has a degree-level qualification (higher education), and 32% has a vocational qualification. According to Geostat data, 29 schools are functioning in Telavi municipality, and the total number of pupils is 8053.

E.4.8 Tourism

285. Around 30 hotels of different levels (including the expensive hotel Ambassador, Lopota, Dzveli Telavi,Kvarlis Tba), more than 100 small hotels and guest houses, around 70 catering facilities, restaurants,café-bars, pizzerias. etc. (being only 3.4% of similar facilities in Georgia), and 15 travel companies operate in the Kakheti region. Room rates range from GEL 10-15 to GEL 350 in the region. The level of service, standards and staff shortage is a problem faced even by expensive hotels. It should also be noted that hotel owners do not provide statistical agencies with accurate data on occupancy rates so it is difficult to determine the total number of visitors.

286. In 2013, the flow of tourists to Telavi is expected to increase considerably (the recently renovated Telavi is becoming a popular destination). However, these are mostly low-budget tourists. Therefore, attraction of high-budget tourists remains a challenge for the region.

287. The natural biodiversity of Kakheti provides an opportunity for the development of recreational tourism in Akhmeta, Gurjaani, Telavi, Sagarejo, Signagi and Kvareli municipalities. It is important to develop adventure tourism in Akhmeta, Dedoplistskaro, Lagodekhi municipalities, eco-tourism in Akhmeta, Dedoplistskaro and Lagodekhi municipalities, and agricultural tourism in all municipalities of Kakheti.

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E.4.9 Historical-Cultural Monuments in the Region

290. Telavi is the main city and administrative center of Georgia's eastern province of Kakheti. Its population consists of some 19,629 inhabitants (as of the year 2014). Telavi and its surroundings are rich in historical, architectural and natural monuments. The most important heritage monuments preserved within the city limits include:

- "Dzveli Galavani" (old walls) - fortress of the first Kakhetian kings (9th-10th centuries AD);
- Church of the St. Mary (16th century AD);
- Church of the Holy Trinity (6th century AD);
- Fortress "Batonis Tsikhe" (fortress of master) built in 17th century AD - this is one of the only well-preserved medieval royal palaces in Georgia;
- "Korchibashishvilebis Tsikhe" - castle of the local noblemen named Korchibashishvilis (16th-18th century AD);
- "Vakhvakhishvilebis Tsikhe" - castle of the local noblemen named Vakhvakhishvilis (18th century AD).

291. Telavi is the only city in Georgia where four different fortification monuments from different historical periods remain relatively intact. Due to this reason, architects, scholars and art historians consider Telavi as the most "medieval" city in the country.

292. Another curious sight in Telavi is a 900-year-old plane tree (40 meters high, 11 meters around the trunk). Other notable landmarks around Telavi include the Alaverdi Cathedral (11th century AD) - the second highest cathedral in Georgia after the newly built Tbilisi Sameba Cathedral, the Ikalto Academy (8th-12th centuries AD) - where the famous Georgian writer Shota Rustaveli studied, the Church of St. George (dedicated to the patron saint of Georgia, where it is said that there are 365 churches named St. George), ruins of the city and castle of Gremi (the former capital of Kakheti from the 15th-17th centuries AD), Shuamta - a complex made up of three churches of different periods - 6th, 7th and 8th centuries in a highland forest, Akhali Shuamta ("New Shuamta" in English) - the monastery close to Dzveli Shuamta ("Old Shuamta" in English), built in the 16th century, the stunning Tsinandali Gardens (the residential Palace of Noblemen Chavchavadzes family) and many others.

Figure 17: Photo of the plane tree

Figure 18: Photo of Alaverdi cathedral

Figure 19: Photo of batonis Tsikhe in the center of Telavi

293. **The Palace of King Erekle II** in Telavi: is considered to be the best preserved medieval royal palace in Georgia. Built by King Archil in 1667-1675, it was the residence of Kakhetian kings during the 17th and 18th centuries.

294. The Batonis-Tsikhe fortress has survived in Telavi center. "Batonis-Tsikhe" means “The Master’s Fortress”. In the 17th–18th centuries this fortress was the residence of Kakhetin Kings. According to historians it was built in two stages – in 1667-1675 and in the second half of the 18th century. The complex comprises the wall, the imperial palace, two churches, the bath and the tunnel. The fortress wall is a limestone battlement of 5m height with towers. It performed the defensive function.

F. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

F.1 Summary of Activities and Anticipated Impacts

A. Introduction

295. Potential environmental impacts of the proposed infrastructure components are presented in this section. Mitigation measures to minimize / mitigate negative impacts, if any are recommended along with the agency responsible for implementation. Monitoring actions to be conducted during the implementation phase is also recommended.

296. Sensitive receptors for Telavi WS projects include, but are not limited to flora and fauna within and near the project area, along the access roads and construction yard, Alazani river and its ichtiophauna (the project area is located on the right terrace of Alazani River in 1,0-1,2 km from active riverbed) and population living along the access roads, surface water, soil. These are areas which are more susceptible to the adverse effects of an anthropogenic activity such as noise, air emissions, and traffic influx.

297. As a general practice, an IEE should evaluate impacts due to the location, design, construction and operation of the project. Construction and operation are the two activities in which the project interacts physically with the environment, so these are the two activities during which the environmental impacts occur. In assessing the effects of these processes therefore, all potential impacts of the project should be identified, and mitigation is devised for any negative impacts. Following sections evaluate impacts of the proposed Water Supply project in Telavi i) Location Impacts: Includes impacts associated with site selection and include loss of on-site biophysical array and encroachment either directly or indirectly on adjacent environments. It also includes impacts on people who will lose their livelihood or any other structures by the development of that site. ii) Design Impact: Includes impacts arising from Investment Program Design, including technology used, scale of operation / throughput, waste production, discharge specifications, pollution sources and ancillary services. iii) Construction Impacts: Includes impacts caused by site clearing, earthworks, machinery, vehicles and workers. Construction site impacts include erosion, dust, noise, traffic congestion and waste production. iv) O & M Impacts: Include impacts arising from the operation and maintenance activities of the infrastructure facility.

298. **Utilities.** Existing telephone lines, electric poles, and wires within the proposed subproject locations may require to be shifted in few cases, specifically at urban area. To mitigate the adverse impacts due to relocation of the utilities, IA will: (i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; (ii) Conduct detailed site surveys with the construction drawings and discuss with the respective agencies during the construction phase, before ground clearance; (iii) Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. In case of disruption of water supply, alternative supply, through tankers, shall be provided. The IPMO has to obtain necessary clearances before starting the work. The proposed clear water transmission line will cross highways, railways and canal, which needs permission. If utilities are moved to private land, a corresponding LARP will be developed and relevant compensation will be paid to APs.

299. Site selection of construction yards, stockpile areas, storage areas, and disposal areas. Priority is to locate these near the subproject locations. However, if it is deemed necessary to locate elsewhere, sites to be considered will not result in destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas will not be considered for setting up yards to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near the water bodies, swamps, or in areas which will inconvenience the community. All locations would be included in the design specifications and on plan drawings. Construction yards shall be located at least 200 m from residential areas. Material stockpiles shall be protected by bunds during the monsoon to arrest the silt laden runoff into drains. The subproject is likely to generate soil from excavations, which needs to be disposed safely or utilized locally. The following measures should be considered for disposal of surplus/waste soil: i) The excavated soil should be removed from construction area at the earliest for beneficial reuse such as land raising / filling of excavated areas. ii) Soil should be covered with tarpaulin sheets during transportation. 48 iii) Soil transportation should not be done during peak hours and should be avoid narrow and heavy traffic routes and important religious or tourist sites etc.

300. Site selection of sources of materials quarries. Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be included in the design specifications and on plan drawings. Priority would be sites already permitted by Mines and Geology Department. If other sites are necessary, these would to be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas even if some distance from construction activities. 15. For Davangere subproject, the quarry material required will be sand and stone aggregate, and the nearest quarries are at ChikkaKuruvatti, Harihar and Medleri (sand quarries along River Tungabhadra) and Chatra at Motebennur and Hunasikatte in Ranebennur Taluka for stone aggregate. These are existing quarries and are licensed by Mines and Geology Department. The material from the existing quarries will be adequate for the subproject construction, and therefore no new quarry sites will be developed for the purpose.

301. **Quarry and Borrow Sites**. The following measures shall be implemented at quarry and borrow sites to minimize impacts on water quality, reduce dust emission during transport, minimize soil erosion and siltation of nearby water courses and avoid damage to productive land and ecologically sensitive areas: Utilize readily available sources of materials. If contractor procures materials from existing borrow pits and quarries, ensure that these conform to all relevant regulatory requirements; Borrow areas and quarries (if these are being opened up exclusively for the project) must comply with environmental requirements, as applicable. If additional quarries will be required after construction has started, obtain written approval from CMC PMU; and Submit to DSIDC on a monthly basis the documentation of sources of materials

302. **Noise Levels.** The soils are shallow in some parts of the subproject area, and therefore activities like rock cutting for trenching will be required in those areas. This requires using of pneumatic drills and there will be high noise during the activity. Also, where the pipelines are required to be laid in the roadway, pneumatic drills will be used

to break open the road surface. Pneumatic drills typically generate an equitant noise of 82-98 dBA, at 1 m distance from the activity. The sensitive receptors are the general population and sociocultural institutions in the area. Noise will be for a short term (about 2-3 days at each location) thus impact is minimal and short-term. The construction contractor will be required to: (i) Plan activities in consultation with the PIU so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Construction work shall be limited to day light hours (6 AM to 6 PM) for all the works located within the town; for facilities outside the town and habitations, the timings may be relaxed with the permission of IPMO and Telavi Municipality, however no work should be conducted between 10 PM – 6 AM at any site. (iii) Provide prior information to the local public about the work schedule; (iv) Ensure that there are no old and sensitive buildings that may come under risk due to the use of pneumatic drills; if there is risk, cut the rocks manually by chiselling; (v) Minimize noise from construction equipment/pneumatic drills by using silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and (vi) Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. Impact on Economic Development

303. Land Use. Subproject activities will not affect the land use. Most of the subproject activities are being conducted along the road ways within semi urban / urban environment; and other facilities (like water reservoirs) are being developed on government-owned land.

304. **Accessibility.** Transport infrastructure will be affected by the pipe laying work, as in the highway and semi urban/ urban areas. The road itself may also be excavated. Traffic will therefore be disrupted. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to: i) Plan pipeline work in consultation with the traffic police ii) Plan work such that trench excavation, pipe laying, and refilling including compacting, at a stretch is completed in a minimum possible time; iii) Provide for immediate consolidation of backfilling material to desired compaction – this will allow immediate road restoration and therefore will minimize disturbance to the traffic movement; iv) Schedule transport and hauling activities during non-peak hours; v) Do not close the road completely, allow traffic to move on one line; vi) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; vii) In unavoidable circumstances of road closure, provide alternative routes, and ensure that public is informed about such traffic diversions; viii) At all work sites public information/caution boards shall be provided – information shall inter-alia include: project name, cost and schedule; executing agency and contractor details; nature and schedule of work at that road/locality; traffic diversion details, if any; entry restriction information; competent official's name and contact for public complaints. ix) Keep the site free from all unnecessary obstructions; x) Drive vehicles in a considerate manner; xi) Prepare a Traffic Management Plan –a template is provided for reference at

305. The implementation of the project will affect most of the city as branches of the distribution network are located in most roads and streets and the construction process will continue for about 1.5-2 years. However, the construction work is in fact not expected to cause major negative impacts. This is because: (i) Most network construction will be conducted by small teams working on short lengths at a time so most impacts will be localized and short in duration; and (ii) Because of the small population and not overcrowded conditions in much of the City, the environment of

Telavi is not degraded, and all environmental condition are within the accepted norms (see table 21).

306. Planning and Design was done by Design Department of UWSCG. To define the project detailed survey of the project area was conducted and the initial design was update with additional information obtained from survey; and submit the detailed design package.

307. **Vehicle movement:** Plan and conduct work in such a way that can construction works in the city be completed in 6-8 hours with as little as possible of traffic interruption, so all of this work (most of the daytime work in minor roads) will be conducted by small teams of men, working on short lengths of the network (around 100 - 150 m) at a time. Provide, erect and maintain barricades, signs, markings, flags, lights and flagmen as may be required for the information and protection of traffic. The flagmen shall be equipped with red and green flags and lanterns/lights. Ensure barricades, signs, marking, and flags are of strong design. All barriers on roads and pedestrian areas shall be lit with warning lights during night time or when there is poor visibility. Where the diversion or closure of any existing carriageway, walkway or public right of way is temporarily necessitated by the works, provide and maintain an alternative, which shall be operational before interference with the existing way.

Table 36: Environment-Related Design Features of the Package

Activity	Design Consideration
Contractor's responsibility	The contractors shall be familiar with the present traffic congestion rules of Telavi, for preparation of road cutting plans before execution of works
Pipe replacement rehabilitation and network extension	In all cases, AC pipes shall be replaced. Existing AC pipes, where intact, shall be left insitu and not disturbed. Where the AC pipe is damaged and where there is a risk of asbestos particles becoming airborne, the contractor shall follow all necessary laws as laid out locally or by this IEE/EMP to contain and remove hazardous material
Working hours and times	The Contractor will perform all construction work in the city of Telavi in the daytime from 08:00 to 19:00
Road cutting	- Unnecessary road cutting should be avoided. - The contractor has to take all necessary safeguards to avoid accidents at site, prevent loss/damage to all existing utilities like pipelines, telephone/gas/electric cables, poles etc and any government or private property during the contract period. - DWASA will apply for the road cutting

Activity	Design Consideration
	permission and the contractor shall give full effort and cost for collection of road cutting permission for required days. Therefore, the road cutting plans necessary for the application must be prepared by the contractor. - No temporary or permanent works must proceed before the design and drawings are approved by the Project Manager and road cutting permission obtained from DCC by PMU - The contractor shall prepare a traffic management scheme (road closure program or diversions) and incorporate detail of traffic diversions and pedestrian routes, all traffic signs (for the regulation and for information) and road markings shall be ensured prior to start of road cutting.

308. Proposed water supply systems project will certainly produce some environmental impacts in project area. Activities to be performed within the scope of the Project were examined in 2 phases:

A. Construction Phase

- Pre-construction activities such as contractor office set ups, necessary equipment stacks and the site preparation
- Building the new reservoirs
- Installation of the new pipes and replacement of the old pipes on the territory of the city of Telavi
- Use of quarries
- Vehicle movements
- Construction yard
- Disposal of waste etc.

B. Operational Phase

- Drinking water quality monitoring
- Management of emergencies, scheduled rehabilitation and conducting repairs

309. Positive impact: after the Project is realized, the drinking water network will fully cover the territory of Telavi town. High quality drinking water will be supplied 24 hrs.a days. 100% of Telavi population.

310. The local community is in favor of the project, as it has great problems with the current situation, when in some parts of the city water is served only 2-3 hours within 3-4 days.

311. A series of consultations were carried out in the framework of the proposed IEE, and a public hearing was held in Telavi in June 2017. Detailed information about the consultations is described in section G - Information Disclosure, Consultation, and Participation. The issues raised during the public hearings are presented in the ANNEX D.

312. All thoughts and suggestions of the local population, expressed during these meetings on, timing of works, reinstatement of roads, , traffic issues, others, are filtered into design and construction planning.

313. Negative environmental impact at the construction stage of the project is expected during the following operations:

1. Noise dust and vibration exerted during the construction of new reservoirs;
2. When installing the new water supply pipes or replacing the old ones, during the excavations of the trenches to install the pipes a great amount of inert waste will also be accumulated. This is mostly concrete, asphalt and ground.
3. Some streets in Telavi are narrow and the traffic in them will be limited much during the project works.

314. This paragraph provides a brief description of anticipated site-specific impacts related to the construction phase of the sub-project “Improvement of Telavi Water Supply system”.

Table 37: Site-Specific Impacts

	Construction Phase. Potential Impacts During Construction Works	Risk	Sites
1	Dust, noise, vibration	High Risk	Construction of New Reservoirs During excavation of pipe trenches within the areas of town of Telavi.
2	Pollution of surface water during construction and rehabilitation works	Moderate Risk	Planned rehabilitation of the existing network of water supply system crosses rivers in several places.
3	Impacts on Archaeological Sites	Low Risk	No damage to any archaeological site shall be expected. The pipe laying sites in Telavi is located in the areas of extensive on-going human impact.
4	Impacts on traffic	High Risk	Existing water supply system of Telavi is partially replaced by the project. For the implementation of above mentioned will be necessary to cut trenches in the streets of the city which will restrict transportation

	Construction Phase. Potential Impacts During Construction Works	Risk	Sites
			by transport means or for pedestrians as well. Special problems will be created in the narrow streets of the city Telavi.
5	Landslides, slumps, slips and other mass movements.	Moderate Risk	No large scale earthworks are planned under the Project. Despite this, the landslide processes may be triggered during construction of the pumping stations.
6	Impacts on flora and fauna	High Risk	Most of the project sites located in this area have been experiencing the severe human impact. However, some loss of red list trees may occur on the territory of the reservoir No.1.
7	Pollution risk for ground waters	Moderate Risk	No major spills of fuel and lubricates at construction sites due to leakages are expected. The spills, which are likely to cause groundwater contamination, may occur during fuelling construction machinery at the construction sites and/or construction yards.
8	Pollution risk for air quality	Moderate Risk	Air pollution may occur in the inhibited areas, including town of Telavi
9	Poaching by construction workers	Low Risk	With the construction of boreholes, the accessibility of humans to the river will increase, which may increase the risk of poaching. At other sites too, wildlife are at risk from poaching by construction workers, so awareness raising will be an important means to mitigate this risk. Awareness will be raised among workers and contractors regarding illegal poaching. Workers will be made aware of the fines and penalties for poaching, as well as the risk of job loss, if caught in these illegal activities.
10	Hazardous Construction Wastes	Low Risk	Small quantities of hazardous wastes will be generated as a result of vehicle operations and the maintenance activities.

	Construction Phase. Potential Impacts During Construction Works	Risk	Sites
11	Impact on existing infrastructure	Low Risk	Electric power transmission systems, existing water supply and drainage channel systems and channels
12	Poor sanitation and solid waste disposal in construction yards and work sites (sewerage, sanitation, waste management)	Low Risk	Construction yard will not be used as living facilities because it is expected that majority of the employees would be local persons. The construction yard would be equipped with a bio toilet and other necessary infrastructure.
13	Construction Related Impacts at the Quarrying Sites	Low Risk	The exploration of the borrow pits should be conducted by the licensed companies or the Contractor has to obtain its own license. However, potential impact of the increased quarrying activities on river bed and floodplain landscape, ichthyofauna and groundwater should be considered.
14	Vehicle movement	Moderate Risk	The frequency of vehicle will be increased. Dump trucks may be using minor roads next to residential houses.
15	Minimizing noise level		Ensure noise level of the machineries and equipment must not exceed 70dB(A). - Use modern vehicles and machinery with standard adaptations to reduce noise and exhaust emissions, and ensure they are maintained to manufacturers' specifications. - Noise-generating equipment must be fitted with silencers. - If a worker is exposed to noise above a noise exposure limit, the contractor must investigate options for engineered noise control such as using low-noise excavators, jackhammers, drills, and power generators. - If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection
16	Minimizing dust generation and air pollution		Limit dust by removing waste soil quickly, bringing sand to site only when necessary, covering and watering stockpiles, and covering

	Construction Phase. Potential Impacts During Construction Works	Risk	Sites
			soil and sand when carried on trucks. - Vehicles travelling to and from the construction site must adhere to speed limits so as to avoid producing excessive dust. - Access and other cleared surfaces, including backfilled trenches, must be dampened whenever possible and especially in dry and windy conditions to avoid excessive dust. - Vehicles and machinery are to be kept in good working order and to meet manufacturer's specifications for safety, fuel consumption, etc. - The contractor is to have the equipment seen to as soon as possible should excessive emissions be observed.

315. When construction is conducted in residential areas, people may be disturbed by the noise of the construction activities and by dust during dry and windy weather, and trenches may impede access to houses for residents and their vehicles. However, these impacts will not be greatly significant because: (i) Disturbance at most locations will last for a few days only; (ii) Background noise of Telavi is low, and even if the noise level will raise during the construction period, people will be more willing to tolerate short-term temporary disturbance if they are aware of the benefits they will gain from an improved water supply.

316. There is inevitably a safety risk when substantial construction such as this is conducted in an urban area, and strict precautions are needed to ensure the safety of both workers and citizens. Contractors will be required to produce and implement site Health and Safety (H&S) Plan.

317. An additional, particularly acute health risk presented by this work derives from the fact that some parts of the existing water supply system include Asbestos pipes. There is therefore a significant health risk for workers and the public if these pipes are uncovered and damaged or cut accidentally, or deliberately to conduct the necessary pipeline refurbishment. This is in fact not such a major problem as might be expected, because: (i) there might be only a small number of AC pipes in the existing water supply system. (ii) The design of the project involves the replacement of these pipes and this can be done without removing or disturbing them, so all AC pipes will be left in situ.

318. Given the dangerous nature of this material, additional measures will still be established to protect the health of all parties in the event (however unlikely) that AC pipes are encountered in the course of the work. During the developments of IEE, UWSCG have developed a protocol to be applied in any instance that AC pipes are found, to ensure that appropriate action is taken. The protocol is based on the approach recommended by some internationally recognized organizations. The AC pipe management plan is attached in Annex I.

F.2. Developing Environmental Documents

319. Prior to the onset of the construction, the Contractor will be obliged to develop the Site-Specific Environmental Management Plan (SSEMP) which must cover the following issues:
   - Define boundaries
   - Identify sensitive receptors & environmental values , including vulnerable groups: elderly, schools, hospitals etc.
   - Specify construction activities
   - Conduct risk assessment
   - Assign environmental management measures
   - Prepare monitoring plan
   - Prepare site plans
   - Prepare environmental work plan

320. In addition to the above mentioned Construction Contractor prior to the onset of the construction must develop the Site Specific Noise and Vibrations Management Plan This document must give the model of the sources and distribution of the noise and vibration originated at the construction stage, and possible impact on the adjacent facilities, as well as all mitigation measures and methods to monitor them. This should include pre-construction surveys of buildings for condition so if cracks occur during construction they can be investigated. Decision on survey area to be agreed and included in SSEMP.

321. All the above-mentioned documents must be developed by the Contractor and submitted to the Supervision Consultant for Endorsement. Finally documents are send to UWSCG/IPMO. The Construction Contractor will be entitled to start the construction works only after the above-said documents are approved by UWSCG.

F.3 Construction Phase

F.3.1 Waste Transportation

322. At the stage of developing the IEE document, two options of waste final placement will be considered: (i) placement of the inert waste accumulated after the disassembly of the existing containers on Telavi landfill and (ii) identification of the relevant location adjacent to the Project site to place inert waste on it in agreement with the local authority.

F.14 Existing Asbestos Pipes

323. At construction stage, according to the contract is considered the installation of new pipes in the whole area of the city. During excavation works of trenches it is possible to damage as existing sewer pipe network, also other legally or illegally water supply pipes. Part of the existing pipes contains asbestos and asbestos dust in case of damage may occur, and which is very dangerous for health.

Mitigation Measures

324. It is necessary to implement whole set of mitigation measures:
   - Special training for the personnel of the contractor;

- Environmental specialist of the consulting company must develop a special procedure and present to the water company which will be used in the process of cutting of the trenches-in case of the connection with the existing Asbestos pipes;
- Environmental specialist of the contractor must attend the process of cutting of the trenches;
- In case of finding asbestos pipes, the excavator must stop working and cutting of the trenches must be continued by means of the blade;
- In case of the damage of Asbestos pipes the construction works must be stopped. Environmental specialist of the consulting company should be immediately informed about this and the fact should be written down by environmental specialist of the contractor;
- Further works to be implemented only after issuance of the permission.

F.4 Air Quality

F.4.1 Noise, Dust and Vibration

Construction Phase

325. Noise, air emissions of harmful substances and vibration are typical impacts of construction. Air quality will be affected during construction by emissions from vessels, equipment, and land vehicles in work activities at work locations. During the pipe replacement stage the rehabilitation works are to be carried out in Telavi streets. The noise and dust generated in course of excavating the trenches will cause nuisance of the local residents that will further increase during summer season assuming growth of the local population on the account of holiday makers.

326. Modeling and assessment of the noise, caused by construction activities is based on existing information about operation of various equipment at various stage of construction. For example, noise level in 15 m as it is considered by the Federal Highway Administration of the ministry of transport of the USA (FHWA), California Department of transportation (CADOT) and SBAG is as follows:

Table 38: Noise levels (Administration of the ministry of transport of the USA)

Noise source	Equivalent noise level dBA
Excavator	84 - 85
Bulldozer	84 - 85
Grader	91 - 92
Compressor	80 - 88
Pneumatic drilling hummers	85 - 98
Pile boring equipment	96 - 107

Table 39: Noise levels (California Department of transportation)

Noise source	Equivalent noise level dBA
Excavator	72-92
Bulldozer	83-93
Grader	80-95
Compressor	75 - 88
Pneumatic drilling hummers	82 - 98
Pile boring equipment	72-82

327. As a rule, noise caused by moving equipment is reduced at some distance. Such reduction has logarithmic properties. In case of noise caused by construction activities, noise spread pattern from the noise point is used, that can be determined as: Noise level1-Noise level2=20 log r2/r1, meaning that by doubling of distance noise is reduced by 6dBA.

Table 40: Noise levels

Distance from noise source, m	Calculation level of the noise Average value - dBa	Calculation level of the noise Maximum value - dBa
10	80	90
20	74	84
40	68	78
80	62	72
160	56	66
320	50	60

328. Noise sources generated by excavation for WS pipes during construction period in scope of city Telavi are mainly engineering machinery and vehicles, and they are featured by their intermittent nature with mobility and high noise level (which is 80~90 dB from a distance of 5 meters).

329. The following measures are to be taken during construction engineering to reduce impacts on acoustic environment:

(1) Any construction engineering entity shall adopt advanced engineering equipment and technologies of low noise, and this requirement shall be a principal criterion for selecting contractors during the bidding process.

(2) The working time and construction schedule must be arranged rationally, and all engineering entities shall make reasonable arrangements for working time, and engineering activities after 19:00 pm through to 08:00 am the next day shall be strictly prohibited, except the circumstances, agreed under consultation with the IPMO and relevant local stakeholders.

330. As it was already mentioned above, prior to start construction activities construction contractor should prepare Noise SSEMP for Telavi. Regular (weekly) noise monitoring should be carried out by contractor, noise level has to be within WB EHS standards.

During the monitoring noise from road movement should also be considered. Mitigations to be carried out to keep noise within the standards are presented in para 209.

331. Consultation should be carried out prior to the start of works to inform residents of upcoming activities, including noise, dust and vibration and to make them aware of the GRM as well.

332. The basic sensitive receptors that will be affected by the noise generated as a result of trench excavation are schools, kindergartens, hospitals, elderly, religious places.

Mitigation Measures

333. These impacts can be reduced by a variety of measures, many of which are common in most urban construction. These include:
- Require adherence to engine maintenance schedules and standards to reduce air pollution.
- Use of defined, well planned haulage routes and reductions in vehicle speed where required;
- Periodically water down temporary roads on site;
- Cover trucks carrying cement, gravel, sand or other loose materials;
- Wet or cover trucks carrying stone/ sand/ gravel;
- Haul materials to and from the site in off peak traffic hours;
- Halting work during excessive winds.
- Immediately replacing defective equipment and removing it from the work site
- No truck movements in inhabited areas between 22:00 and 8:00.
- The population to be informed regarding the pending works.

334. As for the noise, generated during excavation of the trenches in Telavi area, affecting the sensitive receptors in the town, this will require execution of additional mitigation measures.

335. It should as well be taken into consideration that the source of the noise generated during the trench excavation is not in a fixed position. The excavator conducting the trench excavation or pipe installation including backfilling, is permanently moved. During the meeting with the engineers, it turned out that movement speed of the construction equipment depends on the road surface type (soil, asphalt, concrete), relief and the existing infrastructure, and the speed varies between 10-25 m/h. On the basis of the fact that no concrete roads are observed in Telavi, therefore reducing the digging speed to minimum and increasing noise level to maximum, we have to assume that the average speed of equipment movement during trench excavationis 20-25 m. that represents 160-200 m during 8-hour work day.

336. Therefore, during the project implementation phase we will have to wait averagely 2 days for increasing noise level of each sensitive receptor. On the first day, the noise will increase step by step and by the end of the day it will reach its maximum, and on the second day it will start to decrease from the maximum and will completely disappear by the end of the day.

337. In spite of short-term affect, it is essential, mostly for the above mentioned work phases involving sensitive receptors, planning and implementation of the following additional mitigation actions:

- In educational institutions (such as schools, kindergartens), throughout Georgia, studying process, take place during 5 days a week. No study process takes place on weekend in schools and kindergartens. Therefore, the construction contractor company may execute construction works during non-labor days.

338. As for implementation of the works nearby medical facilities, where patients are present, the following mitigation measures have to be conducted:

Option 1: if the contractor shall conduct the works without using equipment (trenches should be dug with shovels) on the nearby area of the hospital, that will represent the best option. The method must be used for digging 400 m. long trench, for each facility approximately 200 m. Certainly, the method will increase the project price and duration of execution, but it will practically reduce to zero the noise generated as a result of works at the above mentioned areas.

Option 2: In case the construction contractor rejects using the proposed method because of financial problems, the contractor will have to execute the following mitigation measures along the construction works area:

1. Not to allow joint operation of two or more heavy technics 100 m away from the medical facility;
2. To use portable noise screens (barriers) that will be installed on both sides of the construction technics, 2.– 2.5 m. away, in such a way to protect direct sound emission to the medical center
3. To measure static noise level near health care facilities with noise measuring equipment continously;
4. In case the noise level exceeds the WB EHS levels, the construction works must be stopped and additional mitigation actions must be executed;
5. The construction works will not be resumed unless the noise level reaches the norms.

Operation Phase

339. No permanent dust emission sources will exist during operation phase. It is expected that in small quantities dust will be generated only during maintenance works.

Dust

340. The types of activities during the construction with the potential to generate dust along the Scheme route include: a) movement of vehicles; b); minor demolition (e.g. concrete bases and footings); d) excavation works e) construction of retaining walls; removal of top soil and vegetation.

Mitigation measures:

a. Damp down unsatisfied /bad condition roads to avoid dust generation while using for transport of waste/material
b. Use tarpaulins to cover loose material that is transported to and from the site by truck
c. Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside barricaded area;

d. Clean wheels and undercarriage of haul trucks prior to leaving construction site;
e. Bring the material (aggregate and sand) as and when required;
f. Ensure speedy completion of work and proper site clearance after completion

Vibration

341. Vibration from the construction activities is a cause concern to the community. The effects of vibration varies and depends on the magnitude of the vibration source, the particular ground conditions between the source and receiver, presence of rocks or other large structures in the area. The intensity, duration, frequency and number of occurrences of a vibration all play an important role in both the annoyance levels caused and the strains induced in structures.

342. Sources of vibration includes construction equipment movement, pile driving, compaction, hammering (hydraulic or pneumatic) and operation of generators. The propagation of vibration from construction activities are different in nature from the vibration from blasting. The construction activities are undertaken essentially on ground surface and spreads basically as two-dimensional waves.

343. Table 41 provides an indication of the approximate vibration levels that may be expected for various vibration sources.

Table 41: Approximate Vibration Levels for Various Sources

Activity	Typical levels of ground vibration
Vibratory rollers	Up to 1.5 mm/s at distances of 25 m Higher levels could occur at closer distances; however, no damage would be expected for any building at distances greater than approximately 12 m (for a medium to heavy roller)
Hydraulic rock breakers (levels typical of a large rock breaker operating in hard sandstone)	4.50 mm/s at 5 m 1.30 mm/s at 10 m 0.4 mm/s at 20 m 0.10 mm/s at 50 m
Compactor	20 mm/s at distances of approximately 5 m, 2 mm/s at distances of 15m. at distances greater than 30 m, vibration is usually below 0.3 mm/s
Pile driving/removal	1 to 3 mm/s at distances of 25 m to 50 m depending on soil conditions and the energy of the pile driving hammer
Bulldozers	1 to 2 mm/s at distances of approximately 5 m. at distances greater than 20 m. vibration is usually below 0.32 mm/s
Air track drill	4 to 5 mm/s at a distance of approximately 5 m, and 1.5 mm/s at 10 m. at distances greater than 25 m, vibration is usually below 0.6 mm/s and at 50 m or more,

	vibration is usually below 0.1 mms
Truck traffic (over normal (smooth) road surfaces)	0.01 to 0.2 mm/s at the footing of buildings located 10 to 20 m from a roadway
Truck traffic (over irregular surfaces)	0.1 to 2.0 mm/s at the footings of buildings located 10 m to 20 m from a roadway

Mitigation Measures

344. Prior to the commencement of any activity, the Contractor shall identify whether any machinery or planned action will cause significant vibration. If is the answer is yes, the Contractor is to undertake a condition survey of all structures within the zone of influence.

345. The Contractor shall monitor vibration at the nearest vibration-sensitive receptors at the start of and during use of non-blasting equipment causing vibration. If vibration levels are monitored and found to exceed the vibration threshold according to relevant criteria, the Contractor shall modify the construction activities until compliance with the criteria has been achieved.

F.5 Water Quality

F.5.1 Contaminations of Surface Water

Construction Phase

346. During implementation of the Project the risk of surface water contamination is of medium level. The surface water may be contaminated due to improper placement of the excavated soil, poor management of construction yards, and improper storage of construction materials and leakage of fuel and lubricates from construction machinery.

347. Impacts to the Alazani River will be minor and that will only be from increased turbidity and sediment loading. The potential for unplanned events such as a spill etc. will be there but the likelihood for its happening is low and will be reduced by the mitigation presented below.

Mitigation Measures

348. The following mitigation measures shall be implemented:
    - Where works are in progress, erosion control and sedimentation facilities including sediment traps and straw bale barriers or combinations thereof will remain in place;
    - Lubricants, fuels and other hydrocarbons will be stored at least 100 m away from water bodies;
    - Topsoil stripped material shall not be stored where natural drainage will be disrupted;
    - Solid wastes will be disposed of properly (not dumped in streams);
    - Guidelines will be established to minimize the wastage of water during construction operations and at construction yard;
    - During construction, machinery and transport will be used by the contractor; both have potential of causing contamination to underground and above ground water

assets. There is need to compile temporary drainage management plan before commencement of work;

- Proper installation of temporary drainage and erosion control before works within 50 m of water bodies should be done;
- Solid Construction material and spoil stockpiles will be covered to reduce material loss and run-off and stockpiles will not be nearer than 100 m to water bodies;
- Borrow sites will not be close to sources of drinking water in case of runoff;
- Water samples will be taken and analysed based on the baseline monitoring results obtained in the preconstruction stage;
- If a complaint is received Samples will be taken and analyses immediately and again two weeks after the complaint to determine if water quality has been restored;
- The contractors will be required to maintain close liaison with the local community to ensure that any potential conflicts related to common resource utilization for project purposes are resolved quickly;
- Guidelines will be established to minimize the wastage of water during construction operations and at construction yard ;
- Borrow sites (if required) should not be close to sources of drinking water;
- Rock rip rap material to be used in river / stream crossings per owner/ engineer's recommendations to prevent natural soil erosion.
- Lubricants/fuels should be placed in drip tray or bunded area and stored over 50m from the Alazani River.
- An oil spill response kit will be kept on-site during the crossing to ensure that should any spill occur it can be dealt with immediately. In addition, staff will need to be trained in how to use the kit, should it be needed.
- All river crossing activities should be done in low flow periods.

Operations Phase

349. The risk of the pollution of surface water in operational phase is very low. Minor pollution of water can take place during maintenance and repair works. In that case the above mentioned mitigation measures shall be implemented.

350. The construction of a new water supply system will increase the generation of wastewater. Works for the rehabilitation of the wastewater network and the construction of a new wastewater treatment plant will be taken up successively in scope of SIDA/Municipal Development Fund (MDF).

F.5.2 Contamination of Underground Water

351. Groundwater table depth within the Project zone is 5-6 meter; therefore potential impact arises from implementation and maintenance of contractors' yard, transport, maintenance of vehicles and handling and storage of lubricants and fuel. The required provisions for contractor's yard are described in the chapter on impacts and mitigation measures concerning quality of soils.

F.6 Soils Quality and Topsoil Management

Construction Phase

352. During construction, impacts on soils are mainly due to the excavation works.

353. The works for the transmission mains comprise material excavation, pipe laying and backfill of material including compaction. Material will be stored temporary alongside the trench and refilled after pipe lying. Therefore impacts associated with earthworks for trench laying are of temporary nature. The pipes will be placed in the trench manually.

354. A sand layer of 30 cm thickness will be laid on top of the pipe, after which the trench will be refilled with excavated material and compacted manually. The excavation is expected to generate surplus material. Surplus material will be used as embankment fill as far as possible.

355. Construction of the reservoirs may lead to disturbance or loss of topsoil. Therefore the Contractor shall implement the following measures:

- The top soil of about 1 ft depth (0.3 m) shall be removed and stored separately during excavation work, and after the construction of the main trunk the same soil shall be replaced on the top, in unpaved areas;
- Subject to advance consent of the local self-governance authorities, the excess topsoil remained after construction of the new pumping station and reservoir will be used at other Project sites or handed over to the appropriate authorities;
- The excavated soil should be removed from construction area at the earliest for beneficial reuse such as land raising / filling of excavated areas;
- Soil should be covered with tarpaulin sheets during transportation
- Soil transportation should not be done during peak hours and should avoid narrow and heavy traffic routes and important religious or tourist sites etc.

Mitigation Measures

356. The following practices will be adopted to minimize the risk of soil contamination and topsoil loss:

- The contractors will be required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination.
- Solid waste generated during construction and at construction yard will be properly treated and safely disposed of only in demarcated waste disposal sites.
- Construction chemicals will be managed properly
- Clearly labelling all dangerous products,
- Fuel tanks (diesel or oil) should be placed in a concrete pool which its perimeterwalls will be at least 1.0 m high with the concrete or plastered masonry wall,
- A proper floor drain should be installed on the slab of the concrete pool forsafely discharging the leakages.
- All topsoil storage sites will be within the project footprint or will be in approved locations

Operation Phase

357. During operation phase, the soil may be contaminated due to water leakage from the damage pipe. In case such damage is not detected in a due time, the area may be"bogged".

358. Soil contamination may also occur during performance of the planned or emergency repair works.

Mitigation Measures

359. Water pressure in the pipelines must be continuously monitored during entire operation phase. In addition, the relevant mitigation measures shall be implemented during maintenance works.

F.7 Biological Environment

Impacts during Construction

360. The impacts on flora and fauna during implementation of contractor's yard, reservoirs sites and transmission mains will be minimized through site selection and installation. The following measures need to be implemented to avoid any impacts on flora and fauna:
    - Avoid tree cutting;
    - In unavoidable cases, plant 10 trees of same species for each red list tree that is cut for construction;
    - The trench shall not be kept open in the night/after working hours. This will avoid any safety risk to wild animals; and in unavoiding cases relevant fencing and barriers should be installed;
    - Remove vegetation as far as possible outside the breeding season (late spring – summer for most species) to avoid impacts to fauna as far a possible.

Impacts during Operation

361. Operation of the water supply components of the subproject will not have any significant impact on the biological environment.

F.8 Traffic

Impacts during Construction

362. The rehabilitation of the water supply network and transmission mains will be mainly conducted along roads existing in the town. Although work will not require land acquisition it could still have economic impacts, if the presence of trenches, excavated material and workers discourage customers from visiting shops and other businesses, which lose income as a result. These losses however will be short in duration. Implementation of the following best construction measures will reduce the inconvenience and disturbance:
    - **Traffic management**. A traffic control and operation plan will be prepared together with the local traffic management authority prior to any construction. The plan shall include provisions for diverting or scheduling construction traffic to avoid morning and afternoon peak traffic hours, regulating traffic at road

crossings with an emphasis on ensuring public safety through clear signs, controls and planning in advance;

- **Information disclosure**. Consultations have been carried out with the local population within the proposed IEE to help improve the project design. During the construction residents and businesses will be informed in advance through media of the road improvement activities, given the dates and duration of expected disruption;
- **Construction sites**. Clear signs will be placed at construction sites in view of the public, warning people of potential dangers such as moving vehicles, hazardous materials, excavations etc and raising awareness on safety issues. Heavy machinery will not be used after day light and all such equipment will be returned to its overnight storage area/position before night. All sites will be made secure, discouraging access by members of the public through appropriate fencing whenever appropriate.

363. Another aspect of the work that has economic implications is the transportation of material to the site and surplus soil from the site to locations where it can be put to beneficial use as recommended. There will be truck movements carrying material. Although this is not significant, considering the narrow roads, it could disrupt traffic in the Town. Dust generated during the transport may also impede the commercial and trade activities, which are predominantly located along the main roads. The transportation of material/waste shall be implemented by the Civil Contractor in liaison with the town authorities, and the following additional precautions should be adopted to avoid effects on traffic:
    - Plan transportation routes in consultation with Municipality and Police
    - Schedule transportation activities by avoiding peak traffic periods.
    - Use tarpaulins to cover loose material that is transported to and from the site by truck
    - Control dust generation while unloading the loose material (particularly aggregate and sand) at the site by sprinkling water/unloading inside a barricaded area
    - Clean wheels and undercarriage of haul trucks prior to leaving construction site

Impacts During Operation

364. As the operation and maintenance activities would be conducted within the existing facilities no impact is envisaged on economic resources. Repairs and leaks of the water supply pipes will be minor and localized. In fact, the improvements to the water supply system will bring various benefits. Availability of good infrastructure facilities will add to the quality of life, and there will be more people interested to live and visit, which will bring new investments and boost economic development.

F.9 Other Wastes from Construction Activities

Non-hazardous waste

F.9.1 Construction Waste

365. Non-hazardous construction waste may be generated on the storage and construction area and will be collected by contractor's workers. Construction wastes in significant

amounts will be generated during demolishing of existing buildings of WWTP #2. Storage of such wastes in area close to settlement and untimely or improper disposal may impact on air quality, dust generation and disturbance of neighboring settlements. In addition, waste from packing materials and woods also will be generated.

366. Disposal of construction wastes both on the sites and at the temporary storage facilities has to meet the following requirements:
    - Place of disposal of the waste concerned must be enclosed.
    - The waste must not have access to drainage water.
    - Waste must be immediately removed from the working sites.
    - Waste can be transferred only to a certified contractor.

Scrap metals

367. Old equipment from WWTP and sewer network, such us old pumps, pipes and etc. will be handed over to the nearest local service center for further use, recycling or disposal.

A. **Mitigation measures:**

- Segregation of wastes on recyclable and non-recyclable wastes;
- Selling recyclable wastes to relevant organizations and timely disposal of non-recyclable wastes to the landfill, determinate by local Municipality;
- Burning of waste on any construction site is forbidden small branches from felled trees and bushes will be donated to the local population;
- Create a safe (sheltered with concrete foundation) storage facility

F.9.2 Inert Waste

368. Inert construction waste is accumulated during the construction of new reservoirs, laying the new pipes and replacing the old ones, also during implementation of transmission mains. Such waste is first of all: asphalt and ground.

369. Within the proposed project waste water network has to be newly laid and some part of the network has to be re-placed.

370. The said waste will be transported and placed on the nearest landfill in Gudauri.

F.9.3 Municipal Waste

371. Municipal solid wastes and waste waters will be generated at the construction and construction yards. Mainly this is rubbish, plastic or glass bottles, glasses, waste food, etc. Improper wastes management may cause the spread of infectious diseases, emergence of insects and parasites in construction yard sites. In addition, it may lead to conflict with local population.

372. Waste should be collected both by the specially assigned personnel and the workshop workers on the area. The waste will require segregation and will need to follow the waste hierarchy – reduce, reuse, recycle. For food contaminated or other non-recyclable items the waste will be placed into 0.24m3 plastic containers and further a local Sanitary Service takes it to landfills. The following should be taken into account:
    - Generation of dust should be avoided;

- The waste hierarchy should be followed as far as possible;
- Plastic containers should be closed to prevent spread of the smell and also to avoid contact of rodents and insects with the waste.

373. The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in:
- Waste handling
- Waste treatment; and
- Waste storage.

374. Burning of waste on any construction site is forbidden with the exception of stub and small branches from felled trees and bushes, which is better to be burned in order to avoid pest dissemination.

Mitigation measures:

375. The followings shall be implemented for proper waste management:
- Segregation of wastes on recyclable and non-recyclable wastes;
- Selling recyclable wastes to relevant organizations (paper, scraps, accumulators) and timely disposal of non-recyclable wastes to the landfill
- Providing hydro isolated septic tank for collecting waste waters at the Construction yard and bio toilets for workers at the construction sites and timely disposal of waste waters to the local waste water treatment plants.

F.9.4 Hazardous construction wastes

376. During construction phase hazardous wastes will be generated from vehicle operation and maintenance and rehabilitation works within the proposed projects. In addition, there is possibility of presence of asbestos materials in remaining building of the original WWTP and the existing sewer network (See Annex I - Asbestos-Containing Material Management Plan).

Mitigation Measures

377. There is a specific hazardous waste landfill in Georgia. However, prior to disposal appropriate consultation and agreement of MoENRP is required to obtain the necessary approvals. To ensure good practice they will also be required to store, transport and deposit all hazardous materials in secure watertight containers.

Mitigation measures:

378. A separate Waste Management Plan needs to be developed by Contractor, endorsed by SC and approved by UWSCG and agreed with the MoENRP of Georgia. The Plan has to include information about type of generating wastes, procedure of their collection and disposal in accordance with the new Solid Waste Code of Georgia and per the SPS 2009. All waste should be processed following the waste hierarchy and be segregated, recyclables should be sent to recycle, only waste not recyclable should be compacted and sent to landfill.

F.9.5 Medical Waste

379. Medical waste is generated in the Medical Care and Control Point and belongs to hazardous waste category. This waste is collected in special plastic boxes and is transferred to a contractor for farther incineration. It is recommended that the medical waste is directly transferred to a contractor from the place of its consolidation. While disposal of the medical waste the following requirements are to be met:

- Medical waste must be disposed in special plastic boxes, which can be hermetically closed;
- Medical waste for farther incineration should be transferred to a certified contractor (Sanitary).

F.10 Impacts on Archaeological Sites

380. Land clearance works, grading and excavations are associated with the risks of damaging underground archaeological remnants. However in the case of the proposed Project no archaeological monuments are expected to be touched during construction phase since pipes will run along and inside existing roads as far as technically feasible. There is a low probability for chance finds of archaeological objects. However, during construction, possibility of appearance of the new archaeological findings still should be taken into account and, therefore, special care should be taken not only at the new construction sites, but also at construction yards and storage areas.

Mitigation Measures

381. To avoid this risk, preliminary preventive studies and archaeological supervision during the earth-works is necessary. Supervisory procedures and all other necessary measures should be agreed with the Ministry of Culture when obtaining the construction permit, in accordance with the rules of the permit issuance. According to the article 14 of the Law on Cultural Heritage, Permit on conducting quarrying activities in Georgia, as well as construction of an object of a special importance as it may be defined under the legislation of Georgia, is issued by a competent authority based on the positive decision of the Ministry of Culture, Monument Protection of Georgia. The basis for the conclusion is the archaeological research of the proper territory to be carried out by the entity wishing to accomplish the ground works. The entity wishing to do the earth-works is obliged to submit the Ministry the documentation about the archaeological research of the territory in question. The preliminary research should include field-research and laboratory works.

382. Therefore steps should be taken minimize the risk. This should involve:

- Contractor should put in place Chance Find Procedures and a protocol for conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved.
- To comply with the previous condition, having excavation observed by a person with archaeological field training. Supervisory procedures and any other necessary measures shall be agreed with the Ministry of Culture;
- Stopping work immediately to allow further investigation if any finds are suspected;
- Calling in the state archaeological authority if a find is suspected, and taking any action they require ensuring its removal or protection in situ.

383. At the construction stage archaeological monitoring should be ensured by the contractor under the supervision of the Ministry of Culture, Monument Protection of

Georgia. The initial budget necessary for the archaeological supervision and other agreed works should be fixed under the construction works appraisal, but the budget could be exceeded if a significant archaeological site will be identified.

F.11 Socio-Cultural Resources

Impacts during Construction

384. There are various social-cultural resources (such as school, church, recreation and entertainment center, etc.) in the town. The construction impact will include noise and dust, and interrupted access due to movement of heavy vehicles transporting material and waste. Mitigation will therefore be needed to protect socio-cultural resources and to enable usage by local people and visitors to continue throughout the construction work. This will be achieved through several of the measures recommended above (under the impacts on air quality), including:
    - Limiting dust by removing waste soil quickly; by covering and watering stockpiles, and covering soil with tarpaulins when carried on trucks
    - Providing wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required
    - Increasing the workforce in to complete the work quickly

385. There is invariably of safety risks when substantial construction such as this is conducted in an urban area, and precautions will thus be needed to ensure the safety of both workers and citizens. The Contractor will be required to formulate and implement health and safety measures at construction sites, which should include such measures as:
    - Following standard and safe procedures for all activities - such as provision of shoring in deeper trenches (> 2 m)
    - Excluding public from the site - enclosing the construction area and provide warning and sign boards, and security personnel
    - Providing adequate lighting to avoid accidents
    - Ensuring that all workers are provided with and use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.)
    - Maintaining accidents records and report regularly
    - Traffic control. Irregular control of trucks by local police (radar control, safety control). Speed limits to be introduced within construction areas and on access roads.
    - Yellow / orange warning tape to protect workers and pedestrians from falling into building pits, to prevent pedestrians from entering the construction site. Warning signs to prevent accidents within the construction site and on access roads

386. Water filled excavations will be fenced or the water pumped out immediately.

387. Economic Benefits. There could be some short-term socio-economic benefits from the construction work if local people gain employment in the workforce. To ensure that these benefits are directed to local people, the Contractor should be required to employ as much of his labor force as possible from the local communities in the vicinity of construction sites. Drawing of majority of workforce from local communities will avoid problems that can occur if workers are imported, including social conflicts and issues of

health and sanitation due to Construction yard. If temporary Construction yards are to be provided, Contractor should ensure that they are maintained well with proper water supply and sanitation facilities. In unavoidable case of sourcing labor from other areas, provide adequate housing facilities so that there are no impacts and conflict with the local people. Following measures shall be followed:

- Establish temporary Construction yards in consultation with the local authority
- Construction yards shall be located away from water bodies
- No clearance of trees vegetation shall be allowed for establishment of Construction yard
- Provide all basic amenities (water sanitation, waste collection & disposal, first aid facilities, etc.)
- Contractor shall provide fire wood and no worker shall be allowed to cut any tree
- Ensure regular and clean maintenance of the Construction yard

F.12 Construction Yards

388. The establishment of contractor's Construction yard may cause adverse impacts if various aspects such as liquid and solid waste management, equipment maintenance, materials' storage, and provision of safe drinking water are not addressed properly. The site for the work yard will be selected by the contractor in agreement with the Municipality, UWSCG and the supervisor.

389. To ensure that potentially resulting impacts are kept at a minimum the contractor will be required to prepare the following plans or method statements:
    - Layout plan of the Construction yard including a description of all precautionary measures proposed to avoid potential adverse impacts on the receiving environment (surface and ground water, soils, ambient air, flora and fauna and human settlement);
    - Sewage management plan for provision of sanitary latrines and proper sewage collection and disposal system to prevent pollution of watercourses or groundwater;
    - Waste management plan covering the provision of garbage bins, regular collection and disposal in a hygienic manner, as well as proposed disposal sites for various types of wastes (e.g., domestic waste, used tires, etc.) consistent with applicable national regulations; and
    - Description and layout of equipment maintenance areas and lubricant and fuel storage facilities including distance from the nearest surface water body. Storage facilities for fuels and chemicals will be located at a safe distance to the water body. Such facilities will be bounded and provided with impermeable lining to contain spillage and prevent soil and water contamination.
    - These plans will be approved by the Engineer prior to beginning of construction activities.

390. Prior to establishment of the Construction yard(s) relevant SSEMP should be prepared by contractor, endorsed by SC and approved by the UWSCG. Contractor shall conduct consultations with local authorities to identify sources of potable water for the workforce that will not compete with the needs of the local population. Potable water for the workforce shall comply with the national quality standards. Construction water should be sourced from the local water supply.

F.13 Construction Related Impacts at the Quarrying Sites

391. The exploration of the borrow pits should be conducted by the licensed companies or the Contractor has to obtain its own license. However, potential impact of the increased quarrying activities on river bed and floodplain landscape, ichthyofauna and groundwater should be considered.

Mitigation Measures

392. The exploration of the borrow pits should be conducted by the licensed companies. In case if the constructing company intend to perform quarrying activities, the company has to obtain related license. Potential impact of the increased quarrying activities on ichthyofauna, groundwater and landscape should be considered anyway. Validity of licenses for the above mentioned companies is a main mechanism to guarantee that most of impacts related to quarrying will be mitigated. License is provided by the Agency of Environmental protection of MoENRP only on a basis of preliminary assessment (including limits and conditions for reinstatement). The Regional Services of the MoENRP and Environmental Inspectorate are in charge to control compliance of the quarrying company's performance. The role of the UWSCG within this plan should be to ensure timely and permanent supervision of construction.

393. The measures aimed on mitigation of the dust and emission impacts, as well as potential river contamination due to improper fueling and vehicle operation should be the same as above described pollution prevention measures, but control on this sensitive site should be stricter. Contractor's environmental personnel shall pay attention to this site during monitoring.

394. Relevant SSEMP, including some level of Impact Assessment should be prepared by contractor about 10 days before starting quarrying activities

F.14 Existing Asbestos Pipes

395. At the construction stage, according to the contract the project is only considered as the installation of new pipes in the whole area of the city. During excavation works of trenches it is possible to damage as existing pipe network, also other legally or illegally water supply pipes. A large part of the existing pipes contains asbestos and any damage to these pipes may result in asbestos dust which is very dangerous for health. As such, all asbestos pipes will remain in place and will be covered by soil.

396. In case, if removal and off-site disposal of aspestos pipes is required due to the demage of the pipeline network the Asbestos management plan is attached to this IEE (see Annex I)

Mitigation Measures

397. It is necessary to implement whole set of mitigation measures:
   - Special training for the personnel of the contractor;
   - Environmental specialist of the consulting company must develop a special procedure and present to the water company which will be used in the process of cutting of the trenches-in case of the connection with the existing Asbestos pipes;

- Environmental specialist of the contractor must attend the process of cutting of the trenches;
- In case of finding asbestos pipes, the excavator must stop working and cutting of the trenches must be continued by means of the blade;
- In case of the damage of Asbestos pipes the construction works must be stopped. Environmental specialist of the consulting company should be immediately informed about this and the fact should be written down by environmental specialist of the contractor;
- Further works to be implemented only after issuance of the permission.
- All workers and personal on the construction site should be equipped with PPE
- Usage of appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material;
- Suppress dust by spraying of water as necessary.

F.15 Rehabilitation of Chlorination Station

398. Filling and storage of the liquid chlorine can be considered as a hazardous operation. Only a small number of companies are involved in supplying of equipment and devices to undertake such activities.

399. Chlorine is hazardous and may pose potential risk and a severe emergency may suddenly and unexpectedly occur at chlorine storage and handling site. Such eventualities should be anticipated, and proper system must be installed to tackle them effectively.

400. To insure the occupational and community health and safety, according to the SPS 2009, the internationally accepted and state-of art best practice will be imposed on having specific measures and special equipment for neutralization of the chlorine gas to confine and treat the gas before being rejected outside in the open air. it is required that contractor will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) providing appropriate equipment to minimize risks and requiring and enforcing its use; (ii) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (iii) having emergency prevention, preparedness, and response arrangements in place. The impacts of this additional measures are site-specific, few if any of them might be irreversible, and in most cases mitigation measures can be designed more readily.

401. For maintenance and operations safety, besides technical safety assurance (automated safeguard systems), the operating personnel and personal with subject-specific education (mechanical/electronic) must be trained. Personal safety equipment should be provided to all operating staff. The warning signs should be attached to the machines. An adequate emergency response plan (ERP) with safety and industrial hygiene resources is recommended to be develop, to deal with the effects resulting from a chlorine gas leak, in order to lessen or avoid injury to plant, personnel, environment and neighboring community (in any).

402. Construction/Rehabilitation phase mitigation measures are the following:
    - Training of the servicing staff, relevant risk analysis of the hazardous chemical substances, and preparation of the health and safety document on the site.

- Ensure that approved, self-contained breathing apparatuses are always available and personnel are properly trained for its use.
- Safety equipment should be inspected and maintained in accordance with the manufacturer's instructions.
- Ensure that all relevant equipment for dealing with a pollution incident are on site and all staff are trained in how to use equipment.
- Ensure that all warning signs and placards are in their appropriate places and are clearly visible.
- In the event of a leak, use trained personnel with the proper safety equipment to respond to the leak immediately. Evacuate all personnel from dangerous areas to a safe space.
- Store cylinders of liquid chlorine in a cool place away from steam pipes or other sources of heat.
- Store cylinders, full or empty, with their valve outlet caps and valve protective caps in place.
- Store all cylinders of liquid chlorine in a location which is protected from direct sunlight and from dampness.
- Do not store cylinders where it is possible for leaking vapors to enter a ventilating system.
- Store all cylinders in a vertical position.
- Store cylinders so that the oldest shipments of cylinders are used first. Valve packing may harden with prolonged storage, causing leaks when the cylinders are used.
- Storage areas should be kept clean so that accumulated trash does not present a fire hazard.
- If a chlorine cylinder or its valve is found out of order, notify the distributor, from whom the chlorine was purchased, giving the cylinder number and the nature of the damage.
- Handle all chlorine cylinders with extreme care. Do not drop cylinders or allow them to strike any object with force.
- Use valves, gauges, regulators, and fittings which have been approved for chlorine service. Ordinary devices are not suitable.
- The cylinder must be in an upright position to remove chlorine as a gas. If liquid chlorine is to be withdrawn from a cylinder, the cylinder must be inverted and clamped securely on a rack set at an angle of about 60° to the horizontal.
- It is dangerous to allow any chlorine cylinder, which has emptied its contents into water or another liquid, to remain connected with the process line. In such cases liquid could be sucked back into the cylinder causing danger to the operator and damage to the cylinder.
- Replace outlet cap and valve protective cap as soon as the cylinder is disconnected.
- Do not alter or repair chlorine cylinders or their valves.
- Provide suitable hand trucks for moving cylinders. These should be properly balanced and have a clamp support at least two-thirds of the way up the cylinder. To monitor the consumption of chlorine at any given time, place the cylinder on a scale. The difference in weight between measurements will equal the quantity consumed.

Operation Phase Mitigation Measures

403. During the operation phase in addition to many of the measures that will be implemented during construction that will roll-over into operation (such as presence of safety equipment), the following mitigation measures have to be implemented:
    - Training of the servicing staff, relevant risk analysis of the hazardous chemical substances, and preparation of the health and safety document on the site.
    - Ensure relevant Material Safety Data Sheet (MSDS) are available on site at all times and details are provided about how to handle a pollution incident and all necessary PPE requirements.
    - Cylinders of liquid chlorine has to be stored in a cool place away from steam pipes or other sources of heat.
    - Storage facilities should be hard standing and have secondary containment. The facility should also have security in place 24hrs a day.
    - Store cylinders, full or empty, with their valve outlet caps and valve protective caps in place.
    - Store all cylinders of liquid chlorine in a location which is protected from direct sunlight and from dampness.
    - Do not store cylinders where it is possible for leaking vapors to enter a ventilating system. Storage areas should be kept clean so that accumulated trash does not present a fire hazard.
    - If a chlorine cylinder or its valve is found out of order, notify the distributor, from whom the chlorine was purchased, giving the cylinder number and the nature of the damage.
    - Handle all chlorine cylinders with extreme care.
    - Do not drop cylinders or allow them to strike any object with force.
    - Use valves, gauges, regulators, and fittings which have been approved for chlorine service. Ordinary devices are not suitable.
    - Retain on site a list of key contact telephone numbers for emergency response providers and regularly liaise with them and conduct drills as per national requirements in the event of an incident.

F.16 Cumulative Impacts

404. The following infrastructure projects are underway and are planned in Telavi: The Municipal Development Fund is implementing a rehabilitation project for the Telavi water supply system, funded by the EIB. It is also planned to build a Waste Water Treatment Plant, which will be implemented by MDF and financed by SIDA. Within the framework of two subprojects on water supply, installation of water pipes will be carried out in different territories of the city of Telavi and at different times. Construction of WWTP will begin after the completion of the design of the project in about 5-6 months. Consequently, in the framework of these three projects, constructions will be carried out at different times and places.

405. On the other hand, it is clear that there is a certain link between these WWS projects and some cumulative effect is expected. As it was mentioned above the two Water Supply projects are planned to accomplish one after another and in fact, after one project is complete, another project will start, while Water Supply and WWTP projects may coincide in time. In fact, there will be disturbance of the population on the territory of the city of Telavi with noise, dust, vibration and street closure as well.

406. At the same time, if the two projects are uncoordinated, the negative impact on the population will be longer and the level of noise and vibration due to the project will be higher. In addition, an uncoordinated action of the two projects will lead to the increased amount of waste.

407. During the Telavi water-supply project, financed by EIB the road cover section was completely removed and the water drainage pipes were installed, but today, in some parts of the city road cover is to be removed again. Consequently, during the WS/ADB project, it will be necessary to remove the concrete cover and the trenches will be excavated twice leading to the closure of streets and disturbance of population once again.

408. Following the above-mentioned, in case of uncoordinated implementation of the two projects, the population of Telavi will be subject to the cumulative negative impact, which was possible to avoid provided the projects were planned expediently. These issues were discussed during the meeting with the mayor of Telavi and it was agreed that all activities will be coordinated on the Municipal level. Coordinated consultations with the local population on informing the public about planned activities will be carried out on an permanent basis to mitigate the effects of cumulative activities.

F.17 Community Health and Safety and Occupational Health and Safety

409. Telavi Water Supply Improvement Project project has to comply with all national, state and local labor laws. Contractor has to Develop and implement site-specific community health and safety (CH&S) and occupational health and safety (OH&S) Plan. These plans will include measures such as:
    (a) excluding public from the site;
    (b) Plan routes to avoid times of peak-pedestrian activities;
    (c) Liaise with UWSCG/IPMO in identifying high-risk areas on route cards/maps;
    (d) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
    (e) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose mask and ear plugs;
    (f) OH&S Training for all site personnel;
    (g) documented procedures to be followed for all site activities; and
    (h) documentation of work-related accidents;

410. Contractor has to ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; Provide medical insurance coverage for workers; Secure all installations from unauthorized intrusion and accident risks; Provide supplies of potable drinking water; Provide clean eating areas where workers are not exposed to hazardous or noxious substances; Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present.

411. Contractor will ensure also that visitor/s do not enter hazard areas unescorted; Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; Ensure moving equipment is outfitted with audible back-up alarms; Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

412. Due to the outbreak of COVID-19 additional anti-COVID measures have to be applied by the Construction Contractor at the construction sites including preparation of Action Plan to fight against Covid-19, hiring doctor and nurse for the regular check-ups and establishing designated quarantine area, purchasing of necessary PPEs, sanitizers, handwashing facilities, face masks, etc. National, WHO and ADB guidelines should also be applied and used during the trainings of workers.

G. INFORMATION DISCLOSURE, CONSULTATIONS AND PARTICIPATION

413. One of the main goals of the IEE is to facilitate the participation of all stakeholders and local communities at all stages of the project cycle: from the pre-construction phase and construction activities to its operation. In this regards, public consultations were held in Telavi to capture the stakeholders' opinions about the project, and agree on the project activities.

414. Prior to the public consultations, a meeting was held with the Telavi Mayor Mr.Platon Kalmakhelidze and the Vise Mayor Mr.Tengiz Mtvarelishvili. The mayor of the town underlined the need and importance of the Telavi WS project and said that currently Telavi's population is supplied with drinking water only 2-3 hours a day, and as the city is divided into 5 zones, in some areas water is supplied only two hours during the two-three days. --*

415. The mayor of the city asked the representatives of UWSCG and Ms. Ketevan Chomakhidze, an environmental specialist of USIIP and especially Mr. Parna Miriashvili, from the UWSCG project department to review the project of Telavi WS with such a way that at the first stage the 1st zone was rehabilitated, since the 1st Zone is basically a multi-storey residential buildings.

416. As for the second zone it may be rehabilitated later, because it is mostly industrial zone and currently no industry is working in Talavi.

417. On June 23, 2017, a Public hearing was held in administrative buildings of Telavi. The photos and registration lists are presented in Annex B and Annex C. The meetings were attended by more than 30 participants from the city of Telavi. Among participants were Vise Mayor of Telavi, citizens from the relevant settlements and NGO representatives. Besides them, consultation meeting was attended by the representatives of the UWSCG: Ms.Kate Chomakhidze, environmental consultant of USIIP; Mr. Parna Mikiashvili, Head, Unit of Internal Projects under Design Department; Ms.Nino Bitsadze, Unit of Pablic Relations, Ms. Keti Chumburidze, Unit of Protocol.

418. Ms Kate Khomakhidze provided a presentation about the Telavi water supply rehabilitation project to the audience. During the presentation, the project objectives and the main results of the environmental assessment, EMP, expected environmental impacts and mitigation measures developed, and GRM were discussed.

419. The console dated comments and recommendations of the stakeholders on the project are the following:

- The local population expressed concern about the current situation with water supply in Telavi, as the population is supplied with water for 2-3 hours a day, and in some areas only for a few hours during the 2-3 days.
- Project work should be started with the shortest possible time as people experience a lot of problems due to the lack of the high quality drinking water.
- Inconvenience and traffic disturbances due to construction work in the city should be minimized as much as possible.
- Proper repairing of the roads in Telavi after completion of the civil works has to be implemented

- Timeline of project and the schedule of the construction activities
- Road disturbances should be minimized

420. The suggestions, comments, recommendations will be incorporated in the final technical design and are reflected in EMP of proposed IEE.

421. Local population were informed that Contractors would develop an Informative Banner with information on project objectives, activities, implementers, schedule of construction works, deadlines, contact information and logbooks for complaints and suggestions on each construction site.

422. The main issues raised during the public consultation are presented in ANNEX D.

423. During the public consultations the GRM was discussed. Stakeholders were explained that GRM to be a continuous process that envisages a collaboration of the Implementation Agency with population during the entire project cycle. The detailed information on this mechanism was presented to the local populatin and is described in the chapter below - H. Grievance Redress Mechanism.

424. This IEE incorporates comments and suggestions from all concerned stakeholders. The final IEE report will be made available on UWSCG and ADB's website.

425. In order to maintain the transparency of public disclosure process, the bi-annual environmental monitoring reports (EMRs) will be prepared and published on the ADB and UWSCG websites as well.

426. Future consultations for project stakeholders shall follow as mentioned below.

- During detailed design stage, in case of any major changes in the design/alignment/location, the IEE will be updated accordingly.
- During construction, IPMO and UWSCG/PR department in close cooperation with the Supervision Company will conduct an intensive information, education and communication campaign to ensure the sufficient level of awareness/information among the affected communities regarding the upcoming construction, its anticipated impacts, the grievance redress mechanism, contact details and location of the IPMO, and status of compliance with the Government's and SPS 2009 environmental safeguard requirements. Among others, the information banners containing information about the subproject, implementation schedule and contact details of the executing agency and Contractors will be installed at the strategic locations within the subprojects' main areas of intervention.

427. The main stakeholders, including vulnerable groups, have already been identified and/or consulted during preparation of this IEE, and any others that are identified during project implementation will be brought into the process in the future. Stakeholders of this project include:

- People who live, and work near construction sites of facilities in Telavi
- UWSCG as implementing agency
- Other government regulatory institutions
- Municipality of Telavi
- NGOs and CBOs working in the affected communities;
- Other community representatives (prominent citizens, religious leaders, elders, women's groups);

- The beneficiary community in Telavi in general; and
- The ADB, as funding agency

428. Additional public consultation within the framework of the Telavi Water Supply project was held on May 27, 2020. 51 person attended the public consultation. Among participants were Mayor of Telavi, citizens from the relevant settlements and NGO representatives, besides them, consultation meeting was attended by the Director of UWSCG, Mr. Grigol Mandaria, Head of the Project Management Department Ms.Ana Onashvili, Haed of Envrionemntal Protection and Permits Department, USIIP environmental consultant Ms. Kate Choamkhidze and other representatives of the Company's Head Office and local Service Center.

429. Ms. Kate Khomakhidze provided a presentation about the Telavi water supply rehabilitation project to the audience. During the presentation, the project objectives, EMP, expected environmental and social impacts and mitigation measures and GRM were discussed.

430. The following issues were discussed at the meeting: what will be the tariff policy for water supply; whether the project work will be started as soon as possible, as people experience many problems due to the lack of quality drinking water; whether local people will be hired during construction work; what are the environmental and social impact of the project and proposed mitigation measures. The minutes of the meeting, photos and a signed list of participants are presented in Appendix 14.

431. This IEE Report in Georgian language will be distributed to the interested public. Report will be available for review in Tbilisi (at UWSCG Head Office), and Telavi (at UWSCG Service Centre and the Town Hall). It will also be disclosed to public by making it available on websites of UWSCG, MoRDI and ADB, together with the IEEs prepared for the other subprojects.

432. Stakeholder consultation and participation was an important process in the preparation of this IEE. The process engaging stakeholders and affected people during the conduct of the IEE included joint sites visits of IA, design and supervising consultants, onsite discussions with local population and public hearings.

H. GRIEVANCE REDRESS MECHANISM

433. No GRM is established under Telavi Water Supply project, as part of the Sector Development Program yet. To effectively implement GRM as part of another ADB-funded Urban Services Improvement Investment Program implemented by UWSCG, the company issued a special order (No. 122) on April 30, 2014, which was replaced in October 2018 by order No. 196 and apples to all ADB financed projects.

434. The aforementioned Order # 196 (please see Annex H), gives clear instructions to every involved stakeholder how to act when affected people are impacted by the project. This UWSCG's GRM experience will be used as an example during the implementation of Telavi Water Supply project as well.

435. The Grievance Redress Mechanism (GRM) is a process through which the affected people may voice and seek resolution of concerns throughout the entire project cycle. In this project, the grievance redress mechanism is in place by which the affected people will be fully informed of their rights and procedures for addressing complaints whether verbally or in writing during consultation, DMS, and at the time of receiving compensation and resettlement assistance.

436. According to the Order #196 mentioned above, UWSCG has established a three-phased (three-tiered) Grievance Redress Mechanism to be applied during processing the grievances submitted by project affected persons during the implementation for ADB funded projects.

437. **1st phase:** at the first phase of grievance redress, an authorized representative of Customers Relations Division/Customers Service Office of Regional Branch/Service Center of United Water Supply Company of Georgia, LLC, is to familiarize him/herself with the content of the complaint, register the complaint by Form adopted by Appendix 1 to Order N196 and submit it to GRC, which will review the submitted complaint within two weeks' time.

438. Figure 20 below shows AP gets queue registration number at Local Service center in Kutaisi under USIIP.

Fig. 20: AP gets queue registration number at Local Service centre


439. **2nd Phase:** in case the complaint is not resolved at the 1st Phase in two weeks' time, an interested party can address Commission established under Order N196.

440. **3rd Phase:** An interested person is eligible to apply to ADB Resident Mission to the address provided below, in case the GRC fails to resolve problem raised in the complaint and grievance still remains unresolved after two-week time period since its official submission.

441. Responsible person assigned at the local service center will register grievances in the Grievance Log. Temporary offices located at the construction sites also keep the Grievance Log to allow aggrieved person file the claim right on spot.

442. Contact Details (telephone numbers and full names of persons in charge) and the daily hours for receiving phone calls of APs and any interested person is included in the Information Leaflet and also displayed on Public Information Boards in the Local Service Centers and Municipalities within project affected area.

443. **Grievance Resolution Process Cycle**: The complaints and grievances from the APs will be addressed through the process described below:

Table 42: Grievance Resolution Cycle

Phase	Action Level	Process	Timeline
1st Phase	UWSCG Local Service Centre	An authorized representative of Customers Relations Division/Customers Service Office of Regional Branch/Service Centre of United Water Supply Company of Georgia, LLC, is to	2 weeks

Phase	Action Level	Process	Timeline
		familiarize him/herself with the content of the complaint, to register the complaint by Form adopted by Appendix 1 to Order N196 and to submit it to GRC, which will review the submitted complaint in two weeks' time	
2nd Phase	GRC	In case the complaint is not resolved at the 1st Phase in two weeks' time, an interested party can address Commission established under Order N196. The decisions from majority of the members will be considered final from the GRC and will be issued to AP after signed by GRC members. The case record will be updated and the decision will be communicated to the complainant within 14 days of submission.	2 weeks
3rd Phase	ADB Georgia Resident Mission	In case the GRC fails to resolve problem raised in the complaint and grievance still remains unresolved after two-week time period since its official submission, the interested person is eligible to apply to Asian Development Bank Resident Mission.	

444. **Public awareness:** Affected people will be fully informed of their rights and of the procedures for addressing complaints, whether verbally or in writing, through the comprehensive public awareness activities (door-to-door campaign, consultation meetings and media campaign). These PA activities will be carried out by the supervision consultant and UWSCG/DREP/PR Division.

I. ENVIRONMENTAL MANAGEMENT PLAN

445. The Environmental Management Plan (EMP) documents the impacts identified in the EIA report, the actions required to mitigate those impacts to acceptable levels in accordance with the laws of the country and the ADB safeguard policy, and the monitoring activities that are to be undertaken as part of the project to confirm that the mitigation actions have been effective in achieving their objectives or to initiate changes in the actions required.

446. The EMP also details the institutional arrangements and capacities that currently exist, or that will be put in place as part of the project implementation, to ensure that the environmental due diligence (including the EMP) has comprehensively considered both the national and ADB requirements for environmental protection, has identified all likely environmental impacts and proposed appropriate mitigation measures, and has the systems in place to ensure that effective procedures for environmental monitoring and control of the project impacts and mitigation measures are implemented throughout the life of the project

I.1 Environmental Impacts, Mitigation and Monitoring Plans

447. The environmental impacts associated with Telavi Water Supply project, have been detailed above in the relevant sections of this IEE. Mitigation measures required to address the impacts identified in the IEE have been summarized in each of the relevant sections covering the physical, biological and socio-economic environment affected by the project. The impacts identified and the specific mitigation measures proposed to address them have been consolidated into the environmental mitigation plan presented in Table 43, which includes time frames, responsibilities and where applicable, estimated costs for each measure.

448. The environmental mitigation plan includes a number of standalone construction-related management plans on: health and safety; waste; sewage; soil (including topsoil and vegetation); site drainage; traffic control; noise; air pollution; dust and cultural/archeological finds. In addition, it specifies the need for the Contractor to provide method statements on spillage control and the location of fuel storage, filling stations and vehicle washing sites to be provided to ARS for approval.

449. An environmental monitoring plan outlines the activities and responsibilities associated with monitoring the effectiveness of the proposed mitigation plan and ensuring compliance with the recommendations of the IEE.

I.2 Implementation Arrangements and Responsibilities

450. The main institutions that will be involved in implementation of the EMP are UWSCG executing agency (EA), Supervision Consultant (SC) the Contractor and to a lesser extent the Ministry of Environment and Natural Resources Protection (MoENRP).

451. Investment Program Management Office (IPMO) established within UWSCG will be responsible for the day to day management of the project including implementation of the EMP. The IPMO wll have an Environmental Specialist who will be responsible for management of the environmental aspects of SDP and Social Specialist who will be responsible for management of the social aspects of SDP.

452. The IPMO (Environmental Specialist) responsibilities in respect of implementation of the EMP are as follows:
    (i) Approve the Site Specific Environmental Management Plan (SSEMP) before Contractor takes possession of construction site;
    (ii) Monitor implementation of EMP and ensure the environmental safeguards compliance;
    (iii) Review the updated IEE and/or SEMP and send it for clearance to ADB;
    (iv) Ensure that contractors have access to the EMP and IEE report;
    (v) Finalize SAEMRs (and Final EMRs upon project completion), send it to ADB and address potential ADB's comments until SAEMR disclosure; Provide ENG and GEO final versions of SAEMRs to be uploaded on UWSCG website;
    (vi) Review and approve the Corrective Action Plan and provide to ADB for review and comments if any;
    (vii) Participate in public consultations during project implementation;
    (viii) In case of need assist IPMO Social/Resettlement Consultant in resolving process of environmental safeguards related complaints;
    (ix) Assist in organizing trainings for the Contractors in coordination with ADB/RETA consultant;
    (x) Participate in external trainings in environmental management and environmental auditing

453. The SC will include a full time Environmental Specialist to assist the IPMO supervise and monitor implementation of the EMP during construction.

454. The Contractor will also appoint a full time Environmental specialist to be a senior member of the construction management team based on site for the duration of the contract. The ES shall have a university degree (preferably at Masters level) in Environmental Science or related discipline and have at least 10 years work experience in environmental management of infrastructure project

455. Department of Environmental Protection and Permits of UWSCG will work together with IPMO on addressing the Environmental Safeguard issues of Telavi WS project. More detailed description of implementation arrangements; responsibilities and staffing are provided in the **Table 43** below.

Table 43: Institutional Arrangement, Responsabilités and Staffing

#	Millstones/Actions	Contractor (Environmental Specialist)	Construction Supervision Consultant (Environmental Specialist)	IPMO (Environmental Specialist)	Environmental Protection and Permits Department (Environmental Specialist)
1	**Environmental planning and management Contractors Environmental Management Plan (site-specific EMP)**	Prepare Specific EMP (SEMP) with supplemented Topic Specific EMPs at pre-construction stage based on IEE/EMP Implement SEMP approved by IPMO.	Review and endorse the SEMP; Monitor implementation of SEMP on daily basis; Monitor monthly environmental monitoring reports or results prepared by the Contractor and report to IPMO.	Review and approve the SEMPs; Monitor implementation of EMP and ensure the environmental safeguards compliance.	Work together with IPMO on addressing the environmental non-compliance issues, if any.
2	**Changes in design**	Provide details of design changes to CSC required to update IEE/EIA, or SEMP; Implement updated SEMP.	Approve the design change to be submitted to IPMO; Make environmental assessment of the change and update the IEE and/or SEMP.	Review the updated IEE and/or SEMP and send it for clearance to ADB	Liaise with CSC in preparing updated IEE and/or SEMP; Upload the approved IEE/SEMP provided by IPMO to UWSCG website for Public Disclosure.
3	**Unanticipated impacts**	Inform CSC about unanticipated impact and follow the instructions received from IPMO.	Make environmental assessment of the unanticipated impact and update the IEE and/or SEMP	Review the updated IEE and/or SEMP and send it for clearance to ADB	Liaise with CSC in preparing updated IEE and/or SEMP

#	Millstones/Actions	Contractor (Environmental Specialist)	Construction Supervision Consultant (Environmental Specialist)	IPMO (Environmental Specialist)	Environmental Protection and Permits Department (Environmental Specialist)
4	**Reporting**	Prepare monthly environmental monitoring reports and send it to CSC and IPMO	1. Prepare inputs to environmental part of quarterly construction progress reports; 2. Prepare inputs to semi-annual environmental monitoring report (SAEMR) to be submitted to IPMO for further review, comments and improvement. 3. Conduct Post-Construction Final Environmental Audit and prepare final environmental audit report.	1. Finalize SAEMRs (and Final EMRs upon project completion), send it to ADB and address potential ADB's comments until SAEMR disclosure; 2. Provide ENG and GEO final versions of SAEMRs to be uploaded on UWSCG website.	Upload the approved reports (ENG and GEO) provided by IPMO to UWSCG website for Public Disclosure
5	**Permits and clearances**	NA	NA	NA	Obtaining environmental permits and clearances
6	**Non-compliances**	Prepare a corrective action plan (CAP)	Assist contractor in preparing the CAP.	Review and approve the CAP and provide to ADB for review and comments if any.	

#	Millstones/Actions	Contractor (Environmental Specialist)	Construction Supervision Consultant (Environmental Specialist)	IPMO (Environmental Specialist)	Environmental Protection and Permits Department (Environmental Specialist)
7	**Public consultations**	Participate in public consultations during project implementation	Organize public consultations: inform people about activities and prepare the record of consultations.	Participate in public consultations during project implementation	UWSCG & IPMO host PCs, CSC will present the topics related to environmental issues
8	**Grievance Redress Mechanism**	Project site Focal person to record environmental grievances in the logbook and follow up with UWSCG established practice for grievance redress	1. Ensure that grievances, if any, are being properly documented and addressed timely and effectively. 2. Assist IPMO to develop consolidated GRM database and consolidation of GRM cases both for ENV and Social safeguards	In case of need assist IPMO Social/Resettlement Consultant in resolving process of environmental safeguards related complaints; Assist IPMO Social/Resettlement Consultant in GRM database consolidation and data analysis.	UWSCG maintains GRM applicable to all projects. UWSCG will ensure IPMO information on grievances is consolidated into the UWSCG grievances (both - environmental and social) without duplication.
9	**Trainings**	Attend on-site trainings organized by IPMO and ADB/RETA Consultant	Assist the IPMO in organization of trainings for the Contractors on environmental safeguards requirements.	Organize trainings for the Contractors in coordination with ADB/RETA consultant. Participate in external trainings in environmental management and environmental auditing	Participate in external trainings in environmental management and environmental auditing

I.3 Site Specific Environmental Management Plan (SSEMP)

456. Following the award of the contract and prior to construction commencing the Contractor will review the EMP and develop this into a detailed Site Specific Environmental Management Plan (SEMP) that amplifies the conditions established in the EMP that are specific for the site and the tasks involved. The SEMP will identify persons who will be responsible for supervising the work within the contractor's team. The SEMP will include a matrix of mitigation measures corresponding to specific site activities. This information will be presented on a series of site plans covering the whole project site showing all environmental management requirements for all activities in the construction phase. Site plans will include:
    (i) Indication of North and scale
    (ii) Existing and planned supporting infrastructure (e.g., access roads, water supplies, and electricity supplies)
    (iii) Location of planned work (ROW/alignment, Construction yard layout)
    (iv) Contours (as applicable)
    (v) Drainage systems
    (vi) Locations of sensitive receptors and environmental values

457. The SSEMP will also include a monitoring plan and a reporting program corresponding to the requirements of the EMP. The SSEMP will be submitted to UWSCG/IPMO for approval at least 10 days before taking possession of any work site.

I.4 Site Induction

458. Following approval of the SEMP by the UWSCG PIU, the Contractor will be required to attend a site induction meeting with the DSC's International Environmental Specialist whereby the SEMP is confirmed with the Contractor to ensure that all compliance conditions are clearly understood. Following confirmation of the SEMP with the Contractor the DSC's International Environmental Specialist advises the DSC Team Leader that the Contractor is now cleared to take possession of the Site and may commence moving equipment to the Site.

459. The Contractor will be responsible for ensuring that all sub-contractors abide by the conditions of the SEMP.

I.5 Reporting

460. The Contractor will prepare a monthly concise report (Maximum 3 pages and appendices, if required) in respect of compliance with EMP/SEMP requirements that will be submitted to the PIU through the DSC. The report will contain the following sections.
    (vii) Details of any environmental incidents
    (viii) Status of all non-conformance identified during audits and inspections that are identified by non-compliance notices.
    (ix) Complaints from the public and proactive community relations activities
    (x) Monthly Accident Report
    (xi) Waste volumes, types and disposal
    (xii) Details of any contaminated areas that have been identified and rehabilitated.
    (xiii) Details of any archaeological discoveries.
    (xiv) Details of any ecological issues.
    (xv) Other relevant environmental issues.

461. The Contractor will have a duty to immediately report to the Engineer if any serious environmental breach has occurred during construction e.g. clearing of sensitive areas, serious oil spills etc.

462. ADBs responsibilities in regard to implementation of environmental safeguards requirements for the project include: undertaking periodic monitoring of the EMP implementation and due diligence as part of an overall project review mission; and if required, provide advice to IPMO in carrying out its responsibilities to implement the EMP for the project.

I.6 Implementation Costs

463. The Costs for Environmental Management of the project shall mainly consist of the (i) monitoring of works by the EMS who will be employed by the SC; (ii) baseline and regular parametric measurements of noise, dust and emission (water quality testing may not be needed unless water supply sources will be affected by the construction works). All of the implementation of mitigation measures shall be part of the contractual works and obligation of the Contractor.

464. The cost for the environmental management for construction period is tentatively estimated.

465. Baseline for some of these parameters has not yet been taken for the IEE. This should be collected before considering about taking readings during monitoring.

Table 44: Environmental Management Cost

Item	Quantity[4]	Unit Cost	Total Cost	Remarks
Baseline Parametric Measurements	6	200 USD	1,200	To be conducted by the Contractor for air emissions, dust, vibration measurements
Monthly Parametric Measurements (at least 3 sites) Noise, vibration and dust	108	200 USD	21 600	Tests to be conducted by the Contractor at 3 sites x 36 months monthly monitoring. Noise, dust and vibration should be monitored on the regular bases as well as during the peak operation of Construction Equipment and Machinery.
Monthly Water Quality testing	108	300 USD	32 400	To be conducted by the Contractor for air emissions, dust, vibration measurements
Environmental Management Specialist	36 months	2,500 USD	90 000	The costs are included in the contract signed between

[4]To be established by CS Consultant and international environmental specialist.

Item	Quantity[4]	Unit Cost	Total Cost	Remarks
(SC)				UWSCG and SC and no additional costs will occur.
Environmental specialist (Contractor)	36 months	1500 USD	54.000	The costs will be included in the contract signed between UWSCG and Contractor.
International Environmental Consultant (Contractor)	36 months	-	-	The costs will be included in the contract signed between UWSCG and Contractor.
E&HS Trainings	33 (on monthly daze)	18000 USD	5000 USD	Training should be conducted for all persons involved in construction process
Anti-COVID measures (hiring of doctor and nurse for the regular check-ups and establishing designated quarantine area, purchasing of necessary PPEs, sanitizers, handwashing facilities, face masks, etc.)	36 months	700 USD	25,200 USD	Training should be conducted for all persons involved in construction process
Study of the landslide-prone areas and buildings and premises on the adjacent territories	1	15000	15000	Study should be conducted before construction activities started.
Traffic Specialist	12 month	2.500	30.000	Specialist will be hired in scope of three projects took place in Telavi at the same time
Construct\\ion dust and noise barriers	140 m	250	35.000	To be installed by Contractor at the WWTP construction site
Miscellaneous			251.80	10% for above Items
Subtotal			85,280.00	Total for above

466. Environmental Impact and relevant mitigation measures are provided in the **Table 45** below.

Table 45: Environmental Management Plan

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Pre-construction					
IEE Preparation	Submit IEE for review and comments to ADB	IPMO		Included in Project price	Approval of IEE by ADB and UWSCG
Grievance Redress Mechanism (GRM)	Prepare GRM Validate requirements with UWSCG	IPMO		Included in Project price	Approval of IEE and GRM by ADB and UWSCG
a.Detail Design					
Establishing Project Implementation Unit (IPMO)	Hire Environmental Specialist	UWSCG	IPMO		ES Hired
	Training on ADB Environmental Safeguards	UWSCG	IPMO		Workshop agenda, signed list of participant, training materials
Climate change impacts	provisions in relation to climate change aspects in subproject area through recommended climate change adaptation measures	ADB consultant	IPMO	Included in Project price	Approval of IEE and detail design by UWSCG and ADB
Public cultural resources	Archaeological research should be undertaken during detail design as required by laws	ADB Consultant	IPMO	Included in Project	Archaeological report Approval of the

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
				price	subproject from State Expertise
Grievance Redress Mechanism	Establish GRM Appoint GRM coordinators / focal points Conduct initial and refresher training for coordinators / focal points / stakeholders / affected people on GRM procedures	IPMO	UWSCG		GRM established
Public consultations on detail design IEE/ EMP	Conduct public consultations on decisions made in regards to detail design, present updated IEE/ EMP, and get feedback to consider in final subproject design Explain established GRM, disseminate information and contacts	UWSCG/IPMO	Telavi Local Service Centre, project area		Report on public consultations included into final IEE. Approval of IEE by UWSCG and ADB
Bidding documents	Include EMP obligations in tender documents and specifications, referencing to this IEE and EMP	UWSCG	IPMO		Approval of EMP/ IEE by UWSCG and ADB
b. Pre-construction Stage					
Pre-construction arrangements	Contractor shall hire a full-time environmental specialist(-s) with relevant background and sufficient experience to ensure compliance with all applicable national laws and regulations,	Contractor	City Telavi	Included in Project price	Environmental Specialist of Contractor

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	obtain all necessary environmental licenses and permits, and implement EMP requirements				hired
	Roles and responsibilities Assign roles and responsibilities related to subproject's Environmental Monitoring and Reporting System	IPMO	UWSCG	Included in Project price	Roles and responsibilities assigned
	Environmental Protection Training Conduct environmental protection training on implementation and supervision of subproject's environmental mitigation measures for Supervision Consultant and Contractor	IPMO		Included in Project price	Training will be delivered
Biological study of the project area	Prior to start construction activities, construction should carry out additional biological study of the project area. Results of the work submitted for consideration UWSCG.	Contractor	City "Telavi" Reservoir site; ttransmission mains	6 000 USD	Bilogical Study report, including Results of the study
Aquatic ecology survey of water bodies	Prior to start construction activities, contractor should carry out aquatic ecology survey of any water bodies likely to be directly or indirectly affected during the construction	Contractor	Project area	Included in Project price	Aquatic ecology survey prepared
Rehabilitation of	Prior to start Chlorine Filling Station Detailed design for the chlorine system and its operation will be	Contractor UWSCG	Chlorine filling	Part of construct	Approval of EMP/ IEE by

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
chlorination Station	developed	Proved by ADB	Station	ion cost	UWSCG and ADB
Public Consultations	Consultation should be carried out prior to the start of works to inform residents of upcoming activities, including noise, dust vibration and to make them aware of the GRM System	PA Specialist of Contractor PA Specialist of SC With cooperation of UWSCG/IPMO and PA department	City "Telavi" Reservoir site;	Included in Project price	Check the number of consultations carried out, photos, issues discussed
A detailed pre-construction survey of building in the narrow streets of Telavi	Prior to start construction activities contractor should carry out Building survey in the streets of Telavi where there is potential for damage to houses from vibration.	Contractor	City "Telavi"	Included in Project price	Review and approve building Survey report
Roads condition survey	Prior to start of construction Contractor will conduct condition survey for the roads likely to be heavily used and damaged by the project prior to the start of construction.		City "Telavi" Reservoir site;	Included in Project price	Review and approve Road Condition Survey report

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Survey of all new infrastructure locations including quarry, construction yard etc.	(i) Prioritize areas within or nearest possible vacant space in the project location; (ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, and drinking water supply systems; (iii) Do not consider residential areas; (iv) Take extreme care in selecting sites to avoid direct disposal to water body (river near intake) which will inconvenience the community. (v) For excess spoil disposal, ensure (a) site shall be selected preferably from barren, infertile lands. In case agricultural land needs to be selected, written consent from landowners will be obtained; (b) debris disposal site shall be at least 200 m away from surface water bodies; (c) no residential areas shall be located within 50 m downwind side of the site; and (d) site is minimum 250 m away from sensitive locations like settlements, ponds/lakes/ river or other water bodies	Contractor		Included in Project price	(i) List of selected sites for construction Construction yard, stockpile areas, storage areas, and disposal areas. (ii) Written consent of landowner/s for reuse of excess spoils to agricultural land
Sources of Materials	To obtain a written approval from the MoEPA of Georgia.	Contractor		Included in Project price	(i) List of approved quarry sites and sources of materials
Utilities	(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) contractor to prepare a contingency plan to include actions to be done in	Contractor		Included in Project price	(i) List of affected utilities and operators; (ii) spoil management plan; (iii) and traffic

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	case of unintentional interruption of services. (iii) Contractor to prepare spoils management plan and traffic management plan				management plan
Preparation of "Inert Waste Management Plan"	Prior to start construction activities, contractor should choose the areas for disposal inert waste and prepare "Inert waste management plan". Prepared plan should be submitted to SC for endorsement and to UWSCG for approval.	Environmental Specialist of Contractor Environmental Specialist of SC Approved by UWSCG	City "Telavi" Reservoir site;	Included in Project price	review & approval of Inert waste management plan
SSEMP	Prior to start construction activities, construction contractor should prepare SSEMP and submit to SC for endorsement and to UWSCG for approval.	Environmental Specialist Of Contractor ES of SC	Project Area	Included in Project price	review & approval of SSEMP
Social Issues	Contractor to hire local workers in case similar qualification to give priority local representatives.	Contractor	Contract documents	Project prise	Number of local workers employed by contractor
Possible removal of Terrestrial habitat. Loss of the top soil	If at the stage of the detailed biological study, there are rare or red-listed species are fixed in the project area, the Construction Contractor is obliged to:	Environmental Specialist Of Construction	Construction and Construction yard, storage	Part of constructio n cost	Number of replanted red list species Changes in design to avoid cutting of

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	) Replant the rare or red-listed species found in the Project area and return them to their original site after the completion of the Project.) Attempt to avoid cutting down the trees in the Project zone (by considering the Project alternatives).) Develop a compensatory planting plan and submit it to the relevant bodies for approval, if it is unavoidable to cut down the trees.) Pay compensation sum identified by the MoENRP of Georgia	Company	area. WW Pipe construction		trees Developed Compensatory planting plan Amount of sum paid for compensation
A negative impact on soil, water and air may be caused because of an incorrect management of the generated inertial waste. Also the generated noise, dust and vibration during demolition may cause a negative impact on the surrounding buildings and population.	• Prohibited use of blasting equipment during the demolition process of reservoirs; • No use of heavy duty equipment is allowed; • Prior to the commencement of any activity, the Contractor shall identify whether any machinery or planned action will cause significant vibration. If is the answer is yes, the Contractor is to undertake a condition survey of all structures within the zone of influence; • The Contractor shall monitor vibration at the nearest vibration-sensitive receptors at the start of and during use of non-blasting equipment causing vibration. If vibration	Contractor	City "Telavi" Reservoir sites; Borehole sites	Included in Project price	Monitoring of noise, dust and vibration, details are provided in table 33

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	levels are monitored and found to exceed the vibration threshold according to relevant criteria, the Contractor shall modify the construction activities until compliance with the criteria has been achieved; • Restrict demolition activities during period of the high winds or under more stable conditions when winds could nevertheless direct dust towards adjacent communities; • Using a water truck for dust suppression on all exposed areas as required; • Active areas adjacent to residents should be kept damp at all times; • Establish and enforcing vehicle speed limits to minimize dust generation; • Using tarpaulins to cover fugitive loads (for demolition concrete materials) on haul trucks moving off-site; • Select plant and equipment, design work practices, and limit hours of operation to minimize potential impacts as far as practicable; • Operators of noisy equipment or any other workers in the vicinity of excessive noisy equipment are to be provided with ear protection equipment; • Under noisy conditions, do not allow operators or other workers to be exceed the				

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	threshold that has been establish for exposure to noise; • Schedule construction so as to minimize the multiple use of the most noisy equipment near sensitive receivers; • Ensure that all equipment is in good repair and operated in the correct manner; • Consult with local residents and building owners the address community concerns;				
Construction Stage					

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Air quality,	**Transportation of materials and vehicle movement:** - All dust generating roads should be watered to suppress dust formation during movement of vehicles, as frequent as necessary depending on circumstances. - During hot dry summer days and active construction works, it is a usual practice to water access roads every two hours. - Trucks carrying earth, sand or stone should be covered with tarpaulins or other suitable cover. **Stockpiles of materials and spoil:** - All stockpiles should be managed to reduce dust emissions Stockpiles should be located downwind of sensitive receptors, - Stockpiles emitting dust should be sprayed with water prior to moving - If a stockpile is within 300 m of sensitive receptors, precautions should be taken to avoid dust generation, including using of a reusable stockpile cover and fencing to form a high barrier to prevent wind lifting and dispersing	Contractor	Excavation areas for trenches at Telavi town;	Part of construction cost	(i) Location of stockpiles; (ii) Complaints from sensitive receptors; (iii) Heavy equipment and machinery with air pollution control devices; (iv) Certification that vehicles are compliant with Air Act

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	Construction sites: J Water should be sprayed on construction sites and material handling routes, where fugitive dust is generated J **No burning is allowed** on any construction sites throughout the project implementation period J Construction vehicles and machinery should be maintained to a high standard to minimize emissions and should avoid unnecessary idling to save fuel and reduce emissions Manufacturing plants locations should be agreed with Supervision Consultant and should be downwind and at least 500 m from nearest residential area				

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Noise	) Noise monitoring should be organized at sensitive receptors (residential buildings, schools, hospitals, religious places)) All exhaust systems should be maintained in good order) Noise generating equipment should be located at least 300 m from any sensitive areas) Noise generating equipment at construction sites should be isolated and, where possible, should be faced away from most sensitive directions) All construction workers should be provided with Personal Protective Equipment (PPE) and use them against high noise and/ or lengthy exposure) Noisy works and vehicle movement near sensitive receptors should be limited to daylight working hours Measures should be taken to reduce any noise disturbance to community, including advance warning on timing of noisy activities, seeking suggestions from community members to reduce noise annoyance, and dissemination of procedure on handling complaints through GRM	Contractor	All Project sites	Part of construction cost	Noise related complaints Monitoring reports

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Vibration	• Prior to the commencement of any activity, the Contractor shall identify whether any machinery or planned action will cause significant vibration. If is the answer is yes, the Contractor is to undertake a condition survey of all structures within the zone of influence; • The Contractor shall monitor vibration at the nearest vibration-sensitive receptors at the start of and during use of non-blasting equipment causing vibration. If vibration levels are monitored and found to exceed the vibration threshold according to relevant criteria, the Contractor shall modify the construction activities until compliance with the criteria has been achieved	Contractor	Project Area	Part of construction cost	(i) Complaints from sensitive receptors; (ii) Equivalent day and night time vibration levels

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Surface water contamination	) **No equipment washing** is allowed in any surface water bodies throughout the project implementation period) **No wastewater shall be dumped** into any water bodies) Wastewater from Construction yard and construction site should be canalized into septic tanks without contacting ground) Septic tanks should be timely emptied by a hired septic truck and transported to legally approved treatment facility or dumpsite Fuel storage, equipment maintenance and repair workshops, and vehicle washing areas shall be stationed at least 300 m away from any water body	Contractor	Project Area	Part of construction cost	Visual inspection Monitoring reports
Construction yard Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants Unsanitary and poor living conditions for workers	(I) Consult with UWSCG/IPMO before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide drinking water, water for other uses, and sanitation facilities for employees; (iv) Ensure conditions of liveability at Construction yard are maintained at the highest standards possible at all times; (v) Prohibit employees from poaching wildlife and cutting of trees for firewood; (vi) Train employees in the storage and handling of materials which can	Contractor	Project area	Part of construction cost	Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	potentially cause soil contamination; (vii) Recover used oil and lubricants and reuse or remove from the site; (viii) Manage solid waste according to the preference hierarchy: reuse, recycling and disposal to designated areas; (ix) Ensure unauthorized persons especially children are not allowed in any worksite at any given time.				
Quarry and Borrow Sites.	Utilize readily available sources of materials. If contractor procures materials from existing borrow pits and quarries, ensure that these conform to all relevant regulatory requirements; Borrow areas and quarries (if these are being opened up exclusively for the project) must comply with environmental requirements, as applicable and eensure satisfactory reinstatement of the site after the completion of the project; If additional quarries will be required after construction has started, obtain written approval from IPMO and MoEPA	Contractor	Telavi	Part of construction cost	Monitoring of agreements with Mope and other relevant authorities Site Observation
Nuisance/ disturbance to sensitive areas Schools, hospitals and religious places due construction work in the	) No material should be stocked in this area; material shall be brought to the site as and when required) Conduct work manually with small group of workers and less noise; minimize use of	Contractor	Telavi near sensitive areas of construction sites	Part of construction cost	Site observation, Number of Public Awareness activities

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
proximity (within 250 m of such place)	equipment and vehicles J Material transport to the site should be arranged considering school timings; material should be in place before school starts; Notify concerned schools, hospitals etc. 2 weeks prior to the work conduct a 30 minutes awareness program at on nature of work, likely disturbances and risks and construction work, mitigation measures in place, entry restrictions				
Asbestos Cement Pipes Health risk due to exposure to asbestos materials	(i) Follow instructions provided in ANNEX H of this IEE - AC pipe Management plan (ii) Require all personnel (including manual labourers) to undergo training as per AC management plan (iii) Left AC pipes in-situ. (iv) Training of all personnel (including manual labourers') (v) Site-specific OH&S Plan including AC pipe protocol (vi) Development and application of a detailed OH&S procedure to protect both workers and citizens. This should comply with national and international standards for dealing with asbestos, and should include: (a) removal of all persons to a safe distance; (b) usage of appropriate breathing apparatus and protective equipment by persons delegated to deal with the AC material; and (c) Procedures for the safe removal and long-term disposal of all asbestos- containing material encountered.	Contractor Supervision Consultant	Telavi, construction site	Part of construction cost	(i) Site-specific OH&S Plan including AC pipe protocol (iii) record of OH&S orientation on AC Cement Materials Protocol (iv) personal protective equipment for AC materials (v) sign boards for pipe alignment identified as AC pipes.

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Impact on surface water bodies due to construction	⁾ In case of heavy rain, protect open trenches from entry of rain water by raising earthen bunds with excavated soil ⁾ Confine construction area including the material storage (sand and aggregate) so that runoff from upland areas will not enter the site ⁾ Ensure that drains are not blocked with excavated soil	Contractor	Project area	Part of construction cost	Visual Inspection
Soil Contamination	⁾ The contractors will be required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination. ⁾ Solid waste generated during construction and at construction yard will be properly treated and safely disposed of only in demarcated waste disposal sites. ⁾ Construction chemicals will be managed property ⁾ Clearly labelling all dangerous products, ⁾ Fuel tanks (diesel or oil) should be placed in a concrete pool which its perimeter walls will be at least 1.0 m high with the concrete or plastered masonry wall, ⁾ A proper floor drain should be installed on the slab of the concrete pool for safely discharging the leakages.	Environmental Specialist of contractor	Construction sites Construction yard	Part of construction cost	Visual Inspection

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	) Minimize unnecessary encroachment onto adjacent lands to reduce area of disturbance to vegetation and soil) Fertile topsoil layer should be cut and stockpiled separately from spoil material to be readily available for later use in slope stabilization and land reinstatement works) Where possible, surplus soil should be used for earth filling works at approved locations) Excavation width and depth should be kept to a feasible minimum to reduce extra spoil generation) Settling ponds, silt fences and screens should be used to prevent sediment transport into surface water) Works and material handling should be limited during heavy rains and high winds to minimize soil erosion All disturbed sites prior to project completion and commissioning should be reinstated at least to pre-project conditions by (i) cleaning area from wastes and debris, (ii) mechanical remediation and (iii) biological revegetation with native plants				
Impact on Traffic	) Informing all residents and businesses about the nature and duration of any work well in advance so that they can make necessary	Environmental Specialist	Construction site	Part of constructio	(i) Traffic route during construction works including

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	preparations if necessary; J Providing wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required J Increasing workforce to complete the work in minimum time in these stretches Traffic Management Plan should be part of the Construction Management Plan. (i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (ii) Schedule transport and hauling activities during non-peak hours; (iii) Locate entry and exit points in areas where there is low potential for traffic congestion; (iv) Keep the site free from all unnecessary obstructions; (v) Drive vehicles in a considerate manner; (vi) Coordinate with Traffic Police for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours;	Contractor	Access Road	n cost	number of permanent signage's, barricades and flagmen on worksite (Appendix 5); (ii) Complaints from sensitive receptors; (iii) Number of signage's placed at project location.
Hazardous Materials	J Comply with all national, regional and local legislation with regard to the storage, transport, use and disposal of petroleum, chemical, harmful and hazardous substances and	Environmental Specialist Contractor	Construction site	Part of construction cost	Waste Management Plan review & approval

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	materials. J Establish an emergency procedure for dealing with spills or releases of petroleum. J Storage of all hazardous material to be safe, tamper proof and under strict control. J Petroleum, chemical, harmful and hazardous waste throughout the site must be stored in appropriate, well maintained containers. J Any accidental chemical / fuel spills to be corrected immediately.		Storage Area		
Working with Chlorine	J Ensure that approved, self-contained breathing apparatuses are always available and personnel are properly trained for its use. J Safety equipment should be inspected and maintained in accordance with the manufacturer's instructions. J Ensure that all warning signs and placards are in their appropriate places and are clearly visible. J In the event of a leak, use trained personnel with the proper safety equipment to respond to the leak immediately. Evacuate all personnel from dangerous areas to a safe space. J Training of the servicing staff, relevant risk analysis of the hazardous chemical substances, and preparation of the health and safety document on the site.	Contractor	Construction site	Part of con-struction cost	Site observation

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	⁾ Ensure that approved, self-contained breathing apparatuses are always available and personnel are properly trained for its use. ⁾ Safety equipment should be inspected and maintained in accordance with the manufacturer's instructions. ⁾ Ensure that all relevant equipment for dealing with a pollution incident are on site and all staff are trained in how to use equipment.				
Spills and Leaks of Chlorine	⁾ Notify safety personnel. ⁾ Remove all sources of heat and ignition. ⁾ Keep all combustibles (wood, paper, oil, etc.) away from the leak. ⁾ Ventilate potentially explosive atmospheres. ⁾ Find and stop the leak if this can be done without risk. ⁾ Use water spray to reduce vapors; do not put water directly on the leak or spill area. ⁾ An adequate emergency response plan (ERP) will be developed, to deal with the effects resulting from a chlorine gas leak, in order to lessen or avoid injury to plant personnel, environment and the neighbouring community.	Contractor	Chlorine Filling System	Part of con-struction cost	Emergency Response Plan
Solid Waste	⁾ Place of disposal of the waste concerned must be enclosed.	Environmental Specialist		Part of constructio	Waste Management Plan

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	⁾ The waste must not have access to drainage water. ⁾ Waste must be immediately removed from the working sites. ⁾ Waste must be placed in secondary protective basins. ⁾ This waste can be transferred only to a certified contractor. The personnel involved in the handling of hazardous and non-hazardous waste will undergo specific training in: ⁾ Waste handling ⁾ Waste treatment; and ⁾ Waste storage.	Of Construction Company	Project area Storage Area Construction yard	n cost	review & approval
Loss of top soil	⁾ Top soil of about 1 ft depth (0.3 m) shall be removed and stored separately during excavation work, and after pipeline construction the same soil shall be replaced on the top.	Environmental Specialist Of Construction Company	Pipeline work in pasture lands, agricultural land,	Part of construction cost	Site observation
Impacts on flora and fauna	⁾ Acquire tree cutting permit from local forestry and wildlife department for any trees to be cut under the project ⁾ For any tree cut or valuable grassland area disturbed for project needs, replant trees or	Contractor	Pipeline work in pasture lands, agricultural land,	Part of construction cost	Visual Inspection

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	re-vegetate areas at other approved locations; best practice is three trees planted for one cut J Use only native plants for re-vegetation of disturbed areas J Identify, demarcate and protect sites where small animals, reptiles, and birds of common species live, such as vegetated roadside areas, tree belts, inner areas of bridges, river riparian zones, etc. J Strictly prohibit poaching of wildlife and damaging plants				
Erosion due to excavation/refilling	J Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer. J In the steep slopes, local grass species shall be planted on the refilled trenches.	Environmental Specialist Of Construction Company	All construction sites	Part of construction cost	Site observation
Impact on air quality due to emissions from construction equipment/vehicles	J Ensure that all equipment & vehicles used for construction activity are in good condition and are well maintained J Ensure that all equipment & vehicles confirms to emission and noise norms	Environmental Specialist Of Construction Company	Telavi town City "Telavi" Reservoir site;	Part of construction cost	Site observation
Socio-economic benefits from employing local people in construction	J To the extent possible labour force should be drawn from the local community	Environmental Specialist	All construction sites	Part of constructio	List of local population hired by

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
work		Of Construction Company		n cost	contractor
Socioeconomic – Income. Impede the access of residents and customers to nearby shops	(i) Prepare and implement spoils management plan (ii) Leave spaces for access between mounds of soil; (iii) Provide walkways and metal sheets where required for people; (iv) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (v) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (vi) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints	Environmental Specialist Of Construction Company	All construction sites	Part of construction cost	(i) Employment records; (ii) Records of sources of materials (iii) Compliance to core labour laws (See appendix 4 of this IEE)
Occupational Health and Safety Occupational hazards which can arise during work	(i) Comply with all national, state and local labor laws (ii) Develop and implement site-specific occupational health and safety (OH&S) Plan, and include in the Construction Management plan. The OH & S plan will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use personal protective equipment like helmet, gumboot, safety belt, gloves, nose mask and ear plugs; (c) OH&S Training for all site personnel; (d) documented procedures to be followed for all site activities;	Environmental Specialist Of Construction Company	All construction sites	Part of construction cost	(i) Site-specific OH&S Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	and (e) documentation of work-related accidents; (iii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site; (iv) Provide medical insurance coverage for workers; (v) Secure all installations from unauthorized intrusion and accident risks; (vi) Provide supplies of potable drinking water; (vii) Provide clean eating areas where workers are not exposed to hazardous or noxious substances; (viii) Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; (ix) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; (x) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; (xi) Ensure moving equipment is outfitted with audible back-up alarms; (xii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and				not exposed to hazardous or noxious substances; (vii) record of H&S orientation trainings (viii) personal protective equipment; (ix) % of moving equipment outfitted with audible backup alarms; (x) permanent sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. (xi) Compliance to core labour laws

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and (xiii) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				
Community Health and Safety. Traffic accidents and vehicle collision with pedestrians during material and waste transportation	(i) Plan routes to avoid times of peak-pedestrian activities. (ii) Liaise with UWSCG/IPMO in identifying high-risk areas on route cards/maps. (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (iv) Provide road signs and flag persons to warn of on-going	Environmental Specialist Of Construction Company	All construction sites	Part of construction cost	(i) Traffic Management Plan; (ii) Complaints from sensitive receptors
Construction yard Temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants Unsanitary and poor	(i) Consult with UWSCG/IPMO before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide drinking water, water for other uses, and sanitation facilities for employees; (iv) Ensure conditions of liveability at Construction yard are maintained at the highest standards possible at all times; Prohibit employees from poaching wildlife and cutting of	Environmental Specialist Of Construction Company	Construction yard	Part of construction cost	(i) Complaints from sensitive receptors; (ii) Drinking water and sanitation facilities for employees

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
living conditions for workers	trees for firewood; (v) Train employees in the storage and handling of materials which can potentially cause soil contamination; (vi) Recover used oil and lubricants and reuse or remove from the site; (vii) Manage solid waste according to the preference hierarchy: reuse, recycling and disposal to designated areas; (viii) Ensure unauthorized persons especially children are not allowed in any worksite at any given time				

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Impacts due to import of labour and establishment of temporary labour camps	In unavoidable case of sourcing labour from other areas, provide adequate housing facilities so that there are no impacts and conflict with the local people: - Establish temporary labour camps in consultation with the local authority - Shall be located away from water bodies - No clearance of trees vegetation shall be allowed for establishment of construction yard - Provide all basic amenities (water supply and sanitation, waste collection & disposal, first aid facilities, etc.) - Contractor shall provide fire wood and no worker shall be allowed to cut any tree - Ensure regular and clean maintenance of the construction yard	Environmental Specialist Of Construction Company	Temporary labour camps	Part of construction cost	
Safety risk – public and worker	- Follow standard and safe procedures for all activities – such as provision of shoring in deep trenches (>2 m) - Exclude public from the site – enclose construction area, provide warning and sign boards, security personnel - Provide adequate lighting to avoid accidents - Ensure that all workers are provided with and	Environmental Specialist Of Construction Company	All construction sites	Part of construction cost	Site Inspection

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.); J Maintain accidents records and report regularly J Trench construction shall be taken up in small segments, so that work (excavation, pipe laying and refilling) in each segment is completed in a day. No trenches shall be kept open in the night/after work hours.				
Land use Environmental Issues due to land use change Not applicable	The impact due to change in land use will be negligible due to this project.				
Historical, archaeological chance finds during excavation	J Contractor shall put in place a protocol for conducting any excavation work, to ensure that any chance finds are recognized and measures are taken to ensure they are protected and conserved. This should involve: o Having excavation observed by a person with archaeological field training; o Stopping work immediately to allow further investigation if any finds are suspected; o Calling in the state archaeological authority if a find is suspected, and taking any action they require to ensure its removal or protection in situ..	Environmental Specialist Of Construction Company	All construction sites	Part of construction cost	Records of chance finds
Cumulative impacts – repeated disturbance to	J Schedule the construction activities in harmony	Environmental	Works on waste water	Part of constructio	Developed plan reviewed and

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
roads and people	with the other on-going works) Schedule works before road work	Specialist Of Construction Company, SC	supply network in the town	n cost	approved by SC and UWSCG
Post construction clean-up Damage due to debris, spoils, excess construction materials	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities restored (iv) All affected structures rehabilitated/compensated (v) The area that previously housed the construction yard is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. (vi) All hardened surfaces within the construction yard area shall be ripped, all imported materials removed, and the area shall be top soiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. (vii) The contractor must arrange the cancellation of all temporary services. (viii) Request PMU/CSS to report in writing that worksites and construction yards have been vacated and restored to pre-project conditions before acceptance of work.	Contractor	All project sites	Part of constructio n cost	Supervision Consultants report in writing that (i) worksite is restored to original conditions; (ii) construction yard has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed; and
Climate Change	Restoration of the wind break belts in the area adjacent to the Project zone what will reduce	Environmental Specialist	Construction area	Part of constructio	Records of on implemented

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	the soil erosion potential and will help regulate the temperature regime during the high air temperatures;	Of Construction Company		n cost	measures
Grievance redress mechanism	A person responsible for GRM implementation should be appointed to implement GRM	Contractor	Telavi	Part of Construction cost	GRM established
Operation Phase					
Operation & Maintenance of Water supply system in Telavi	UWSCG shall ensure that all water supply pipelines are maintained well and water is treated to the required Drinking Water Standards	UWSCG	Well field, water network	Part of operation costs	O&M Plan prepared and implemented
Water Quality Monitoring	Treated water shall be tested for drinking water quality standards – parameters on regular basis and residual chlorine, E-coli to be tested at consumer end point.	UWSCG	Well field, Reservoirs	Part of operation costs	O&M Plan prepared and implemented

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
Health and Safety Hazards for UWSCG workers and the public	• Ongoing training programs for first aid and Occupational Health and Safety training to • Undertake periodic inspections of electrical equipment by qualified staff and periodic safety audits	UWSCG	Well field, water network	Part of operation costs	O&M Plan prepared and implemented
Sustainability of Infrastructure Efficiency and reliability of water supply systems	• Provide training for water network and metering repair training • Provide O&M training for water and sewer distribution networks; maintaining pressures and detecting leaks • Provide adequate budgets and undertake planned maintenance programs in accordance with specific O&M plans • Provide vocational training for UWSCG staff • Undertake planned cleaning of town drains and dispose of sludge to designated disposal sites	UWSCG	Well field, water network	Part of operation costs	O&M Plan prepared and implemented
Grievance redress during O & M	Appropriate registers shall be maintained to record complaints and Junior Engineer/s from ULB shall be assigned to track follow up action to ensure that the complaint is addressed in a timely manner by the contractor. - If the complaint is such that it cannot be dealt with at his level, it can be referred to higher authority to take the required decision and followed up with the contractor for the compliance. - Concerned engineer from ULB shall do frequent vigilant	UWSCG	Well field, water network	Part of operation costs	O&M Plan prepared and implemented

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	checks at the areas from where maxim				
Disturbance/ nuisance/ noise due to operation activity	⁾ Consulting company has to define the noise level and its spreading area generated at the stage of pumping stations operation; ⁾ Additional changes will have to be included in the design if required and also noise reducing barriers will have to be arranged	UWSCG	pumping stations area	Part of operation costs	O&M Plan prepared and implemented
Risk and hazards of Clorine during the Operation of Clorine Filling Station	⁾ Training of the servicing staff, relevant risk analysis of the hazardous chemical substances, and preparation of the health and safety document on the site. ⁾ Ensure relevant Material Safety Data Sheet (MSDS) are available on site at all times and details are provided about how to handle a pollution incident and all necessary PPE requirements. ⁾ Cylinders of liquid chlorine has to be stored in a cool place away from steam pipes or other sources of heat. ⁾ Storage facilities should be hard standing and have secondary containment. The facility should also have security in place 24hrs a day. ⁾ Store cylinders, full or empty, with their valve outlet caps and valve protective caps in place. ⁾ Store all cylinders of liquid chlorine in a	UWSCG	Chlorination Station	Part of operation costs	O&M Plan prepared and implemented

Potential Negative Impacts	Mitigation measures	Responsibility	Location	Cost	Monitoring of Mitigations
	location which is protected from direct sunlight and from dampness. J Do not store cylinders where it is possible for leaking vapors to enter a ventilating system. Storage areas should be kept clean so that accumulated trash does not present a fire hazard. J If a chlorine cylinder or its valve is found out of order, notify the distributor, from whom the chlorine was purchased, giving the cylinder number and the nature of the damage. J Handle all chlorine cylinders with extreme care. J Do not drop cylinders or allow them to strike any object with force. J Use valves, gauges, regulators, and fittings which have been approved for chlorine service. Ordinary devices are not suitable. J Retain on site a list of key contact telephone numbers for emergency response providers and regularly liaise with them and conduct drills as per national requirements in the event of an incident.				

I.7 Monitoring

467. More detailed monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations that will signal the need for corrective actions; and (b) monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and document the progress and results of mitigation are provided in table 33 below. All parameters (Water quality, noise) should be monitored against international standards.

468. A program of monitoring will be required to ensure that all concerned agencies take the specified action to provide the required mitigation, to assess whether the action has adequately protected the environment, and to determine whether any additional measures may be necessary. Regular monitoring of implementation measures by Civil Contractors will be conducted by the SC, on behalf of Implementing Agency. Monitoring during operation stage will be conducted by the UWSCG.

469. Most of the mitigation measures are fairly standard methods of minimizing disturbance from building in urban areas (maintaining access, planning work to minimize public inconvenience and traffic disruptions, finding uses for waste material, etc). Monitoring of such measures normally involves making observations in the course of site visits, although some require more formal checking of records and other aspects. The regular control and inspection during general construction activities in Telavi is needed.

Table 46: Environmental Monitoring Plan for general construction activities in Telavi

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
Pre construction					
Tender documentation	Environmental Issues	Once before bid announcement	Environmental audit of bidding documents to ensure relevant sections of the EMP have been included	The bidding document shall reflect all environmental mitigation measurements	UWSCG, SC
Contract documentation with construction contractor	Environmental Issues	Once before contract signature	Environmental audit of contract documents to ensure relevant sections of the SSEMP have been included	The contract document shall reflect all environmental mitigation measurements	UWSCG, SC
Contract documentation with construction contractor	Social Issues	Once before contract with construction company signed	Ensure relevant section of contractor's responsibilities to hire local population have been included in contract.	50 % of workers should be hired from local population.	UWSCG, SC
Construction company prepared all necessary environmental management plans and conducted all requested investigations	Environmental Issues	Once before contract signature	Environmental audit of the environmental plans prepared by construction contractor	All environmental plans were prepared and approved by relevant organizations.	UWSCG, SC
Construction yards,	Environmental	After the Signature	(i) List of selected sites for		Contractor

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
hot mix plants, stockpile areas, storage areas, and disposal areas.	Issues	of Contract	construction yards, hot mix plants, stockpile areas, storage areas, and disposal areas. (ii) Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land		
Surface water quality	Environmental Issue	After the Signature of Contract	Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) Number of silt traps installed along trenches leading to water bodies; (iii) Records of surface water quality inspection; (iv) Effectiveness of water management measures; (v) No visible degradation to nearby drainages, nallahs or water bodies due to civil works		Contractor
Construction					
Ambient Air	Dust	Continual Dust should be	Visual assessment during the Works Measuring at nearest potentially sensitive	If dust levels are above acceptable visual levels, implement dust suppression techniques (wetting down	Contractor

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
		monitored on the regular bases as well as during the peak operation of Construction Equipment and Machinery	receivers.	area) and/or assess weather conditions and maybe temporarily cease works until conditions ease	
Noise	(15 minute) Noise Levels	Periodic attended Monitoring at hourly Intervals. Noise, should be monitored on the regular bases (weekly) as well as during the peak operation of Construction Equipment and Machinery	Measuring at nearest potentially sensitive receivers.	If noise action level is exceeded then review work practices and noise control procedures, including maintenance of equipment, installation of silencers, provision of noise barriers and modification of work hours.	Contractor
Vibration	(15 minute) Vibraition level	Periodic attended Monitoring at hourly Intervals. Vibration should be monitored on	Measuring at nearest potentially sensitive receivers.	If vibration level is exceeded then review work practices, maintenance of equipment.	Contractor

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
		the regular bases as well as during the peak operation of Construction Equipment and Machinery			
Water Quality	Quality/ Contaminant concentrates	Continue In rain weather after 10-15 minutes rain stats.	Guideline / license requirements (whichever is Applicable) Impact Monitoring Compliance Monitoring	If contaminant concentrations/license conditions are exceeded, review disposal options and decide on most applicable. Report any accidences of license (of applicable) to issuing authority.	Contractor
Waste Management Implications	Segregation, Storage and transport of wastes	Daily Monthly inspection	- Visual assessment during the Works; - Field inspection, - Report of waste volumes generated. - Report and record all leakages and spills - Impact Monitoring. - Compliance Monitoring	Solid waste cycled as 0 % of movement of solids or liquid waste through the soil, rocks, water, atmosphere.	contractor
Ground	Soil Monitoring and Erosion Control	Continual	Assess adequacy of sedimentation/environmental controls on-site Impact Monitoring	If controls have failed or are found inadequate, cease works immediately and repair to an acceptable	Contractor

Item	Parameter	Frequency	Action Level	Response When Action Level Exceeded	Responsibility
				standard	
Ecological Resources	Fauna and Flora	Continual	Minimal ecological impacts Impact Monitoring	Required to ensure the recommended mitigation measures are properly implemented.	Contractor
Landscape and Visual	Surface treatment of temporary structures	Once at the Completion of work	Minimum disturbance of the original landscape. Impact Monitoring	Required to ensure the recommended mitigation measures are properly implemented	Contractor
Operation					
Conduct source water quality monitoring	As per the government regulations	1 sample from each borehole	Comparison with the base values and standards as per government regulations	Required to ensure the recommended mitigation measures are properly implemented.	UWSCG
Treated water quality monitoring	As per the government regulations	At the outlet of chlorination plant; at reservoir sites; and at extreme points of network in various locations in town	Comparison with the base values and standards as per government regulations	Required to ensure the recommended mitigation measures are properly implemented.	UWSCG

J. RECOMMENDATIONS AND CONCLUSIONS

J.1 Recommendation

470. The process described in this document has assessed the environmental impacts of all elements of the Telavi Water Supply System project. All potential impacts were identified in relation to pre-construction, construction, and operation phases. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible. Environmental impacts as being due to the project design or location were not significant. However, the social impacts (access disruptions) due to construction activities are unavoidable, as the residential and commercial establishments exist along the project corridor.

471. During the construction phase, impacts mainly arise from the need to dispose waste soil and from the temporary disturbance of residents, businesses, traffic and important buildings by the construction work. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. Since the pipe line works are conducted along the roads, there is potential to create disturbance. To minimize this, the contractor should develop a Method Statement, which should be approved by the UWSCG/IPMO prior to start of work, and should conduct the work strictly in line with the Method Statement.

472. There were limited opportunities to provide environmental enhancements, but certain measures were included. For example it is proposed that the project will employ in the workforce people who live in the vicinity of construction sites to provide them with a short-term economic gain; and ensure that people employed in the longer term to maintain and operate the new facilities are residents of nearby communities.

473. Anticipated impacts during operation and maintenance will be related to detection and repair of leaks and pipe bursts. These are, however, likely to be minimal, as proper design and selection of good quality pipe material shall mean that leaks are minimal. Leak repair work will be similar to the pipe-laying work.

474. Mitigation will be assured by a program of environmental monitoring conducted during construction and operation to ensure that all measures are implemented, and to determine whether the environment is protected as intended. This will include observations on- and off-site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the UWSCG/IPMO.

475. The public participation processes undertaken during project design ensured stakeholders are engaged during the preparation of the IEE. The planned information disclosure measures and process for carrying out consultation with affected people will facilitate their participation during project implementation.

476. The project's grievance redress mechanism will provide the citizens with a platform for redress of their grievances, and describes the informal and formal channels, time frame, and mechanisms for resolving complaints about environmental performance.

477. A copy of the EMP/SSEMPS shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

478. The citizens of the Telavi will be the major beneficiaries of the improved water supply, as they will be provided with a constant supply of high quality water, 24 hours. In addition to improved environmental conditions, the project will improve the over-all health condition of the town.

479. The Telavi Water Supply System subproject is unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

480. Based on the findings of the IEE, the classification of the Project as Category “B” is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB SPS (2009) or Georgian regulations.

481. Potential negative impacts were identified in relation to design, location, construction and operation of the sub project components. Mitigation measures have been developed to reduce all negative impacts to acceptable levels.

482. Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built and when it is operating. Appropriate monitoring measures to guarantee the long term and sustainable operation of the water supply system are presented in a monitoring plan.

483. When operating, water supply components will have overall beneficial impacts to human health and the environment as it will provide the inhabitants of Telavi with a new water supply system.

484. The main beneficiaries of the improved system will be the citizens of Telavi, who will be provided with a new water supply system. This will improve the quality of life of people as well as raising the standards of both individual and public health as the improvements in hygiene should reduce the incidence of disease. This should lead to economic gains as people will be away from work less and will spend less on healthcare, so their incomes should increase.

485. The recommendation of this Environmental Assessment process is that all mitigation, enhancement and monitoring activities proposed here shall be implemented in full. This is essential to ensure that the environmental impacts are successfully mitigated; this is the responsibility of UWSCG.

486. The proposed subprojects – Improvement of the Water Supply Systems in Telavi is unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels. Based on the findings of the IEE, there are no significant impacts as all project components including reservoirs and boreholes will be built on the territory belonging to UWSCG were water supply facilities already exist.

J.2 Conclusion

487. The subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

488. Based on the findings of the IEE, the classification of the Project as Category “B” is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB SPS (2009) or national legislation of Georgia.

ANNEXES

ANNEX A: PHOTOS OF PROJECT AREA (A)

Photo of Shalauri reservoir

Photo of Central Reservoir #1 and access road

Photo of Borehole #1 near the Central Reservoir #1

Photo of Water Treatment Plant in the vicinity of the Central Reservoir #1

Photo of 1000m3 Reservoir on the University Street

Photo of Gigo Gori reservoir

ANNEX B: PHOTOS OF OUBLIC CONSULTATIONS (B) 23 June 2017:

ქ.თელავის წყალმომარაგების სისტემის რეაბილიტაციის პროექტი

წინასწარი კვლევითი სამუშაოების განხორციელების
საჯარო განხილვა

Construction of Water Supply System in Telavi

Public Consultations

23 ივნისი, 2017

სახელი, გვარი	ორგანიზაცია	საკონტაქტო ინფორმაცია	ხელმოწერა
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სახელი, გვარი	ორგანიზაცია	საკონტაქტო ინფორმაცია	ხელმოწერა

ANNEX D: ISSUES RAISED DURING PUBLIC HEARINGS IN TELAVI

Issues raised	Response	Addressed in IEE
Information on the timeline of Telavi subproject and the schedule of the construction activities	Telavi water supply sub-project will start in early 2018 and will be implemented within the two years	
Scope of the project activities, including type of works to be implemented within the project	Detail information on requested information was provided	Details provided in para 11 of the proposed project
What will be final result of the project implementation and how the Water Supply System will be improved	Local population will be provided with high quality drinking water for 24 hours	
Proper repairing of the roads in Telavi after completion of the civil works is required	After completion works all roads shall be rehabilitated at least up to condition of pre-construction stage	
Monitoring of the water quality after the completion of project implementation	Regular monitoring of the water quality will be undertaken by the UWSCG and its laboratories	Details provided Table 26
Life time of pipes	Polyethylene pipes characterized by extremely low roughness coefficient will be used for the construction of the water network, which ensure more than 40 years life time	
How many streets will be involved in the project and will it completely cover the city?	Within the proposed project I, II and III zone will be fully rehabilitated	
Who will supervise and monitor construction of the proposed project	UWSCG and Supervision Consultant	

Who is responsible for the restoration after completion of the rehabilitation works and who will do it?	Contractor will carry out restoration works under the supervision of SC and UWSCG	
What type of impact on environment is associated with the project?	Environmental impacts that are associated with the project are only site specific. Impacts are mostly confined to the construction stage of the project and are therefore temporary. For permanent environmental impacts during operation stage, suitable mitigation measures will be implemented.	
What will be Socio Economic Impacts of the Project?	Project will generate new job opportunities. Standard of individual and public health will improve as a result of the project.	
Who is implementing and sponsoring the Project?	Project is Financed by the Asian Development Bank (ADB) and the Government of Georgia and implemented by the United Water Supply Company of Georgia (UWSCG).	
What type of impact on environment is associated with the project? And what mitigation measures will be taken?	The potential overall adverse environmental impact of the Project is moderate and the identified issues can generally be managed and the potential impacts reduced to acceptable levels through the implementation of the set of proposed mitigation measures during construction, operation and monitoring.	

ANNEX E: REGISTRATION LIST, PUBLIC CONSULTATIONS 27 MAY 2020

ქ. თელავის წყალმომარაგების სისტემის რეაბილიტაციის პროექტის
საჯარო განხილვა

Construction and Rehabilitation of Water Supply
Infrastructure in Telavi
Public Consultations

27 მაისი 2020

სახელი, გვარი Name	ორგანიზაცია Organization	საკონტაქტო ინფორმაცია Contact information	ხელმოწერა Signature
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[illegible]	[illegible]	577380305	[illegible]
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ANNEX F: MINUTES OF THE MEETING, 27 MAY 2020

Minutes of Meetings

Subject: Public hearing of Initial Environmental Examination (IEE) under the project of Improving Telavi's Water Supply System.

Time and venue: Telavi city, rugby pitch; May 27, 13:00.

Attendees: local population, representatives of Telavi City Hall, Head Office and Regional Branch of United Water Supply Company of Georgia.

Mr. Grigol Mandaria, Company Director, Ms. Maka Goderdzishvili, Head of Environmental Protection and Permits Department, Ms. Liza Chovelidze, an employee at the same Department, Ms. Ana Onashvili, Head of Projects Implementation Department, Ms. Nino Danibegashvili, an employee at the same Department, and Ms. Keti Chomakhidze, Environmental Specialist under Urban Services Improvement Investment Program financed by the Asian Development Bank, attended the meeting.

Mr. Giga Gvelesiani, Representative of the ADB Resident Mission, attended the meeting as well.

Ms. Keti Chomakhidze opened the meeting and presented the Initial Environmental Examination Report and Social Assessment Report. Ms. Chomakhidze spoke about the rehabilitation and construction works envisaged by the project, project objectives. She reviewed the measures to be employed to prevent, reduce, mitigate or compensate the adverse impact on the environment and social issues.

During the presentation, the public was informed in detail about the Grievance Redress Mechanism, which was established as soon as the project had been launched. In addition, the public was given hard copies of presentation and they were informed about the locations of water infrastructure (network, reservoirs and boreholes).

After the presentation finished, discussion ensued. In addition to discussing general issues associated with the project, the public asked to discuss the issues of connecting the population to water supply network.

Mr. Grigol Mandaria, Company Director, Ms. Ana Onashvili, Head of Projects Management Department, Ms. Maka Goderdzishvili, Head of Environmental Protection and Permits Department answered the questions. The public asked the following questions:

1. **Question:** Who finances Water Supply Improvement Project and what is the project worth?

   Answer: The Asian Development Bank finances the project. The budget is 10 MIO USD worth.
2. **Question:** Will the local population be hired?

   Answer: Similar to other ongoing projects, the local population will be employed for this project too.
3. **Question:** How much will be the tariff?

   Answer: Tariff has not been determined by GNERC yet. Only per capita tariff is known.

4. **Question:** To what extent do the boreholes envisaged by the project ensure the supply of Telavi's population with high quality water?

   Answer: The project foresees the building of 3 new boreholes and rehabilitation of 5 existing boreholes; they will completely ensure 100% supply of population with water after the project finishes.

5. **Question:** The apartment block at №8, Alazani Avenue, is a non-standard apartment block. In order to connect it to new supply system, the internal distribution system should be installed. What is the solution?

   Answer: The Company cannot bear the costs of installation of internal system. The population should make a decision. If they decided on leaving the old system, then the meters will be installed on the existing network.

6. **Question:** What kind of works are being executed under the current rehabilitation of water supply system in Telavi?

   Answer: Currently, the Company is implementing a project through State budgetary financing, which foresees the replacement of existing 11 km-long water supply network, installation of 3 boreholes and installation of meters in apartment blocks.

7. **Question:** When does the project start and finish?

   Answer: The project implementing civil works company will be revealed in autumn; the project implementation will start in 2021. The project completion date is 2023.

8. **Question:** The project envisages the construction of new water supply network with total length of approximately 61 km.

   Answer: That is correct. However, this figure might change slightly. We will try to cover all districts of Telavi where the system needs replacing.

9. **Question:** The water is supplied to №4, Sokhumi Street, Telavi, only for 2 hours per day. There is a problem of supplying higher floors.

   Answer: For the time being, the yield does not allow us more. That is why the new project has been designed. Once the new project is implemented, this problem will be solved.

10. **Question:** Does the project include the rehabilitation of sewage network?

    Answer: No, it does not, for the time being. At this stage, only water supply network will be replaced; after that, the sewage network will be rehabilitated. The works will be executed gradually in order to avoid traffic and other problems.

11. **Question:** What measures are planned to avoid disturbance to population and to protect the environment during the civil works?

    Answer: The following mitigation measures will be implemented:

    - Follow standard and safe procedures for all activities – such as provision of shoring in deep trenches (>2 m)
    - Exclude public from the site – enclose construction area, provide warning and sign boards, security personnel, providing wooden walkways/planks across trenches for pedestrians and metal sheets where vehicle access is required
    - Provide adequate lighting to avoid accidents
    - Ensure that all workers are provided with and use appropriate Personal Protective Equipment - helmets, hand gloves, boots, masks, safety belts (while working at heights etc.);

- Trench construction shall be taken up in small segments, so that work (excavation, pipe laying and refilling) in each segment is completed in a day. No trenches shall be kept open in the night/after work hours.
- Informing all residents and businesses about the nature and duration of any work well in advance so that they can make necessary preparations if necessary;

ANNEX G: PHOTOS OF THE MEETING, 27 MAY 2020

ANNEX H: GRM ORDER N196, 30 October 2018

United Water Supply Company of Georgia, LLC

Order #196

Tbilisi

On Grievance Redress Mechanism under projects financed by the Asian Development Bank at United Water Supply Company of Georgia, LLC

In accordance with Safeguard Policy Statement developed by the Asian Development Bank in 2009 and Point 8 of Article 8 of the Articles of Association of United Water Supply Company of Georgia, LLC, I hereby Decree:

1. Three-stage Grievance Redress Mechanism be approved to redress grievances submitted by project affected people (hereinafter the individual concerned) during the implementation of projects financed by the Asian Development Bank.

2. At first stage of grievance redress, an authorized representative of Customers Relations Division/Customers Service Office of local Service Center/Regional Branch of United Water Supply Company of Georgia, LLC, be obliged to familiarize himself/herself with the content of the complaint, to register the complaint in the form approved by Annex #1 of this Order and to submit it to Grievance Redress Committee (hereinafter the Committee), which will consider the submitted complaint within the two weeks period.

3. The Committee envisaged by the Point 2 of the Order be approved with the following composition:

a) Head (Regional Branch Manager/Service Center Director) of respective territorial unit of United Water Supply Company of Georgia, LLC – Committee Chairman;

b) Representative of Projects Management Department of United Water Supply Company of Georgia, LLC – Committee Member;

c) Representative of Environmental Protection and Permits Department of United Water Supply company of Georgia, LLC – Committee Member;

d) Representative of construction company implementing project/subproject – Committee Member;

e) Representative of supervision company of project/subproject – Committee Member;

f) Representative/Commissioner of the respective municipality – Committee Member;

g) Environmental Specialist of the Asian Development Bank Program – Committee Member;

h) Representative of respective territorial unit of United Water Supply Company of Georgia, LLC – Committee Secretary.

4. In case the problem raised in the complaint is not solved within the two weeks periods at the first stage of grievance redress, the individual concern canaddress the Committee established

by Point 5 of this Order, which will make decision within two weeks period after it receives the complaint approved by Annex #1 of this Order.

5. To promptly and effectively review and solve the complaint of the individual concerned, the Grievance Redress Commission (hereinafter the Commission) be established with the following composition:

a) Director of United Water Supply Company of Georgia, LLC – Commission Chairman;

b) Deputy Director on Technical Issues of United Water Supply Company of Georgia, LLC – Commission Member;

c) Deputy Director on Financial Issues of United Water Supply Company of Georgia, LLC – Commission Member;

d) Deputy Director on Commercial Issues of United Water Supply Company of Georgia, LLC – Commission Member;

e) Head of Legal Department of United Water Supply Company of Georgia, LLC – Commission Member;

f) Head of Environmental Protection and Permits Department of United Water Supply Company of Georgia, LLC – Commission Member;

g) Head of Communications Office of Director's Apparatus of United Water Supply Company of Georgia, LLC – Commission Member;

h) Head of Projects Management Department of United Water Supply Company of Georgia, LLC – Commission Member;

i) Head of Construction Supervision Department of United Water Supply Company of Georgia, LLC – Commission Member;

j) Representative of Environmental Protection and Permits Department of United Water Supply Company of Georgia, LLC – Commission Secretary.

6. Heads of self-governing units be required to define a representative envisaged by the Sub-point "f" of Point 3 of this Order, who is employed in local self-governance in the field of social matters.

7. In case the problem raised in the complaint is not solved within two weeks at the second stage of grievance redress, the individual concerned can address the Permanent Representative of the Asian Development Bank to Georgia at the following address: Tbilisi, #1, G. Tabidze Street, Tel: +995 32 225 06

8. Order #122 dated April 30, 2014, On Grievance Redress Mechanism under projects financed by the Asian Development Bank, of Director of United Water Supply Company of Georgia, LLC, be declared null and void.

9. Records Keeping Office of Administrative Department of the Company be charged with distribution of this Order among the territorial units.

10. The Order take effect upon signature.

ANNEX I: ASBESTOS-CONTAINING MATERIAL MANAGEMENT PLAN

Waste Asbestos-Containing Material Management Plan

Definitions

Asbestos means the asbestiform varieties of: Chrysotile (serpentine); crocidolite (riebeckite); amosite (cumming to nitegrunerite); anthophyllite; tremolite; and actinolite.

Asbestos-containing material (ACM) means any material or product which contains more than 1 percent asbestos.

Asbestos-containing building material (ACBM) means surfacing ACM, thermal system insulation ACM, or miscellaneous ACM that is found in or on interior structural members or other parts of a school building.

Asbestos debris means pieces of ACBM that can be identified by colour, texture, or composition, or means dust, if the dust is determined by an accredited inspector to be ACM.

Airborne Asbestos Fibbers Any material that contains greater than one percent asbestos, and which can be crumbled, pulverized, or reduced to powder by hand pressure. This may also include previously non-friable material that becomes broken or damaged.

Abbreviations

ACM	Asbestos-Containing Material
ACBM	Asbestos-Containing Building Material
ADB	Asian Development Plan
GIIP	Good International Industry Practice
EHS	Environmental Health & Safety
EMP	Environmental Management Plan
EA	Executive Agency
ILO	International Labour Organization
MoE	Ministry of Environmental and Nature Resource Protection of Georgia
UWSCG	United Water Supply Company of Georgia

1. Legislative Requirements

1.1. Georgian Legislation

The hygienic requirements, sanitary rules and standards related to asbestos and ACM (asbestos-containing materials) on the territory of Georgia are regulated by Decree No. 2004 of the Minister of Labour, Health and Social Affairs of Georgia "**The hygienic requirements for the sanitary rules and standards for asbestos and asbestos-containing materials**".

The said law regulates packing, storing and transportation of the asbestos-containing materials, as well as collecting, storing and utilization processes of asbestos-containing industrial and municipal waste.

The maximum admissible concentrations of fibrous aerosols with diverse actions and metals in the working zone is regulated by Decree No. 262/N of September 18, 2002 of the Minister of Labour, Health and Social Affairs of Georgia.

In line with the said law, the ACMs belong to the class of highly hazardous substances.

1.2 IFI Group Approach to Asbestos Health Risk

The WBG EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP)[5]. When one or more members of the WBG are involved in a project, the EHS Guidelines are applied as required by their respective policies and standards.

The WBG's EHS Guidelines[6] specify that the use of ACM should be avoided in new buildings and construction or as a new material in remodeling or renovation activities. Existing facilities with ACM should develop an asbestos management plan that clearly identifies the locations where the ACM is present, its condition (e.g., whether it is in friable form or has the potential to release fibers), procedures for monitoring its condition, procedures to access the locations where ACM is present to avoid damage, and training of staff who can potentially come into contact with the material to avoid damage and prevent exposure. The plan should be made available to all persons involved in operations and maintenance activities. Repair or removal and disposal of existing ACM in buildings should be performed only by specially trained personnel[7] following host country requirements or, if the country does not have its own requirements, internationally recognized procedures[8]. Decommissioning sites may also pose a

[5]Defined as the exercise of professional skill, diligence, prudence, and foresight that would be reasonably expected from skilled and experienced professionals engaged in the same type of undertaking under the same or similar circumstances globally. The circumstances that skilled and experienced professionals may find when evaluating the range of pollution prevention and control techniques available to a project may include, but are not limited to, varying levels of environmental degradation and environmental assimilative capacity as well as varying levels of financial and technical feasibility

[6] http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GeneralEHS/$FILE/Final+-+General+EHS+Guidelines.pdf (pp. 71, 91, 94)

[7] Training of specialized personnel and the maintenance and removal methods applied should be equivalent to those required under applicable regulations in the United States and Europe (examples of North American training standards are available at: http://www.osha.gov/SLTC/asbestos/training.html)

[8] The ASTM International E1368 - Standard Practice for Visual Inspection of Asbestos Abatement Projects; E2356 - Standard Practice for Comprehensive Building Asbestos Surveys; and E2394 -

risk of exposure to asbestos that should be prevented by using specially trained personnel to identify and carefully remove asbestos insulation and structural building elements before dismantling or demolition[9].

1.3 International Convention and Standards for Working with Asbestos

The International Labour Organization (ILO) established an Asbestos Convention (C162) in 1986 to promote national laws and regulations for the "prevention and control of, and protection of workers against, health hazards due to occupational exposure to asbestos."[10] The convention outlines aspects of best practice: Scope and Definitions, General Principles, Protective and Preventive Measures, Surveillance of the Working Environment, and Workers' Health. As of March 4, 2008, 31 countries had ratified the Convention;[11] 17 of them have banned asbestos.

Some of the ILO asbestos convention requirements:

- work clothing to be provided by employers;
- double changing rooms and wash facilities to prevent dust from going home on street clothes;
- training of workers about the health hazards to themselves and their families;
- periodic medical examinations of workers,
- periodic air monitoring of the work environment, with records retained for 30 years;
- development of a work plan prior to demolition work, to protect workers and provide for proper waste disposal; and
- protection from "retaliatory and disciplinary measures" of workers who remove themselves from work that they are justified in believing presents a serious danger to health.

2. Risk Assessment

The asbestos risk assessment process involves identifying, analysing, evaluating, controlling and monitoring sources of asbestos within buildings or other structures. The presence of asbestos within a building is considered a hazard, but the level of risk associated with the hazard is related to the presence of airborne fibbers'. The identification of asbestos within a building doesn't automatically necessitate its immediate removal. Asbestos that is in a stable matrix, or effectively encapsulated or sealed, and remains in a sound condition while left undisturbed, represents low risk to health.

Asbestos becomes dangerous when the fibbers' are released into the air and inhaled or ingested in high concentrations over a prolonged period of time. Individuals face the risk of inhaling or ingesting airborne fibbers' when asbestos containing products are worn down, disturbed, or damaged.

There are some classifications to determine the risk of the ACMs, but the principal evaluation indicators are the same with all of them. The degree of risk increases as a result of the following factors:

Standard Practice for Maintenance, Renovation and Repair of Installed Asbestos Cement Products.

[9] http://www.ifc.org/ifcext/enviro.nsf/AttachmentsByTitle/gui_EHSGuidelines2007_GeneralEHS/$FILE/Final+ +General+EHS+Guidelines.pdf (pp. 71, 91, 94)

[10] www.ilo.org/ilolex

[11] http://www.ilo.org/ilolex/english/convdisp1.htm

1. High degree of the physical damage of the ACMs.
2. High probability of the future damage of the ACMs.
3. High degree of contact of the damaged ACMs with air.

The ACMs located in an uncontrolled manner in the project zone, besides being virtually fractured, are subject to daily impact of the following factors:

1. The project area is the driving route for the cattle of the nearby villages (the cattle is driven across the project area twice a day). The cattle use the waste in the area as a feed. Consequently, the ACMs in question are subject to further impact every day.
2. The local population permanently dispose the waste in the said area in an uncontrolled manner what is another source of damage for the ACM.

As already mentioned, the area where the ACM waste is placed, is an open area and is in direct contact with air.

Following the above-mentioned, the existing situation can be evaluated as highly risky. ACM is friable and not in a stable condition, and there is a risk to health, it must be removed by a certified asbestos removalist as soon as practicable.

Within the scope of the project, it is necessary to ensure the separation/collection, transportation and safe disposal of the AC waste by the Contractor prior to the preparatory works.

3. Waste Asbestos-Containing Material Management Plan

3.1 Project Goals and Objectives

The goal of the presented „**Waste Asbestos-Containing Material Management Plan“** is to avoid, reduce or manage any potential adverse impact on the environment and/or humans caused by the project implementation.

In order to achieve this goal, the following measures are necessary:

- The quantity and content of the waste placed in the project zone in an uncontrolled manner is to be identified;
- The degree of risk of the negative impact of the existing situation on the environment is to be identified;

- A duly qualified project-implementing organization is to be identified through a tender;
- A detailed „**Waste Asbestos-Containing Material Management Plan“** is to be developed;
- The separation/collection, transportation and safe disposal of the AC waste is necessary;
- The monitoring plan is to be developed and implemented.

3.2 Rights and Responsibilities

The companies and organizations engaged in the AC waste have the following rights and obligations:

Executive Agency (UWSCG):

- Approve AMP risk assessment and Waste ACM Management plans
- Ensure resources are allocated to enable thorough application of Debris ACM Management plan on site
- Ensure employees are made available for asbestos awareness training and asbestos removal work
- Ensure an Asbestos Removal Business Certificate is maintained for the site where applicable
- Ensure the Waste ACM Products Register is maintained for the site
- Ensure the Asbestos Exposure Register is maintained for the site
- Ensure compliance with Waste ACM Management plan

Contractors:

- Submit risk assessment and Waste ACM Management plans when performing waste separation (asbestos removal), transportation and disposal works;
- Develop a site-specific waste separation (asbestos removal) control plan prior to performing the separation works;
- Undergo site induction;
- Ensure no asbestos is removed or disturbed without prior notification to RD
- Ensure legislative requirements and appropriate procedures are complied with.
- Upon job completion ensure all products are labelled using the correct identification stickers and disposed in safe manner.
- Report immediately to RD any perceived asbestos risk

4.3 Awareness Training

4.3.1 Asbestos Separators/Removalists

Persons carrying out asbestos removal work are to be trained so they can carry out this work safely and without risk to their own health or the health of others. This training must reflect the specific type of asbestos work to be undertaken. Asbestos Separators/Removalists are to keep written records of all training provided to their asbestos removal workers and these records should be requested before awarding the contract for any site removal work.

4.3.2 Site employees

Any UWSCG employees and others who may come into contact with ACM on the site, either directly or indirectly, must be provided with adequate information and training. Depending on the circumstances the asbestos awareness training may include:

- the purpose of the training;
- the health risks of asbestos;
- the types, uses and likely occurrence of ACM at the specific construction site;
- the trainees' roles and responsibilities under the project Waste ACM Management plan;
- where each site-specific register of ACM is located and how it can be accessed;

- the timetable for removal of ACM from the particular construction site;
- the processes and procedures to be followed to prevent exposure, including exposure from any accidental release of asbestos dust into the workplace;
- where applicable, the correct use of maintenance and control measures, protective equipment and work methods to minimize the risks from asbestos, limit the exposure of workers and limit the spread of asbestos fibers outside any asbestos work area;
- control levels for asbestos; and
- the purpose of any air monitoring or health surveillance that may occur.

4.3.3 Local population

The awareness building training about the negative impact of the ACM waste on the environment should be held for the population living or working adjacent to the project zone. Depending on the circumstances the asbestos awareness training may include:

- the purpose of the training;
- the health risks of asbestos;
- the types, uses and likely occurrence of ACM at the specific construction site;
- where each site-specific register of ACM is located and how it can be accessed;
- the timetable for removal of ACM from the particular construction site;
- the processes and procedures to be followed to prevent exposure, including exposure from any accidental release of asbestos dust into the workplace;

4.4 Waste Separation

4.4.1 General requirements

Management of disaster debris and demolition waste illegal disposed must be properly separated to remove problem materials if the bulk of the debris or waste is to be managed at appropriate solid waste facilities and/or to be recycled. Careful waste separation is essential to expedite disaster clean up and removals, hold down costs, reduce waste, and protect human health. Recycling certain materials will help hold down costs. Poorly separated waste or debris may not be managed as inert waste and may be subject to further waste evaluation and disposal costs as municipal waste, asbestos waste or even hazardous waste. Problem loads may be rejected and contractors may be asked to do additional work.

Wastes should be carefully separated into categories described below and properly managed at approved recycling, processing or disposal facilities in accordance with International, national and local requirements. Keep records on the amount removed from each unit, how it is segregated and eventually managed, recycled or disposed:

Electronic waste (E-Waste) including monitors, stereos, mercury devices and fluorescent lighting equipment such as thermostats, mercury switches, fluorescent fixtures and bulbs, light ballasts and similar materials. Please package fluorescent bulbs and other fragile materials to avoid breaking.

Hazardous waste includes, but is not limited to: paints, solvents, varnishes, stains, cleaners, degreasers, spot removers and similar ignitable products; aerosol cans, and compressed gas

containers or cylinders; ammunition including unused shells, lead shot, bullets, powder loading supplies, etc; oils, fuels, automotive additives, fluids (transmission , hydraulic, brake, etc.); batteries (including lead, mercury, ni-cd, etc.); acids and bases – often labelled corrosive (store acids separately from bases and do not mix!); toxics, poisons, pesticides (includes insect, rodent and weed killers); electronics (computers and screens, TVs, stereo equipment, etc.); mercury devices (switches, fluorescent lighting, mercury bulbs, thermometers, etc.); light ballasts and transformers; antifreeze; fertilizers; and other ignitable, corrosive, reactive, toxic, PCB, problem or unknown wastes. Label containers and do not mix materials.

Medications and infectious waste including pills, medicines, dressings, needles, sharps, human blood or tissue, isolation waste, pathological waste, infectious human or animal waste, etc.

Asbestos-containing material from individual all sources may include asbestos pipe wrap, boiler coatings, loose insulation, transit (older cement type siding and electrical backing), vermiculite (light, platy insulating material) and other materials APPENDIX 1. SOME ALTERNATIVES TO ASBESTOS-CONTAINING PRODUCTS). Please label all bags or containers “Asbestos Waste.” Asbestos Waste must be disposed at approved solid waste facilities.

4.4.2 Fencing the working area

The ACM found in the project area is severely damaged and the degree of damage is increasing day after day following the existing surroundings. In addition, these materials are scattered in the open area creating the most favourable conditions for asbestos dust to originate and move to certain distances.

Consequently, any additional intervention by a human further boosts the risk of origination and movement of the asbestos dust to certain distances.

For safety reasons, aiming at avoiding the distribution of the asbestos dust originated in the process of separation, the area of the waste disposal must be divided into smaller areas and bordered with approximately 2-metre-high fences in the separation process. Plastic must be used as fences, as dust is easy to remove from it.

To the extent possible, the process of separation shall be started when the number of people is minimal in the project area.

Safety marks and signals shall be provided at the locations preventing foreign people from penetrating the area.

The works are inadmissible to accomplish in windy weather to prevent the asbestos dust from spreading.

All personnel participating in the separation and packing of the ACM shall have PPE, and all workers shall be equipped with respirators.

4.5 Personal Protective Equipment (PPE)

The PPE requirements for work involving ACM at construction sites are to be based on the relevant risk assessment conducted by a suitably qualified person. Section 9.7 and Appendix C of the Code of Practice for the Safe Removal of Asbestos [NOHSC:2002(2005)] must be consulted to determine the PPE needs, as well as AS/NZS 1715 and AS/NZS 1716 for specific respiratory protection requirements. See NOHSC: 2002 (2005)Appendix C – Guide to the selection of respiratory protection.

Protective clothing and equipment is to be worn at all times during work in the asbestos work area, prior to the final clearance inspection. Any PPE worn during asbestos disposals to be treated as asbestos waste and disposed of in the approved waste bags. The laundering of contaminated protective clothing in workers' homes is strictly prohibited.

The employees, who are obliged to use the respirators, should be proficient of the rules of their exploitation. The training programs and labour protection guidance of the employees engaged in the operations with asbestos should cover the following questions:

(a) Surroundings when the use of respirators is necessary and the identification of such surroundings;
(b) The rules of exploitation and examination of the respirator's close attachment to one's face;
(c) The rules of the right functioning, examination and right storage of the respirator.

Prior to the removal/separation, the asbestos materials must be wetted. The removal works must be accomplished with cautious to avoid mechanical damage to the ACMs.

4.6 Packing Asbestos-Containing Materials

Asbestos waste, including contaminated PPE and cleaning materials (e.g. cleaning rags and plastic sheeting used to fencing the asbestos work area) are to be removed and disposed of into bags.

Loose asbestos waste is not to be allowed to accumulate within the asbestos work area. It must be collected and disposed of in asbestos waste bags and/or in a solid, sealable asbestos waste container, such as a bin or drum, as storage is required.

Controlled wetting of asbestos waste is to be done to reduce the possibility of dust emissions during the bagging or other containment of the waste. If asbestos waste cannot be disposed of immediately (e.g. because of volume requirements for disposal), it is to be stored in a solid waste drum, bin or container or skip and sealed and secured upon the completion of each day's work so that unauthorized access is prevented.

Waste Bags: - asbestos waste is to be collected in heavy-duty 200 µm (minimum thickness) polythene bags that are no more than 1,200 mm long and 900 mm wide. The bags are to be labelled, with an appropriate warning, clearly stating that they contain asbestos and that dust creation and inhalation should be avoided.

Asbestos should be packed and marked in tough, hermetic and dust-proof bags, with the marking or annotation about the safety with the following data:

- Name of the waste;
- Address of the product manufacturing company; chemical designation or common names of all components of the asbestos-containing production;
- Percentage ratio of asbestos in the mixture;
- Information about the asbestos properties dangerous for health;
- Indications about the necessity to use the PPE (respirators, protective clothing, etc.);

The bags should be hermetically closed with a thermal welded joint or stitched thread. In case of the damage to the bags, the damaged spots should be soldered with a joint tape, placed in the impermeable bags, sealed and marked.

4.7 Waste Transportation

The routes used for removing waste from the asbestos work area are to be designated in the Asbestos Removal Control Plan before the commencement of each removal. A competent person, following discussions with the asbestos removals, should determine the methods used to transport wastes through a building. In occupied buildings, all movements of waste bags should occur outside normal working hours.

Once the waste bags have been removed from the asbestos work area, they are to be either:

• be placed in a solid waste drum, bin or skip; or

• be removed from the site by an approved and licensed carrier.

Waste bags should not be stored at the asbestos removal site if they are not placed in an asbestos waste drum, bin or skip. Drums or bins used to store asbestos waste should be stored in a secure location when they are not in use.

4.8. Offsite Waste Disposal

Transport and final disposal of asbestos waste material shall be carried out by a competent person who carries certification as a transporter of hazardous materials in asbestos waste and in a manner that will prevent the liberation of asbestos dust to the atmosphere.

All asbestos waste material shall be buried at an approved landfill site and in a manner approved by the local and state authorities. Prior to payment of invoices RD must receive copies of waste disposal receipts, as provided by the approved landfills. All details of offsite disposal are to be included in the asbestos removal control plan.

No building materials are to be re-used or recycled unless they have undergone full successful decontamination. If this can’t be achieved then the building materials are to be treated as asbestos waste and disposed of accordingly. All waste disposals shall be recorded (date, quantity, disposal contract etc) in an appropriate register (e.g. within the sites waste management plans for disposal of regulated wastes).

The waste unloaded on the landfill should be buried under at least 25-cm-thick soil layer. Leaving asbestos-containing waste open on the landfill is inadmissible.

During the trench conservation, the final layer covering the asbestos-containing waste, should be at 2 m thick.

1. Asbestos Exposure Register

Contractor will maintain an asbestos exposure register that records persons that have been exposed, have potentially been exposed or have worked in close proximity to asbestos materials. Workers are to complete Form S0268 Asbestos Exposure Questionnaire and give a

submit a copy to RD who will update the site register accordingly. A copy of the Form S0268 is to be kept by contractor.

5. Project Supervision and Monitoring

5.1 General Conditions

During any large asbestos removal jobs or the removal of any high-risk ACM, the RD representative is to maintain a presence at the removal site, and liaise with the appointed asbestos removal contractor, to ensure that the removal process runs according to requests of legislation and/or the **Debris Asbestos-Containing Material Management Plan** developed by the removal contractor.

It might also be decided that an appropriately qualified occupational hygienist, with experience in asbestos abatement works, shall be engaged for the duration of the removal project, depending on the size of the removal job and level of risk associated with it.

5.2 Air Monitoring

Air monitoring is being performed wherever ACM are being removed/Separated, to ensure the control measures are effective. The competent person for the asbestos removal/separation control plan is to determine all air monitoring requirements. Following the physical state of ACM and location of their placement, permanent monitoring of asbestos dust content in the air is necessary. The monitoring shall be arranged at the following locations:

- On the site of the waste separation/removal;
- On the adjacent land plots used for agricultural purposes by the population;
- At the nearby residential buildings.

A documented air-monitoring program is to be developed. The air-monitoring program is to include requirements for clearance monitoring. An air-monitoring program is recommended for the removal of non-friable ACM, as it is good occupational hygiene practice. The air monitoring is to be performed in accordance with the NOHSC Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos fibbers [(NOHSC: 3003 (2005)].

Asbestos removal work must not commence until the air monitoring has commenced.

If an enclosure is used, air monitoring is to occur:

- Prior to any work (background monitoring);
- At least3 times daily at the boundary of the asbestos work area;
- At least once a day at the nearby residential houses and agricultural lands;
- As part of preliminary clearance monitoring, following a satisfactory visuall inspection;
- During dismantling of the enclosure, and
- As part of the final clearance inspection.

If an enclosure and a decontamination unit are used, air quality must be monitored at the following locations:

- The clean side of the de contamination unit;
- The change area;
- The lunch room (where applicable);
- The laundry; and
- The surroundings of the asbestos work area including in the vicinity of the negative are exhaust (where possible).

The results of all air monitoring are to be provided to all relevant parties as soon as possible.

Constructon contractor shall submit detaled Monitoring Plan before commencing construction activitias. The following information is to be included in the asbestos removal/separation monitoring:

1. **Identification** - Details of the ACM to be removed (e.g. the location(s), whether it is friable or non-friable, type, condition and the quantity to be removed;
2. **Preparation** – (i) Consultation; (ii) Assigned responsibilities for the removal; (iii) Program of commencement and completion dates (iv) Emergency Plans; (iv) Asbestos removal boundaries, including the type and extent of isolation required and the location of any signs and barriers; (v) Control of electrical and lighting installations; (vi) Personal protective equipment (PPE) to be used, including; (vii) respiratory protective equipment (RPE); (viii) Details of air monitoring program; (ix) Waste storage and disposal program;
3. **Removal/Separation** – (i) Methods for removing the ACM (wet or dry methods); (ii) Asbestos removal equipment (spray equipment, asbestos vacuum cleaners, cutting tools, etc); (iii) Details on required enclosures, including details on their size shape structure, etc, smoke testing enclosures, and the location of negative pressure exhaust units' (iv) Details on temporary required by the asbestos removals (e.g. decontamination units), including details on water, lighting and power requirements, negative air pressure exhaust units and the locations of decontamination units; (v) Other control measures to be used to contain asbestos within the asbestos work area;
4. **Decontamination** - Detailed procedures for workplace decontamination, the decontamination of tools and equipment, personal decontamination and the decontamination of non-disposable PPE and RPE;
5. **Waste Disposal** - Methods of disposing of asbestos wastes, including details on the disposal of: (i) disposable protective clothing and equipment, and (ii) the structure(s) used to enclose the removal area;
6. **Air Monitoring** – (i) Location, types and methods, for monitoring airborne fibres and dusts; (ii) Ways of communicating monitoring results to workers;
7. **Training** – (i) Training that reflects the specific types of asbestos work to be undertaken; (ii) Keeping written records of inductions and asbestos awareness training;
8. **Health Surveillance** – (i) Details on any exposures to asbestos by workers; (ii) Details on all asbestos workers health records.

5.3 Control Levels for monitored airborne asbestos fibbers

“Control levels” are airborne asbestos fibre concentrations, which, if exceeded, indicate there is a need to review current control measures or take other action. These control levels are occupational hygiene “best practice” and are not health-based standards.

The control levels shown in the table below are be used to determine the effectiveness of control measures:

Table 1 Control levels and required actions

Control Level **(airborne asbestos fibres/mL)**	**Control/Action**
<0.01	Continue with control measures
>0.01	Review control measures
>0.02	Stop removal work and find the cause

5.4 Clearance Inspections

Clearance to re-occupy an asbestos work area is determined by a thorough clearance inspection conducted by a competent person. All of the barriers, warning barricade tape and warning signs are to remain in place until the clearance certificate to re-occupy has been granted.

A clearance certificate is to be provided to UWSCG by the asbestos removal contractor at the completion of the work and monitoring.

The need for clearance monitoring will be assessed as part of asbestos removal control plan and for undertaking any maintenance work involving ACM. It will be undertaken by a competent person, independent of the person conducting the asbestos work, after cleaning has been completed and the area dried.

Air samples are to be taken in the asbestos work area. For jobs involving an enclosed area, this is to be done within the enclosed area, following the completion of the work but prior to the removal of the enclosure and again after the removal of the enclosure.

The removal, cleaning and clearance work will not be considered completed until an airborne fibber level of less than 0.01 fibbers/mL has been achieved, as determined by the clearance monitoring.

5.5 Settled Dust Sampling

This sampling only provides an indication of cleanliness following disturbances of ACM and should not be used as an indicator of risk to health. Any settled dust sampling criteria are to be developed by discussion with a competent person undertaking a visual inspection of the area.

6. Emergency Response Procedures

6.1 Evacuation Event

An emergency associated with the potential for exposure to airborne asbestos fibbers across the project area site may necessitate the need to evacuate. Site procedures for evacuation are to be conveyed to contractors and employees during the site induction. The risks associated with any asbestos removal work should be assessed and include contingencies in the case of an emergency.

Decontamination procedures can be temporarily waived in the event of an emergency requiring evacuation. This is to be based on an informal risk assessment conducted at the time.

Persons involved in asbestos removal must evacuate to the evacuation assembly point but remain downwind to ensure any fibbers remaining on clothes, as a result of not decontaminating completely, do not enter the breathing space of others.

Upon arrival at the evacuation point, emergency wardens and health and safety personnel are to be notified of the status of the asbestos removal work and the assessed level of risk associated, as well as the assessed level of risk associated with asbestos removal person not undergoing the complete decontamination process.

6.2 Damage of ACM

Where damage has occurred to asbestos material the following is to be implemented:

- The site emergency contact number is to be used to report the location of the potential contamination.
- Asbestos trained workers are to respond (wearing suitable respiratory protection, gloves and disposable coveralls), assess the risks associated with the spill and secure the affected area, plant or equipment using asbestos warning tape and signs,
- Ensure fans, wind sources are controlled to prevent further spread of the contamination,
- The areas below and adjacent or above are secured and barricaded with asbestos warning tape to prevent materials dropping or passing into those areas
- Use surface soaking sprays to wet down the material and obtain a bagged sample of the suspect material, or
- Use plastic sheeting and adhesive tape to seal or encapsulate the affected area or plant,
- Use materials such as plastic drop sheets, binding material and or suitable adsorbent material to contain the water spray and run off,
- Clean up the affected areas using suitable tools (soft brushes, mops, dust pans etc.) and if necessary vacuum using HEPA filters,
- Apply sealant or repairs to the damaged areas to prevent further contamination,
- Inspect the work to ensure all suspect materials have been removed,
- All contaminated articles and clothing are to be bagged in suitable asbestos disposal bags and be disposed of as asbestos waste,

- Set up an air monitor in the work area to monitor airborne fibbers concentrations and secure the work area until the results are obtained,
- Send the sample off for testing and determine if it contains asbestos,
- Undertake further asbestos removal work to make the area safe using a safe work method statement and an asbestos removal specialist;
- Provide details of the material sample results and monitoring results to the workers involved who may have been exposed,
- Undertake medical assessments of the workers involved who may have been exposed and provide copies of the assessments to the workers.
- Have the workers who were potentially exposed to uncontrolled asbestos fibbers complete a Form S0268 – Asbestos Exposure Questionnaire
- Maintain records of the incident reporting, investigation and health assessments with the Asbestos Exposure Register.