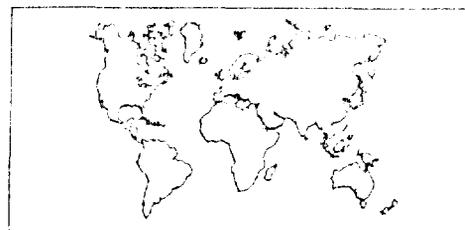


Environmental Assessment/Analysis Reports



Report E0066

Georgia - Municipal Infrastructure Rehabilitation Project

EA Category B

Environmental
Assessment

March 1995

This report has been prepared by the World Bank

3.50 In order to strengthen the Borrower's operational plan, the municipalities will need to pay more attention to maintenance planning and scheduling, particularly to ensure that all new electrical and mechanical equipment will be properly maintained. This will require attention to the manufacturers' maintenance recommendations, setting aside required funds, and preparing maintenance programs and plans for each equipment item. In recent years, the operational personnel have only been maintaining old and used equipment.

3.51 With respect to the solid waste disposal sites (land fills and unofficial dumps) in Batumi, Poti, and Tbilisi, new organizational and procedural arrangements will need to be established for effective operation. For the urban transport sector in Tbilisi, rationalization of the operation was recommended by the mission as a parallel activity within the municipality in order to ensure overall cost efficiency of the service delivery in the future.

2. Borrower's Project Implementation Plan (PIP)

3.52 The Borrower's Project Implementation Plan will include arrangements for the timely provision of all necessary input, adequate staffing of the Agency, training, implementation of adequate financial management procedures, specification of the monitoring and evaluation system to be applied, and implementation of other operational procedures required for effective project execution. The PIP was formalized under the Project Management Agreement (PMA) which will be signed between the Government of Georgia and the Agency. A project implementation schedule was prepared during project appraisal (See Annex 11). Dissemination of information regarding the project has been initiated and the tentative performance indicators by which the project will be monitored and evaluated have been defined during appraisal (see para 5.2h of Agreements and Recommendations).

3.53 In addition to the PMA, the Borrower will prepare a Manual of Procedures (MOP) for the project implementation activities containing more detailed guidelines to the Agency and other organizations involved in implementing the agreements reached with the government (see para 5.2i of Agreements and Recommendations).

3. Supervision Plan

3.54 As this is the first Bank-supported investment credit to Georgia, and given the particular implementation arrangements, the project is expected to require a significant supervision effort, particularly during the first year when a large portion of the procurement will be undertaken. Therefore, it is planned that about 40 staff weeks of effort for the first year and about 20 staff weeks in each of the following two years would be required for supervision. A detailed supervision plan was discussed during project appraisal and negotiations, and is attached as Annex 10 (See para 5.2h of Agreements and Recommendations).

4. Environmental Review

3.55 No new construction or development is planned under the project. There will be no primary negative environmental or socio-economic impacts. The project has been placed in the environmental screening category "B," as consistent with the provisions of Bank Operational

Directive 4.01 "Environmental Assessment". The project will be environmentally beneficial to the communities and sectors targeted for financial assistance by: (a) reducing the degradation of municipal infrastructure systems; (b) maintaining a minimal level of operational service; (c) helping arrest declining socio-economic and environmental conditions; and (d) providing a critical contribution to reducing the health risks from infectious diseases.

3.56 The primary benefits include: (a) curtailing the threat of infectious diseases to public health by reducing the amount of raw sewage flow through the city streets in Batumi, Poti, and Tbilisi; (b) introducing a more effective system of waste collection and disposal and land fill management in Batumi, Poti and Tbilisi; (c) restoring and maintaining potable water supplies in Tbilisi and Batumi; (d) providing heating and weatherization in schools and hospitals in Tbilisi; (e) operationalizing the urban transport system; and (f) initiating a wider action program for improved management of Georgia's coastal resources. Annex 12 provides a more detailed account of the environmental review and proposed mitigation plan.

5. Public Environmental Awareness, Non-governmental Organizations, and Community Participation

3.57 Historically, a certain level of public awareness about the environment and appreciation for nature has existed in Georgia. It is probable that while this awareness still exists, widespread support for environmental programs has temporarily subsided due to more pressing economic and political concerns.

3.58 Nonetheless, an environmental NGO movement is gaining recognition and proliferating into more specialized groups, stemming mainly from the political party of the Georgia Greens. The Green Party, which played an active role in the Independence movement, has since gained greater representation in the Parliament, despite the nation's current focus on short-term, economic survival needs. President Shevardnadze's new party, the Citizen's Union, has incorporated many Green members with the objective of emphasizing environmental issues, including the urgency of the ecological situation on the Black Sea coast.

3.59 Current institutional relationships between government and non-governmental organizations, while new, seem cooperative. If properly encouraged, potential exists for collaboration between public and private sectors. Yet, the idea of "community-based" resource management, in which local resource users participate in planning and management decisions about their rights to, and responsibilities for, resource use, remains alien--both to communities themselves and to government institutions. Excluding the Orthodox church, there are very few indigenous cultural community institutions on which to build. While the concept of local participation is familiar to NGOs, mechanisms for achieving coordination between users and government agencies, and encouraging community decision-making and field action, are not well tested. Meanwhile, small-scale, traditional resource users on the coast, such as fishermen, wood-cutters, and farmers comprise an important group which needs to be understood in terms of their own concerns regarding the natural resource base, its use, and overexploitation. Efforts will be made in the Coastal Zone Management program to reach these groups.

6. Economic Analysis

3.60 One of the project's main objectives is to support the Government's economic stabilization efforts by helping to increase the productivity of the urban population in three key cities. This will be achieved through the provision of spare parts and equipment urgently needed to arrest an aggravated deterioration of basic infrastructure services (i.e., urban transport, heating, water supply and sewerage) and to lay the foundation for future improvement of the management and delivery of such services. Without this intervention, labor mobility and the productivity of urban populations will continue to decline, thus jeopardizing the national economic stabilization. It is not very meaningful to attempt to quantify precisely the aggregate impact of the proposed project, given the many distortions and uncertainties in the Georgian economy. However, an analysis has been made on individual project subcomponents which indicates that in all cases, given the rapid deterioration of key municipal services and their crucial role in national economic stabilization and future growth, the benefits are substantial, clearly outweighing costs. This is normally the case in rehabilitation interventions of this kind. In addition, individual subcomponents taken together help lay the foundation for greater future benefit to the economy by instituting or setting in motion processes that aim to improve overall management and delivery of essential municipal services. Annex 12 provides details on the qualitative analysis, which may be summarized as follows:

- Tbilisi Schools and Hospitals. Immediate and short-term assistance for weatherization and heating, costing an estimated US\$4.1 million, will: (a) increase public access to education and health care facilities; (b) reduce energy requirements to some extent; (c) enable pupils to attend school longer this year and in the future than in the past two years (when total school days were reduced due to winter closings) through improved facilities; (d) ensure a more continuous educational process for students by reducing the winter break from 12 weeks taken last year--which proved disruptive for the students--to approximately 5 weeks; (e) ensure continued health care services and greater access to 23 hospitals in the city during the winter; (f) increase the efficiency and utilization of hospital space through a migration of patients from hospitals which will not be weatherized (and are planned to close because of underutilization) to those 23 that are rehabilitated; (g) reduce the patient overload at ambulatory care clinics which have been burdened in the past winters by patients who are understandably unwilling to tolerate poor hospital conditions.
- Tbilisi Urban Transport. Immediate and short-term assistance through the project, costing an estimated US\$4.1 million, will help: (a) increase labor mobility and thus support economic activity in the capital, (b) increase frequency of trips resulting in increased access and reduced waiting time; and (c) increase passenger safety and mitigate or stop the rate of equipment deterioration.
- Water Supply in Tbilisi, Batumi: Project investments totaling US\$2.04 million, will help: (a) improve environmental quality and reduce exposure to water-related disease; (b) maintain or improve the quality of drinking water; and (c) maintain existing access to water supply services.

- Wastewater Treatment in Tbilisi, Batumi and Poti: Project investments totaling US\$2.26 million, will: (a) reduce the serious hazard to the public and help alleviate environmental degradation; (b) increase access to sewerage services; and (c) increase operational efficiency by reducing electricity requirements for pumping stations and reducing somewhat the overall manpower requirements.
- Solid Waste Management in Tbilisi, Batumi and Poti: Project investments totalling US\$1.02 million will help: (a) reduce environmental pollution and public exposure to health hazards; (b) reduce probability of accidents at garbage landfill sites; and (c) increase operational efficiencies by increasing productivity of manpower and hours of access to needed equipment.

7. Social Analysis

3.61 No detailed social assessment was undertaken as part of project preparation or appraisal. However, some salient social features may be highlighted. More than 25% of the population, or 1.5 million, reside in the capital city of Tbilisi; three of the other major cities, Batumi, Poti and Sukhumi, are ports on the Black Sea. The Black Sea coastal watershed covers 40% of the country geographically and contains almost 40% of its population.

3.62 Until recently, standards of living in Georgia have been relatively high. A long tradition of close family ties and communal barter exchanges, combined with an historically robust agricultural economy and a large informal or underground economy, have helped maintain both cultural integrity and socioeconomic security. At the same time, Georgia has until recently enjoyed a comprehensive system of social welfare, including free health care, consumer subsidies such as bread and electricity funded from the state budget, and other welfare benefit programs (i.e., pensions, disability, maternity, child care allowances). Health standards and life expectancy have also been comparatively high, although substandard technologies have prevailed throughout FSU countries. Historically, Georgian society has been acculturated to place high values on education. By the 1980s, the Georgian population was considered among the best educated in the USSR.

3.63 Now, in the midst of a social and economic breakdown that is considered more extreme than any other former Soviet republic, living standards in all socioeconomic classes have dropped precipitously since the late 1980s. Georgia's strong economic dependency on Russia, especially in the vital energy sector and other supplies, has made it particularly vulnerable to the contraction of the Russian economy. Lay-offs, hyperinflation, and chronic shortages of basic commodities such as bread have eroded livelihoods. Although precise statistical data are not available, it is now believed that 90 percent of the population currently lives below the poverty line. Health standards are declining in certain key areas, including a rise in infant and maternal mortality rates.

8. Poverty Alleviation

3.64 The proposed project will, by stemming the further deterioration of key municipal services such as heating in hospitals, waste water treatment and landfill systems, and potable

water supplies, help alleviate poverty to some extent, particularly the most vulnerable social groups. It is the more vulnerable groups, such as the sick, the poor, and refugees of war who suffer disproportionately when basic services breakdown and the environment degrades. In Batumi, the clogged septic tanks overflow in neighborhoods of war refugees, while those most directly exposed to the mismanaged and fast eroding landfill are impoverished grazers, garbage scavengers, and those in the area who depend on subsistence fishing and local river drinking water in order to survive. In Tbilisi, ensuring a minimal level of heat during the winter to hospital patients and school children, and upgrading potable water supplies and other urban infrastructure, contribute to the health and the welfare of marginalized groups, as well as the general population. Rehabilitation of essential municipal services, and the direct linkage to environmental resource amelioration, is fundamental in the longer term strategy of poverty alleviation.

Georgia
Municipal Services Rehabilitation Project
Environmental Review and Mitigation Plan

I. EXECUTIVE SUMMARY

1.0 The environmental review and mitigation plan is prepared in accordance with Operational Directive 4.01 for a Category B classification. This Project will entail no new construction or development. There will be no primary environmental and socio-economic negative impacts. In a few investments there are minor secondary impacts. In general, the investments will have positive primary and secondary impacts in reducing public health risks. Current investment efforts will contribute to some improvements in the natural resource base. Mitigation and monitoring efforts, outlined in Table 1, are proposed during the implementation and operation of the proposed investment activities.

2.0 At a minimum, the investment Project will: (i) reduce the degradation of municipal infrastructure systems; (ii) maintain a minimal level of operational integrity; (iii) arrest the declining socio-economic and environmental conditions; and (iv) provide a critical contribution to reducing the health risks from infectious diseases.

II. INTRODUCTION

3.0 The Ministry of Health states that the health, economic, and social consequences of water pollution have already become evident to the residents of Georgia. The level of morbidity by waterborne gastrointestinal infection diseases in several regions of Georgia has dramatically increased in the last decade. The consumption of untreated drinking water which has contributed to outbreaks of acute gastrointestinal diseases have been occurring almost every year during the last decade. Annual outbreaks of dysentery have taken place in Tbilisi with an average of 150 cases a year. An increase of morbidity of children with Hepatitis A is evident in the region of the Black Sea basin. The beaches of the Black Sea are strongly polluted from high bacterial counts (e.coli) ranging from 43,000,000 mg/l to 110,000,000,000 mg/l. Of equal concern is the unmanaged disposal of municipal waste which has lead to increase in infectious diseases, impacts on water quality, and exposure to vermin.

4.0 The project investments in Batumi and Poti have the additional environmental benefits of helping to alleviate serious pollution from some of the most critical "hot spots" on Georgia's coast as identified by the GEF-supported Programme for the Environmental Management and Protection of the Black Sea. Institutional development and technical assistance activities will help lay the foundation for a long range resource conservation and management program on Georgia's coast.

III. REHABILITATION PROJECTS

Baseline Conditions

5.0 *Tbilisi Transportation:* Since almost 90% of the urban transport users are dependant on the Metro, it is important to improve the system to maintain cohesion of city operations and improve the safety environment. Exposed electric cables and wires as well as water and oil leakages resulting from a poorly managed system create a hazardous environment for passengers. The investment plan would provide spare parts and improve system operations so that the social benefit of passenger safety is achieved, in addition to efficiency gains.

Analysis of Alternatives

5.1 With no action, the transportation infrastructure would continue to deteriorate and threaten the operations and efficiency of the entire transportation system, and significantly increase the potential for accidents. Use of individual vehicles would be the only alternative to public transportation system. The use of individual vehicles is not a cost effective, practical, and environmentally sensitive alternative.

Impacts/Mitigation/Monitoring

5.2 The proposed immediate and short term action will have positive primary and secondary impacts in reducing the potential for paralysis of urban operations and providing better systems operations. Tree pruning, required for clearance of overhead electric cables, will be managed in a sensitive way to reduce impacts to trees. The Metro and Tbilitrans oversight committee and the TCC (Technical Coordination Committee) will monitor transportation service operations and management.

6.0 *Tbilisi Heating:* For the past two winters, all 200 schools in the country's capital were closed and many of the city's most critical hospitals had limited operational capacity due to the lack of heating, including fuel shortage, degraded heating infrastructure, and poor weatherization of buildings. To help provide the necessary environment to maintain a basic level of educational and health services through the winter, investments to mitigate this situation should be initiated immediately (before the onset of winter).

Analysis of Alternatives

6.1 Alternative heating options, such as the use of kerosene heaters, were deemed inappropriate for schools and hospitals as they were considered extremely unsafe for operation in the presence of children. Additionally, the noxious fumes from the use of kerosene heaters in closed, unventilated rooms would have a significant adverse public health impact. For these reasons, kerosene heaters were deemed unsafe. Other space heating alternatives depended too heavily on unavailable fuel and electricity inputs. The option of taking no action would have a significant detrimental impact on the continuity of education and on the vulnerable hospital patients of Tbilisi.

Impacts/Mitigation/Monitoring

6.2 The dominant environmental issue is the public health risk of exposure to cold/freezing conditions. The TIAP would provide continuous power supply to hospitals,

implement primary weatherization for 200 schools and 23 hospitals. Weatherization of schools would provide positive impacts on public health, create a foundation for developing long term environmental conservation strategies, and contribute positively to the social fabric of the community.

6.3 Weatherization of these facilities may indirectly reduce the uncontrolled harvesting of urban trees for firewood; thus, this approach impacts positively on the environment. To reduce the poor air quality in hospitals, low sulfur mazout fuel (.5%) will be recommended. Although the project does not encompass the purchase of fuel, the municipality has ensured that fuel will be provided for the critical facilities identified.

7.0 *Water Supply and Distribution (Tbilisi and Batumi)*: The water supply and distribution system is currently suffering from defective equipment, leakage, and an unreliable electrical supply. Continuous loss of pressure in the distribution system and the consequent emptying of mains give rise to potable water quality problems due to groundwater infiltration into the network. In most districts, water supplies are only made available for two-hour periods. During winter months, when electricity shortages are acute some residents are deprived of water for periods of up to 4 days. In Batumi, the lack of treatment capabilities during flooding forces the river intakes to the Water Supply Enterprise to close and requires the city to be dependant on borehole water supply (which is energy intensive). The short-term investment project intends to reduce the rate at which the system is deteriorating, reduce wastage of water, maintain water quality, and improve utilization of the system in each city.

Analysis of Alternatives

7.1 An alternative to improvements in public water supply is the use of bottled water. However, bottled water can only be used for consumption and does not satisfy the need for other uses. Furthermore, bottled water is not cost effective, and it increases the production and use of bottles and containers, which is energy intensive. Taking no action will only prolong the inadequate supply of potable water and continue the risk to public health.

7.2 Sole dependency on borehole supply would require a detailed investigation of groundwater resource supply and management of groundwater supply. Sole dependency on river water is limited during periods of high flow due to increase of turbidity in river water.

Impacts/Mitigation/Monitoring

7.3 Improving the distribution of potable water would have a positive impact on public health by reducing the occurrence of infectious diseases. A potential negative impact could result if chlorine, a hazardous gas, is not properly handled and stored. Management plans will be developed for storage and handling of chlorine. Temporary impacts would result from disruption in traffic and water supply due to pipeline repairs. The Water Supply Enterprise will be advised on improving water supply system operations. The TCC will review and supervise components of the project implementation activities.

8.0 *Water Treatment Facility (Tbilisi/Gardaboni)*: Currently only the mechanical screens are operating while intermittent electrical power prevents operation of the secondary

biological treatment within the facility. The dominant environmental issue pertains to the poor quality of water discharging into the Kura River. Additionally, the disposal of sludge, including both industrial and municipal wastes, is potentially toxic and therefore can cause environmental problems on the land which it is dumped on. The short term investments would include the renovation of sufficient primary tanks and associated systems, to permit a total of seven tanks in service.

Analysis of Alternative

8.1 Taking no action would continue the deterioration of the treatment facility system, and continue to impact water quality of the Kura River. With regard to establishing the proposed dedicated hydropower facility which will be utilizing power plant cooling water to provide power to the facility, preliminary calculation indicate there is insufficient hydraulic head to generate sufficient electricity to make the Gardaboni facility somewhat self-sufficient.

Impacts/Mitigation/Monitoring

8.2 Improvements to primary treatment would provide appropriate capacity consistent with the flow arriving at the works. Operating consistent primary treatment operations at a minimum would slightly improve the quality of the effluent being discharged into the Kura River. The TCC will monitor the implementation activities.

9.0 *Sewerage Systems (Tbilisi, Batumi, and Poti)*: Thirty to forty percent of the Tbilisi's sewers are reported to be out of service because of blockages. This is a problem in all three cities and has caused flooding into the streets and consequent public health risks evidenced through the rise of infectious diseases. The proposed short-term investment would supply pumps, spare parts, sewer renovation and cleaning equipment to maintain operational integrity of the system and reduce sewerage overflow in the streets.

Analysis of Alternatives

9.1 There are no cost effective feasible alternatives in either city. All three are very dependant on the existing sewerage infrastructure. Both Poti and Batumi are located in a topographically flat river floodplain areas where gravity drainage is poor and Tbilisi is located in an area where alternative use (ie. septic systems) are not geographically feasible. Furthermore, installation of self composting systems is neither cost effective nor viable in cities as it is a system which serves primarily residential areas.

Impacts/Mitigation/Monitoring

9.2 The proposed investment for cleaning equipment and supply of spare parts would improve the pipeline system and reduce sewerage flow into the streets, resulting in a reduction to public health risks. This reduced exposure to infectious diseases would be the primary positive impact.

9.3 A temporary negative impact, if sewerage management is not improved, would include the potential increase in flow from cleaned pipelines which would discharge into the Kura River. A temporary impact may result from disturbance and disruptions during sewer

main repairs. Appropriate construction measures will be taken to reduce impacts. The TCC will monitor the implementation activities.

Technical Assistance/Institutional Needs

9.4 The Water Supply Enterprises in all three cities will be advised on improving sewerage system management. Technical Assistance will be provided to work with the City Design Institutes to conduct the Sewerage Network Mapping which will entail a closed circuit television inspection survey.

9.5 The Integrated Coastal Zone Management Strategy will incorporate intermediate and long term management efforts for waste water treatment to reduce the impacts of sewerage outflow on Black Sea coastal resources.

10.0 *Solid waste disposal (Tbilisi, Batumi, and Poti):* The dumps or landfills in all three cities are posing problems to public health, surface and ground water quality, and local air quality. In Tbilisi, there are a number of non-sanctioned dumps located throughout regions of the city which are located on river banks, commonly have open fires, and are infested with vermin. The proposed short term action for Tbilisi includes establishing a dump-truck transfer system that would allow more efficient operation of trash disposal to the sanctioned landfills and a systematic reduction of hazards which arise from the illegal dump sites.

10.1 In Batumi, the landfill is located at the bank of the Choroki River floodplain delta and is causing adverse environmental hazards, including poor water quality and deteriorating public health from the rapidly eroding landfill debris which washes to up on the coastline of the Black Sea. Additionally, the landfill impacts its informal users (i.e. scavengers, shepherds, grazers) who derive their livelihood on the resource. In Poti, much of the landfill was cannibalized from the civil conflicts and remains unmanaged. The short-term investment strategy includes the provision spare parts and equipment to improve landfill management in both locations.

Analysis of Alternatives

10.2 The proposed Technical Assistance for a topographical survey of the existing landfill site may provide insights on a possible feasible alternative site, possibly adjacent to the current landfill. Similarly, a feasibility study should be conducted in Poti to identify alternative sites, if necessary.

Impacts/Mitigation/Monitoring

10.3 The closure of unauthorized dumps in Tbilisi would have a positive impact on the surface and groundwater quality by reducing runoff and leachate problems to the Kura river. The dump closure will also improve air quality from reduced burning trash, and reduce public health risks from infectious diseases. The TCC will review transfer system operations and dump closures.

10.4 In Batumi and Poti, landfill investments would have significant positive impacts on the public health and local and regional water quality by reducing exposure of contaminants and debris in the water. Implementation of a landfill management plan, if prepared properly, should have both primary positive impact on public health, and a secondary positive socio-economic impact on the informal users of the landfill. Care should be taken to not dislocate these people during operations. The TCC will review landfill management and operations.

Technical Assistance

10.5 Technical Assistance will be provided for a Tbilisi Waste Management Master Plan. The plan would propose to incorporate a community public participation component in waste management and recycling as one step in a strategy to reduce waste and improve its disposal.

10.6 In Batumi, technical advice will be provided for a topographical survey of the existing landfill site undertaken using aerial survey. Technical Assistance will also be provided for a Landfill Protection Program. This study for will focus on floodplain protection as an interim measure to divert the flow in the channel and reduce landfill bank undercutting and erosion. Additionally, the work program may include a feasibility study for a channel modification strategy and temporary bank stabilization of the Choroki River in order to mitigate landfill erosion into the Sea. In both Batumi and Poti, Technical Assistance will be provided for the Integrated Coastal Zone Management Strategy (ICZM). The ICZM will incorporate intermediate, short-term, and long term management efforts to reduce the impacts of the landfill operations on the Black Sea coastal resources.

MUNICIPAL INFRASTRUCTURE REHABILITATION PROJECT

TABLE 1. ENVIRONMENTAL MITIGATION PLAN

INVESTMENT PROJECT	ISSUES	ACTIVITIES	IMPACTS	MITIGATIONS	MONITORING
TRANSPORT <i>Tbilisi</i>	<ul style="list-style-type: none"> • metro and rolling stock require spare parts • system in disrepair • control room in disrepair • operational equipment and infrastructure in deteriorated conditions • poor management of repair operations 	<p><u>TIAP</u></p> <ul style="list-style-type: none"> • purchase of spare parts for metro and rolling stock • improvements to power distribution system for metro and rolling stock <p><u>Short Term</u></p> <ul style="list-style-type: none"> • revision of fare structure • improve operational equipment • improve tracks • restore control room • refurbish vehicles 	<p><u>General</u></p> <ul style="list-style-type: none"> • positive impacts to socio-economic fabric of the city • provide better system operations • more energy efficient system • tree pruning 	<ul style="list-style-type: none"> • positive impacts will not require mitigation effort • tree pruning will be managed to minimize impacts to trees 	<ul style="list-style-type: none"> • for monitoring and review: Metro oversight committee and Tbiltrans oversight committee will be established

Table 1 cont. Environmental Mitigation Plan

INVESTMENT PROJECT	ISSUES	ACTIVITIES	IMPACTS	MITIGATION	MONITORING
HEATING <i>Tbilisi</i>	<ul style="list-style-type: none"> insufficient heating in schools no insulation in buildings deteriorated conditions no electricity 	<p><u>TIAP</u></p> <ul style="list-style-type: none"> repairs to glazing of schools and hospitals installation of 2nd glazing to schools and hospitals installation of independent heating systems provisions of dedicated electricity lines 	<p><u>General</u></p> <ul style="list-style-type: none"> positive primary and secondary impacts on public health reduce impact on urban forests no negative primary or secondary impacts socio-economic and natural resources 	<p><u>General</u></p> <p>positive impacts will not require mitigation effort</p>	<p>TCC will review projects/installation</p>
		<p><u>Short Term</u></p> <ul style="list-style-type: none"> repair the fabric of buildings insulation of roofs provisions for independent heating systems in hospitals provisions for independent electricity for hospitals 	<p><u>Specific</u></p> <ul style="list-style-type: none"> public health concerns from insulation noise from generators use of mazout fuel 	<p><u>Specific</u></p> <ul style="list-style-type: none"> insulation will be specified as asbestos free products the generators will be housed, and placed in locations to minimize impacts from noise use of low-sulphur fuel (<0.5%) 	

Table 1 cont. Environmental Mitigation Plan

INVESTMENT PROJECT	ISSUES	ACTIVITIES	IMPACTS	MITIGATION	MONITORING
<p>WATER SUPPLY <i>Tbilisi and Batumi</i></p>	<p><u>Both Cities</u></p> <ul style="list-style-type: none"> interrupted water supply limited electrical supply loss of water pressure water loss due to leakage chlorination plant in poor condition 	<p><u>Both Cities</u> <u>Short Term</u></p> <ul style="list-style-type: none"> equipment for repairing mains providing chlorination equipment switch gear and materials for pumping (motor) equipment 	<p><u>Both Cities</u></p> <ul style="list-style-type: none"> positive primary and secondary impacts on public health temporary impacts; disruption in traffic due to pipeline repairs secondary impact: chlorine is toxic gas 	<ul style="list-style-type: none"> appropriate construction measures minimize impacts proper storage and handling of chlorine 	<ul style="list-style-type: none"> Water Supply Enterprise will be advised on system management and operations TCC will review repair activity management plan will be developed for handling chlorine
	<ul style="list-style-type: none"> deteriorated pumps and electrical equipment 	<p><u>Specific Batumi</u></p> <ul style="list-style-type: none"> standby generators and replacement pumps 	<p><u>Specific Batumi</u></p> <ul style="list-style-type: none"> noise from generators 	<ul style="list-style-type: none"> the generators will be housed and placed in locations to minimize impacts from noise 	<ul style="list-style-type: none"> TCC will supervise placement and housing of generators management plan and training will be provided for laboratory operations
		<p><u>Tbilisi</u></p> <ul style="list-style-type: none"> laboratory/ equipment for water quality testing studies: preparation of water distribution management plan 			

Table 1 cont. Environmental Mitigation Plan

INVESTMENT PROJECT	ISSUES	ACTIVITIES	IMPACTS	MITIGATION	MONITORING
WASTEWATER COLLECTION AND TREATMENT <i>Poti</i> <i>Tbilisi</i> <i>Batumi</i>	<p><u>All Cities</u></p> <ul style="list-style-type: none"> • untreated sewerage discharged to river • sewer network in deteriorated condition • frequent blockages in sewers and flooding in streets • no equipment available for cleaning sewers • intermittent electricity • treatment facilities inadequate • primary treatment under capacity • no secondary and tertiary treatment • treatment facilities non-accessible, bridge in-operational 	<p><u>All Cities</u></p> <ul style="list-style-type: none"> • sewer cleaning equipment • spare parts for sewer parts • excavating equipment • basic renovation of primary treatment facilities <p><u>Poti</u></p> <ul style="list-style-type: none"> • refurbishment of pumping stations • vehicles and equipment for emptying septic tanks 	<p><u>All Cities</u></p> <ul style="list-style-type: none"> • primary and secondary positive impacts on public health • positive secondary impacts on water quality and ecosystem • temporary impacts from disturbances during sewer repair <p><u>Tbilisi</u></p> <ul style="list-style-type: none"> • sewerage line cleaning may have possible temporary impacts on river water quality with flushing the system 	<ul style="list-style-type: none"> • appropriate construction measures to minimize impacts • appropriate sewer line management and piping will be implemented 	<ul style="list-style-type: none"> • Water Enterprise will be advised on system management and operations • TCC will review repair activity • water quality testing will be initiated <p><u>All Cities</u></p> <p>CCTV inspection of sewers for future sewer line improvements</p>

Table 1 cont. Environmental Mitigation Plan

INVESTMENT PROJECT	ISSUES	ACTIVITIES	IMPACTS	MITIGATION	MONITORING
SOLID WASTE COLLECTION AND DISPOSAL <i>Batumi</i>	<ul style="list-style-type: none"> • disposal of waste in uncontrolled landfill/dumps at river's edge • water quality problems from runoff/debris washing into the river • limited supply of vehicles and equipment • unmanaged disposal • open burning 	<ul style="list-style-type: none"> • study and implementation for interim river bank stabilization to reduce landfill erosion into river • landfill managed equipment • new collection and transport vehicles • spare parts • landfill management strategy 	<ul style="list-style-type: none"> • positive primary and secondary impacts on public health, water quality, and air quality • temporary negative impacts from increased turbidity during construction of river bank stabilization • socio-economic impacts to informal users of the landfill • socio-economic impact to gravel operators on the river channel 	<ul style="list-style-type: none"> • appropriate sediment and erosion control measures • landfill management strategy will be sensitive to informal users of the landfill • compensation and reestablishment of gravel operations in river bed 	<ul style="list-style-type: none"> • TCC review of landfill operations
<i>Tbilisi</i>	<ul style="list-style-type: none"> • disposal of waste in unauthorized dumps in regions of the city • water quality impacts from urban runoff and leachate • poor incinerator operations • fires at dumps 	<ul style="list-style-type: none"> • equipment, vehicles to establish transfer collection system • Study - a feasibility study to produce master plan for future development of municipal solid waste collecting and disposal operations 	<ul style="list-style-type: none"> • positive impacts would reduce impacts on public health • positive impacts on air quality • positive impacts on water quality 	<ul style="list-style-type: none"> • management plan will developed • unauthorized dumps will be closed 	<ul style="list-style-type: none"> • TCC review of landfill operations
<i>Poti</i>	<ul style="list-style-type: none"> • unmanaged landfill 	<ul style="list-style-type: none"> • equipment for landfill operations 	<ul style="list-style-type: none"> • positive impacts to public health, water quality, and air quality 	<ul style="list-style-type: none"> • management plan would be developed 	<ul style="list-style-type: none"> • TCC will review landfill operations

