Initial Environmental Examination

Project Number: 42408-043 MFF
June 2013

Republic of Azerbaijan: Water Supply and Sanitation Investment Program – Nakhchivan City Water Supply and Sewerage Subproject (Tranche 3)

Prepared by SAWMC, Government of Republic of Azerbaijan for the Asian Development Bank.

CURRENCY EQUIVALENTS
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AZN 1.00 = 1.274 USD Dollar
$1.00 = AZN 0.784

ACRONYMS

ADB	:	Asian Development Bank
AR	:	Autonomous Republic
EC	:	European Council
ECO	:	Environmental Control Official
EIA	:	Environmental Impact Assessment
EMP	:	Environmental Management Plan
EMU	:	Environmental Management Unit
EPA	:	Environmental Protection Act
GRP	:	Glass Reinforced Plastic
IEE	:	Initial Environmental Examination
Km	:	Kilometer
m^3	:	Cubic meter
Mg/L	:	milligrams per liter
Mld	:	Million liter per day
MENR	:	Ministry of Ecology and Natural Resources
M&E	:	Monitoring and Evaluation
NAR	:	Nakhchivan Autonomous Republic
PHS	:	Public Household Survey
PIU	:	Project Implementation Unit
PMF	:	Project Management Facility
PMO	:	Project Management Office
Project	:	Nakhchivan City Water Supply and Sewage Infrastructure
SAWMC	:	State Amelioration and Water Management Committee
SEE	:	The State Ecological Expertise
SNIP	:	Construction Norms and Regulations of Azerbaijan
ToR	:	Terms of Reference
WSS	:	Water Supply and Sewage
WTP	:	Water Treatment Plant
WWTP	:	Wastewater Treatment Plant
WHO	:	World Health Organization

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I. EXECUTIVE SUMMARY

1. The Asian Development Bank (ADB) funded Azerbaijan Water Supply and Sanitation Investment Program is intended to optimize social and economic development in selected secondary towns through improved water and sanitation (WSS) services. This Investment Program is in continuation to the ADB assistance in WSS Sector, and will include: (i) WSS infrastructure development in the Nakhcivan City and its periurban towns; (ii) Management Improvement and Capacity Development of WSS agency; and (iii) a Program Management Facility (PMF) that will oversee the Program development, implementation and management. This is being implemented through multi-trance financing facility of ADB over a period of 8 years (2010-2018). The State Amelioration and Water Management Committee (SAWMC) of Nakhcivan AR is the Executing Agency for Nakhcivan subprojects. PMF, created at SAWMC, is responsible for project implementation, and is supported by international and national consultants. At the field level, a Project Implementation Review Committee will review progress and ensure timely resolution of operational issues.

2. ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in ADB's Safeguard Policy Statement (2009). This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans. Accordingly, this Initial Environmental Examination (IEE) Report has been prepared for Water Supply and Sewerage Works for periurban towns of Nakhcivan City, to be implemented in Tranche 3. Components of this subproject are: (i) water supply infrastructure – approximately 62 km of water distribution network with fire fighting hydrants and house connections, and (ii) sewerage infrastructure – approximately 49 km of sewer network with manholes, house connections and a lift station. Subproject is currently in preparation stage of bidding documents. Construction is likely to start in early 2014 and will be completed in 24 months.

3. The subproject construction sites are located in existing roads right of way and are clear of human habitation. There are no protected areas, wetlands, mangroves, or estuaries. There is no need for land acquisition and relocation of people. Trees, vegetation (mostly shrubs and grasses), and animals in the subproject sites are those commonly found in built-up areas. The geological structure of the area is stable and no potential land subsidence is foreseen.

4. Regardless of these various actions in locating and designing infrastructure during the IEE process, there will still be impacts on the environment when the infrastructure is built and when it is operating. This is mainly because of the invasive nature of trenching; and because the pipe/sewer network is located in an inhabited town where there are densely populated areas. Because of these factors the considerable impacts are on the physical and human environment.

5. The Nakhcivan periurban towns subproject involves straightforward construction and low-maintenance operation, in an environment that is not especially sensitive, so it is identified that there will be no major adverse impacts. The likely impacts are mostly short-term, localized and can either be easily avoided or mitigated. Most of the predicted impacts are associated with the construction works, involving trenching and other ground disturbance. However the routine nature of the impacts means that most of the impacts can be easily mitigated. Impacts mainly arise from generation of dust from soil excavation and refilling; and from the disturbance of residents, traffic and activities by the construction work. These are common impacts of construction in urban areas, and there are well developed methods suggested for their mitigation. These include: (i) Measures to reduce/control dust generation; (ii) Measures to handle solid waste and hazardous materials; (iii) Measures to

prevent soil erosion and soil contamination; (iv) Providing prior public information and taking noise reduction measures; (v) Planning transport routes/schedules carefully and awareness creation; and (vi) Following standard and safe procedures for public and worker safety. The details of impacts and mitigation measures is provided in the report.

6. Once the system is operating, most facilities will operate with routine maintenance, which should not affect the environment. Leaks in the network will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only.

7. The major impacts of the implementation of water supply and sanitation subproject will be beneficial to the citizens of periurban towns of Nakcivan as it will provide constant supply of water and safe sewage disposal, which will serve 5 towns, namely Qaracuq, Qarahanbeyli, Bulgan, Hacıniyyet and Tumbul. This will improve the quality of life of people as well as benefiting both individual and public health as the improvements in hygiene should reduce the incidence of disease associated with poor sanitation. 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.

8. An Environmental Management Plan (EMP) is proposed as part of this IEE which includes (i) mitigation measures for significant environmental impacts during implementation, (ii) environmental monitoring program, and the responsible entities for mitigation, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) grievance redress mechanism. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. A number of impacts and their significance have already been reduced by amending the designs. Mitigation will be assured by a program of environmental monitoring to be conducted during construction stages. The environmental monitoring program will ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for remedial action will be reported to the ADB.

9. The stakeholders were involved in developing the IEE through discussions on site and public consultation after which views expressed were incorporated into the IEE and the planning and development of the project. The IEE is made available at public locations and will be disclosed to a wider audience via the ADB website. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

10. Therefore, the components proposed under this water and sewerage subproject in periurban towns of Nakhcivan are unlikely to cause significant adverse impacts. The potential impacts that are associated with design, construction, and operation can be mitigated to standard levels without much difficulty through proper engineering design and the incorporation/application of recommended mitigation measures and procedures. Based on the findings of the IEE, the classification of the Project as Category “B” is confirmed, and no further study or detailed EIA is required to comply with ADB SPS (2009). As per Law of Environmental Protection, 1999, an EIA study was conducted and was duly approved by the MENR.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Environmental Laws and Institutions

1. Institutions

11. There are four principal environmental institutions (or Ministries in the NAR) who handle water resources protection, management and operation. These include (i) MENR, (ii) the Ministry of Health, (iii) the Ministry of Emergency Situations (which implements construction safety supervision and standards and regulates safe sewage discharges and WSS operations), and (iv) State Amelioration and Water Management Committee (SAWMC) who will manage the WSS in their respective areas under the Investment Program:

Table: 1 Principle Environmental Institutions / Ministries in Azerbaijan

INSTITUTIONS / MINISTRIES		
	Name	**Leading Exercise**
1	MENR, Ministry of Ecology and Natural Resources	This ministry upholds all natural resource protection laws. The State Ecological Expertise (SEE) acts within this agency on the Program level in reviewing IEE /EIAs.
2	MoH, Ministry of Health	Sanitary and hygienic safety is the responsibility of the Ministry of Health. Its main function is the implementation of control over meeting the sanitary and epidemiological rules and standards as well as hygienic standards. This entity implements anti-epidemiological measures throughout Azerbaijan and NAR by legal and physical persons through application of laboratory and sampling controls.
3	MES, Ministry of Emergency Situation And CES (Commission of Emergency Situation in NAR)	This agency implements construction safety supervision and standards. This department will involve to the Project through the Commission of Emergency Situation (CES) in NAR. Their main involvement in this Program will be to regulate leakage from sewer lines, safe discharges from the sewage treatment system, and safe operation of the wastewater treatment plant and water treatment units.
4	SAWMC (State Amelioration and Water Management Committee in NAR)	SAWMC, the implementing Agency of the Water Supply and Sanitation Projects in Nakhchivan Autonomous Republic. They manage and operate the water and wastewater infrastructure such as the delivery of potable water and the collection of wastewater. They also manage and operate the water and wastewater treatment plants.

2. Laws

12. Laws affecting water and wastewater infrastructure which have been incorporated into the Environmental Management and Monitoring Plan (EMP) include the following. These laws have been adopted by the Nakchivan Autonomous Republic.

(i) Environmental Protection and Utilization of Natural Resources (1992)
(ii) Environmental Protection (1999)
(iii) State Ecological Expertise (1996)
(iv) Environmental Safety (1999)
(v) Water Code of the Azerbaijan Republic (1998)
(vi) Water Supply and Wastewater (2000)
(vii) Health Protection (1999)
(vii) Sanitary-Hygienic State (1992), part of GOST
(ix) Water quality, air and noise standards: GOST (various years)
(x) Program on Strengthening Financial Discipline in the Water Sector (2002)
(xi) Improvement of Water Supply Management (2004)
(xii) Construction Norms and Regulations: SNiP
(xiii) Rule for Use, Protection and Preservation of Trees and Bushes (No 173; September, 2005)
(xiv) The Land Code (25 June 1999)
(xv) European Economic Community Directive on Wastewater 91/271/EEC (1991)

Detailed information on the most pertinent laws to be applied for this Investment Program are explained below:

Table:2 The Laws of Azerbaijan with respect to environmental aspects

	LAWS AND REGULATIONS	MOST PERTINENT ASPECT
1	**Law on Environmental Protection, 1999**	This Law establishes the main environmental protection principles, and the rights and obligations of the State, public associations and citizens regarding environmental protection. According to Article 54.2 of the Law, IEE/EIA is subject to SEE. This also explains that the MENR is responsible for the review and approval of IEE/EIA reports submitted by developers. Furthermore, in Articles 81 and 82 of the Law on Environmental Protection (1999), the Law specifically provides for the application of international agreements in case an international institute or body has provisions that are different from those of the Azerbaijani legislation.
2	**State Ecological Expertise, SEE, 1996**	The State Ecological Expertise (SEE) mandates an IEE/EIA for infrastructure development projects. The objective of the SEE is to identify impacts on the environment caused by construction projects, examine the results of such impacts and propose mitigation measures to prevent adverse effects on the natural environment and people's health. It is essentially a stand-alone check of compliance of the proposed activity with the relevant environmental standards (e.g. for pollution levels, discharges, and noise).
3	**The Law on Sanitary-Hygienic State, 1992**	The Law on Sanitary-Hygienic State is GOST 17.1.3.07-82. This law serves as a basis for drinking water quality standards and mandatory implementation of sanitary-hygienic expertise regarding chemical and biological standards for water quality. Similarly, noise standards are described in GOST 12.1.003-83. However, the GOST does not specify regulations on permitted effluent discharge levels post wastewater treatment. As such, Azerbaijan has adopted Directive No 91/271 from the European Environmental Commission

		(EEC) in GOST. This regulation identifies the allowable biological and chemical levels for sewage effluent.
4	**The Water Code, 1998**	The Water Code (1998) regulates legal relations concerning the protection and use of water bodies (surface, subsoil, and boundary water bodies) in Azerbaijan. The Law details the obligations of the State with respect to the use and protection of water bodies in terms of monitoring and protection schemes as well as the supervision over the use and protection of water bodies. The items most relevant to the Project include the outlining of; The use of water bodies as potable and service water; The use of specially protected water bodies; and The use of water bodies for the discharge of wastewaters.
5	**SNIP, Construction Norms and Regulations**	The Construction Norms and Regulations are identified in SNiP which details how to carry out noise reduction measures to assure compliance with the relevant sanitary norms (section 3.9) and it details regulations on the dumping of excess materials (section 3.12). SNIP III-4-80 also details regulations on construction worker's health and safety. Chapters 2 and 5 provide organizational procedures of construction work sites and material transport. SNIP specifically claims that workers need to be informed and trained about sanitation and health care issues and the specific hazards of their work.
6	**Rule for Use, Protection and Preservation of Trees and Bushes,No 173, 2005**	The Rule for Use, Protection and Preservation of Trees and Bushes (2005) is a regulation that details the way to protect trees and shrubs in case of necessary cutting or replanting. These trees are excluded from the Forestry Fund of the Azerbaijan Republic.
7	**Article 22 of the Land Code, 1999**	Article 22 of the Land Code (1999) stipulates that the state is required to establish protection zones with a special (restrictive) regime for the purpose of construction and operation of industrial facilities.
8	**EU Counsil Directive, 98/83/EC, Drinking Water Standards**	Water quality sampling must be conducted to meet the frequency and methods stipulated in European Council Directive 98/83/EC and Section 7. The treated water should comply with the EU Directive 98/83/EC, and parameters are below; Parameters Council Directive Aluminum (only if used as flocculents) 0.2 mg / l Ammonium ……0.5 mg / l Color ……Record observation Clostridium perfringens (if water originates from Surface water) ……...0 per 250 ml Escherichia coli ……0 per 250 ml Hydrogen ion concentration ……..……6 – 9 Iron (only if used as flocculent……..0.2 mg / l Nitrite (only when chloramination is used as a disinfectant) ……..0.5 mg / l Odour ……..……Record observation Taste ……..……Record observation
9	**EU Council Directive, 91/271/EEC, Urban Wastewater**	Effluent quality discharge shall meet European Council Directive 91/271/EEC on Urban Wastewater

Standards directive*	Treatment Plants (UWWTP), **Parameters Max. Effluent Standards** BOD5, biochemical oxygen demand…..25 mg / l COD, chemical oxygen demand …… .125 mg / l TSS, total suspended solids …….. 35 mg / l TN, total Nitrogene …….. 15 mg / l TP, total phosphorus ……..2 mg / l

* As there are no specific water effluent discharge sampling requirements and limits specified under Azerbaijan regulations, the EU Directive 91/271/EEC (UWWTP- Urban Wastewater), has been adopted by the Ministry of Health (MoH) of Azerbaijan to regulate the urban wastewater quality.

B. Government's Environmental Assessment and Review Procedures

13. Environmental assessment and review procedures in Azerbaijan in accordance with the SEE do not include the categorization of projects. The project is either initially approved with few mitigation conditions if necessary, or the project must undergo a full EIA. If the activity is assessed to result in major potential impacts, a full EIA is automatically required.

14. Since categorization is absent under Azerbaijan environmental regulations and Articles 81 and 82 of the Law on Environmental Protection (1999) specifically provides for the application of international agreements in case an international institute or body has provisions that are different from those of the Azerbaijani legislation, the ADB guidelines were adopted for project categorization under the Investment Program.

15. The procedure for IEE/EIA in Azerbaijan includes the following:
During the first stage of the environmental examination process, an initial examination of the application of the proposed activity is made by the SEE within the MENR and the expected impacts of the proposed activity are considered. This may include preliminary consultations with other agencies, NGOs, experts and initial public inquiries. On the condition that the activity is likely to cause only minor impacts on the environment, the application may be approved with some conditions. If the activity is assessed to have more than minor impacts, a full EIA is required. A decision on processing charges is taken and a scoping meeting of representatives of the applicant, invited experts and invited members of the public is organized and chaired by the MENR. Based on the outcome of this meeting, the SEE will notify the Program Management Offices (PMOs) on the required scope and depth of the investigation and on the results of public consultation during the EIA study.

16. For the current project, this IEE report was submitted to MENR as part of initial examination. An environment review expert group, chaired by MENR, carried out the investigations and consultations. Finally, a written approval was given, which can be found in the appendices.

III. DESCRIPTION OF THE PROJECT

A. Type of the Project

17. This project consists of construction of water supply and sanitation infrastructure of 5 periurban towns of Nakhchivan City, (Qaracuq, Qarahanbeyli, Bulgan, Hacıniyyet and Tumbul). It is classified as a part of Urban Water Supply project and is categorized as **Category B**, based on the set criteria in OMF1 (paras 6-7). Nahkcivan AR State Amelioration and Water Management Commitee is implementing the WSS Project - (Water supply and Sanitation Project) jointly financed by the ADB and by the government of Azerbajian. The main objective of the Project is to improve access to safe, reliable and sustainable water supply and sanitation services in the periurban towns of Nakhcivan City.

B. Need for Project

18. Recent WSS projects in Nakhcivan City included a state of the art treatment plant, an MBR type wastewater treatment plant and reconstruction of entire Nakhcivan City WSS network. Part of these Projects has been completed and the remaining works are anticipated to finish by late 2014. Capacities of both water and sewage treatment plants were designed to include the water needs and sewage disposals of the peri urban towns.

19. The water network of the periurban towns of the City are old, leaky and non reliable. No house connections exist in the Project towns. The network water is supplied only by standpipes on the corners of the streets. Locals need to carry their cleaning and cooking water from these standpipes. Many residential houses also incur the additional cost of having to pump water from their groundwater wells to their elevated tanks. With the lack of a reliable distribution pipework, most people use bottled or tankered water for drinking.

20. When the recent projects in Nakhcivan are completed, the network water of the towns will be supplied from the new water treatment plant of Nakhcivan City. However, the periurban towns do not have a water network system to safely carry the treated water to the households.

21. No sewerage system of periurban towns exist. All individual houses have basic septic tanks where their sewage flows. The tanks are simply holes of 3-4 meters deep in the ground. The old septic tanks need to be cleaned or sucked by septic pump trucks in 2-4 times a year. It is also important to note that these septic tanks contaminate ground water.

22. Preliminary design works of the WSS network of the towns show that the fortunate topography of Tumbul and Hacıniyyet towns allows the sewage to gravity flow to the new WWTP of Nakhcivan City (planned to be in operation by 2014). Also a portion of the Qaracuq, Qarahabeyli and Bulgan towns can flow to the new WWTP by gravity. The rest will need to be pumped by a small lift station.

23. Time, effort and money spent by family members, generally women and girls, in collecting water, boiling and adding chemicals are be quite high. Households have had to buy electrical pumps to lift water to their elevated storage tanks.

C. Location and Accessibility

24. The Nakhchivan Autonomous Republic lies to the south west of the Republic of Azerbaijan and is completely enclosed on the north and east by Armenia, bounded to the south and the west by the river Araz, beyond which is the Republic of Iran to the south and Turkey to the west. The Nakhchivan City, the capital of Nakhcivan Autonomous Republic, is located in the western part of Azerbaijan almost on the border with Iran and Turkey, 450 km west of Baku.

25. Nakhchivan City is laid out across the elevated part of the flood plain of the river Aras, which is dammed just below, at Orzilva, and forms a large reservoir lake for hydropower production. The City is bounded to the east by the right bank, lower slopes of the river Nakhchivan-cay. The latter drains the Zangezur Mountains, flowing from above the town of Shahbuz, to join the Aras. A map of Nakhcivan AR, showing the neighbor countries and the location of Nakhcivan City is shown in Figure 1.

26. Periurban towns of Nakhcivan City lies south of Nakhcivan City. These towns are very close to the City such that the preferred means of transport from four of the towns to the City centre is by foot.

Figure 1 Location of Nakhchivan City and periurban towns

D. Proposed Schedule for Implementation

27. The main activities of assignment were planned to be handled in two main phases. These phases are:

Phase I: Tendering
Phase II: Construction

28. The Phase I consists of preparation of contract documents, announcements of bidding, preparation of terms of references, standards and bidding documents, evaluation of bids, awarding of the contract. It is anticipated that the Tranche 3 works will be awarded in 1 package.

29. After signing of the contract between the Contractor and Client for construction of WSS infrastructure works, Phase II will be commenced, which is being planned to last for 24 months.

E. Description of the Project

30. The field surveys and public consultations show that the demand for reliable water supply and sanitation services is very high. No tap water exists in the houses. Standpipes in the corners of the streets are the only way to reach network water and water being supplied is mostly not used for drinking purposes due to deteriorated, unsafe water supply system. Most people have groundwater wells in their yards and they use individual pumps to pump the groundwater to small water tanks located at the top level of their houses. There are some households that use water from stand pipes and from keherises for drinking. The sewage system is non existent.

31. A Multitranche Financing Facility -Water Supply and Sanitation Investment Program – had been initiated by ADB and Government of Azerbaijan in 2009 to improve public health and the environment in the participating towns of Azerbaijan, including Nakhcivan City, with a desired outcome of improved coverage, and the continuity and quality of water supplies and wastewater collection & disposal.

32. Under Tranche 1 and 2 of the MFF Investment Program, construction work was performed in the Nakhchivan City to renew the entire water and wastewater infrastructure. Construction of the City's total proposed WSS network system is expected to finish within a year. The construction of new water treatment plant for Nakhcivan City has finished recently. The construction of the wastewater treatment plant is expected to start in IV quarter of 2013.

33. Tranche 3 of the MFF aims to integrate the water supply network and sewage collection systems of the periurban towns to the City's new WSS system.

1. Water Supply Network Description

34. Per the design of water supply network of Nakhcivan City, which was done in 2008, the water supply points of the periurban towns were already determined. During construction of water network of Nakhcivan City, water feeding pipes for the periurban towns were installed underground with blind flanges. Tranche 3 works will start from these predetermined points towards the 5 towns.

35. The Design Population and Flow Rate of the Water supply network of the periurban towns have been given in Table 3.

Table 3: Pressure Zone Network

Town	Design Population	Area (ha)	Water Supply Flow Rate (l/sec)
Qaracuk Town	4,566	202	15.17
Qarahanbeyli Town	4,150	122	13.79
Bulgan Town	1,901	33	6.32

Hacıniyyet Town	370	24	1.23
Tumbul Town	2,702	103	8.98
Total	**13,689**	**484**	**45.49**

36. The water supply system of periurban towns was prepared. Total length of pipes with corresponding dimensions are given below.

Table:4 Diameter and Length

Diameter (mm)	Length (m)
63	132
90	8.487
110	39.956
160	11.639
225	1.894
Total	**62.108**

2. Sewerage System Project Description

37. Due to topographical condition of peri urban towns of Nakhcivan City, sewerage systems of Hacıniyyet and Tumbul towns will be collected seperately, wheras other three towns' sewerage will be collected at one point due to their closeness to each other.

38. For Hacıniyyet and Tumbul towns, sewerage will be conveyed to the new WWTP by gravity. Since boundaries of Qaracuq, Qaraxanbeyli and Bulqan towns are adjacent, the sewerage of these three towns will be collected together. Some portion of these towns (as topograph allows) will be conveyed to the WWTP by gravity, while rest will be collected to a lift station from where sewage will be pumped to the new WWTP.

39. Total detailed lengths of peri urban towns sewerage system are given below.

Table: 7. Diameter and Length

Diameter (mm)	Length (m)
200	39.231
300	8.565
400	1.067
Total	**48.863**

IV. ANALYSIS OF ALTERNATIVES

40. The alternatives analysis of the project in terms of routes and sizes of WSS lines have been studied and analyzed. Similarly, comparison between with and without project or the "No action option" is also studied and analyzed.

A. Alternatives in Pipe Routes

41. In general, WSS routes in residential areas are located under roadways, streets, pavings, etc., since their purpose is to serve the residents of the adjacent apartments, buildings etc. Hence, the alternatives of the WSS routes were minimal in this urban WSS project. In the design, the alignment of the water and wastewater lines were selected such that they are apart from each other as required by the codes, while achieving minimal excavation and minimal disturbance to the natural soil, vegetation and/or planting. Minimal significant adverse environmental impacts are expected with the present selections of WSS line routes.

B. Alternatives in Pipe Sizes

42. Pipe sizing is an important part of any WSS work since it dictates how much water can be delivered to end users or how much wastewater can be carried safely to the WWTP. In addition, pipes constitute a major portion of the WSS project costs. Hence proper attention to pipe sizing was given to make sure the desired flow rates (i.e. based on projected 2036 population) are met safely without oversizing the pipes.

C. No Project Option

43. The analysis has also been done with and without project scenario. Implementation of proposed project will create a lot of positive impacts on health and hygiene of people, public environment and socio-economic status of community as well. Provision of good quality water and wastewater infrastructure will help to enhance the quality of life of the people. The project will also help to create job opportunities to considerable number of people during construction and to few people during operational phase. The Implementation of the proposed project will produce only negligible and insignificant environmental impacts.

44. On the other hand, if the project is not implemented, the people of the project area will still have to suffer from various problems they are facing today. For drinking, people are forced to use pumps. The people are using unsafe and low quality water network putting their health in risk. Wastewater lines are nonexistent. Due to polluted water and unhygienic environment, the community is facing high level of related disease incidences every year.

V. DESCRIPTION OF THE ENVIRONMENT

45. The environmental baseline survey area is the WSS service area of the periurban towns of Nakhchivan City, including anticipated future extensions of the City until 2034.

A. Physical Resources

1. Climate

46. Winters are too cold and summers are dry and hot in Nakhchivan City and the closeby towns. Annual average temperature is 14,260 and average temperature of the hottest months is about 28-30 °C. Sometimes temperature reaches to 40-43°’ during the hot months.

47. The average temperature in winter is - 5,50. The common low temperatures of the coldest months are -10 to -15, however sometimes lower temperatures can be observed.

48. Frost depth of the rocks is 0,6 m but it reaches to 0,8 m on severe winter seasons. North and north-west winds prevail on the field. Maximum wind speeds in the territory is about 20 km per hour. Average monthly precipitation is about 280-330 mm. The precipitation is distributed quite uniformly throughout the year. Surface steaming is about 1200-1400 mm which is 3-4 times more than the precipitations. Rate of humidity in the air is % 10-20. The main wind directions are east in the summer and northeast in the winter.

2. Topography and Soils

49. Nakhchivan City is laid out across the elevated part of the flood plain of the river Aras, which is dammed just below, and forms a large reservoir lake, for hydropower production. The City is bounded to the east by the right bank, lower slopes of the river Nakhchivan-cay. The alluvial gravels of Nakhchivan cay are the main source of potable water supply.

50. The peri urban towns sits on he south of the City, close to the Araz River. The towns lie on a plateau around 780 m – 840 m contours.

3. Water Recources

51. The current source of the water for Nakhcivan City and peri urban towns is from a series of infiltration galleries placed in the bed of the river Nakhchivan-chay, located 11km from the City. The Nakhchivan-chay lies to the east of town. It is a relatively small mountain river with a total catchment area of 1,630 km2 and has good water quality. The Araz river is located to the south and west of the town and separates the town from the Iranian and Turkish borders. Water from this river is used for agricultural purposes because the water is quite turbid and has a high amount of suspended solids. The Araz River is the second largest river in the country and includes a catchment area of 102,000 km2. A number of water reservoirs constructed for irrigation and water regulation have been constructed along both rivers. Also, numerous irrigation canals and collectors are located in the plains within and surrounding the town.

52. Hydrogeological situation of the region is poor and simple. Precipitations, creeks and waters coming from the artificial dams play a significant role on the existence of ground waters. Depth of the ground waters is about 1,8-25 m. Water level is 1,0-3,0 m in some places, especially in erosion plains of Aras River. Ground waters observed in the field are poor and mesohaline.

4. Geology and Seismology

53. The Nakhchivan region contains two dominant types of soil: mountain-forest brown soil and meadow. The meadow soils are most plentiful in the City as they are located from lowland semi-dry areas up to arid steppe areas. The soil has a light, loamy structure and a medium degree of salinity. The mountain-forest brown soil is distributed as patches on the plain area of the town and is predominant in the northern mountains. This soil is heavy loam having a low salinity and is susceptible to erosion. Conversely, the meadow soil is not susceptible to erosion processes and contains the necessary nutrients to cultivate crops. The soils of this type on the plains in the region are typically used for cultivating nuts and fruits.

54. Geological structure of Nakhchivan City and its surrounded area is composed of Sherur-Culfa and Zengezur anticlinorium and Ordubad synclinorium. Sediments of Third (QIII) and Forth (QIV) Age are widespread in geological structure. Sediments of third age are composed of Sarmatian age layers. Thickness of these sediments reaches to a hundred

meter. Due to their lithological structure, these sediments are composed of clays similar to argillite, argillites, alevrolites and sands. Fourth Age alluvium-prolluvial, prolluvial-deluvial sediments are widespread over Third Age sediments. General thickness of Fourth Age sediments is no more than 20-50 m.

55. Earthquakes have the most damaging effect among the natural geology processes in Nakhchivan field. Sometimes severe earthquakes occur here. A significant part of the earthquakes result from the hypocenters of Zanzegur Mountains, Aras River shores and Mount Ağrı. The region was shown in the part of 8 magnitude depending upon the General Seismic Regional Map of Azerbaijan field which was prepared in 1981 and accepted as technical regulation. Having realized after Hamamlı Earthquake in 1988 that the seismic of the region shown in the previously prepared GSR (General Seismic Regional) Map does not reflect the truth; general seismic of the region was shown as 9 magnitude by adding 1 in accordance with TN-Q-II-7-81 and HH-02/3-, 16/1191 numbered and 11.09.1991 dated decision of State Construction and Architecture Directorate of Azerbaijan.

B. Ecological Resources

56. 7 climate zones out of 11 existing in the world are met in Nakhchivan Autonomous Republic. There are about 3000 plant species, 373 animal sorts, 226 bird kinds in Nakhchivan Autonomous Republic.

57. The flora of Nakhchivan and of periurban towns is rich compared with other botanic-geographic regions of Azerbaijan. 2782 kinds of supreme plants are met in this region. They in their turns assembled in 773 species and 134 families. 68 of these kinds are cultivated. Wild plants possess 123 families and 697 species. 732 kinds flora are met in the lowlands along the Aras river, 1326 kinds in the middle mountainous and 640 kinds in the highest mountainous areas. The following plants and their types in Nakhchivan Autonomous Republic divide into –deserts and semi-deserts; friganoid and bozgir plants; high pasture, subalp and Alp meadows, Alp piles; woods, oasis, along river small woods; deposit and rock plants, water march plants.

58. The territory of Nakhchivan is distinguished from the other regions of Azerbaijan according to its natural condition and richness of fauna. The kinds of animals and its number comprise 60-80% percent of the Azerbaijan fauna. The fauna of the autonomous republic has been investigated since the second half of the 19th century. The scientists have defined 813 butterfly kinds, 134 kinds of sovca, 4 kinds of insects, 3 kinds of runaways, 4 kinds of praying mantis, 67 kinds of straight wings, 75 kinds of grasshoppers, 480 kinds of halfhardwings. There are 6 kinds of amphibians and 19 kinds of reptiles in Nakhchivan Autonomous Republic. 218 kinds of birds live in the Nakhchivan territory. 61 kinds of mammals are known in the area. 40 kinds of vertebral animals out of 350 kinds living in the autonomous republic were included to the “Red book”.

59. The wildlife resources in the project area are scarce. The present vegetation cover, together with human disturbances, provides very few or no habitat variations in terms of feed, shelter, and protection. No rare species exists in the project area.

60. No national reserve is located within or near the Project towns. However, two sites in the vicinity have environmental importance to the Republic in spite of lacking national protection status. These areas include: 1) the Arazboyu Sanctuary; and 2) the Nehram Mountain IBA 019 (Important Bird Area). The Arazboyu Sanctuary is locating on the Boyuk Duz plain about 12 km to the west of the City. The Nehram Mountain IBA is located on the territory of the Nehram Mountains about 16 km south of the project area. The project activity is not expected to affect these environmental sites.

C. Economic Development

1. Industries

61. The total rate of the industrial production in 2007 rose 17 times in comparison with 1995. The perentage share of the non-state sector in the total output of the industrial product constituted 69%. The perentage share of the industry in the gross domestic product reached 22,5 % in 2007, compared with 10,1% of 2000.

62. Late years the industrial enterprises producing bread and rolls buns, flour, meat and milk productions, chicken, macaroni, tea, sugar, salt, sweets, fruit juice, alcoholic drinks, condensed and packed honey, roasted and packed agriculture products, mineral waters, decorative stones, travertine faced stones, plastic materials, lime, gypsy, marble, furniture of various sorts, metal, cast iron and precious metal and output of other products were established and used in the autonomous republic.

63. The minerals output of Nakhchivan are of great importance. The rock salt of industrial importance, dolomite, travertine, tuff, the marbled lime stone, gyps, clay, sand, mergel, zink-lead, molibden, copper-molibden, gold and mineral waters rich Nakhchivan Autonomous Republic has a very available atmosphere in extracting different kinds of building materials of which, ferconcrete items, brick, travertine, marble and other products to expand their production and deliver to the world market.

64. The numbers of unemployed have remained stable, and up to 60% of the work force of about 41,150 is employed in state enterprises and in the many private SME's.

2. Transportation

65. The infrastructure improvement is of great significant together with the role of the key production fields in the development of economy. From this point of view, to improve the transport sector in the autonomous republic which has been living in blockade condition for a long time, is much more important. Mainly, the services at the motor transport, air and railway transports are used in the autonomous republic.

66. The motor transport is the main in passenger and goods transportation inside the autonomous republic. Mostly, all villages and region centers of the autonomous republic were supplied with the fixed route buses.

67. For the purpose to simplify the visit with the main land of Azerbaijan, the regular fixed Nakhchivan – Baki – Nakhchivan bus routes passing the territory of Iran have been working since the ends of 2007.

68. The development of the motor transports mainly depends on the condition of the existing roads. The Motor Roads State Company of Nakhchivan Autonomous Republic services the motor roads of 1473 km distance. 274 km of these roads are of the republic importance, but 1199 km of local importance. The measures to standardize the motor roads to the modern world standards are being continued at the present moment.

69. The railway transport is of great importance in the autonomous republic. There is a railway junction in the part of Julfa in the direction of Tabriz of the Islamic Republic of Iran. As a result of the occupation policy of Armenia, the railway line connecting the autonomous republic with Azerbaijan was completely cut at the beginning of 1992.

70. The goods transportation in the transport sector rose 11,2 times but the passengers transportation 1,9 times in 2007 compared with 1995.

3. Land use and Agriculture

71. The available climate-soil condition of the autonomous republic gives an opportunity to develop the agriculture here. As the major part of population live and engage with the agrar sector, it needed to pay a great attention to the promotion of this filed. The population are mainly busy with grain-growing, fruit-growing, potato-growing and cattle breeding.

72. For the purpose to develop the agriculture the land reform was completed in Nakhchivan. As a result of the agrarian reforms, 10,5% of the total land plot of the autonomous republic was given to the private property, 56,3% to the municipal property and 33,2% was kept under a state property. Only 176,9 thousand ha or 33% out of 536,3 thousand ha of the total land are available for the agriculture. 14,5 thousand ha or 8,2% of the available lands for the agriculture fall to the share of yard plots.

D. Social and Cultural Resources

1. Population

73. The population of Nakhchivan and the peri urban towns are young and dynamic, with an average age of 26. The age distribution shows that 56% of the total population is of active working age; thus it has the human resources potential for development based on people's priorities, ascertained through the surveys, the top three problems are economic hardships, water supply and sewerage. They are followed by heating problems. The water difficulties are exacerbated by low water pressure and low quality of water. Unemployment, high prices, lack of favourable business environment makes life strenuous. Sewerage related problems relate to the lack of centralized sewerage, blocked pipes, overflowing sewage, which all threaten social wellbeing. Households also stressed lack of electric power during the -30^{o}C conditions.

74. People have developed coping strategies to alleviate the severe impact of low cash income such that subsistence living is possible. There are 2,337 households in the five towns. The houses are made up of family dwellings, majority of which have a plot of land for growing vegetables. The more rural parts of the city, many also own some livestock, cows, chicken & sheep. In addition, a large proportion of the males work outside the country and send important remittances that are not declared as income.

2. Health facilities

75. Today 2 hospitals of 2799 beds, the Diagnostic-Treatment Center, 72 out-patients' clinics, 1 First–Aid Medical Center, 7 first–aid departments, the Court Medical Expert and Pathology Anatomy Union, the Nakhchivan city Infants House, 9 Hygiene and Center of Epidemiologies, 74 chemist's shops and chemist's shop stations act in NAR.

76. Today per 10 thousand persons there are 72,8 beds of hospital of the population of the autonomous republic. At present 739 doctors, 2794 middle medical personals work in the public health institutions of the autonomous republic. The average number of doctors per 10 thousand persons is 19,2 doctors and 72,7 middle medical personals.

3. Education facilities

77. The Nakhchivan branch of the Azerbaijan National Academy of Sciences was established on the basis of the scientific institutions acting in the autonomous republic and joining them such as: Nakhchivan Regional Scientific Center, Nakhchivan Scientific-Investigation base, the Batabat station of the Shamakhi Astrophysics Observatory. The branch embraces 6 scientific –investigation institutions – History, Ethnography and Archaeology, Art, Language and Literature, Natural Reserves, Bioresources Institutions, the Manuscripts Foundation and Batabat Astrophysics Observatory.

78. In the Nakhchivan branch of the Azerbaijan National Academy of Sciences acting since January, 2003 there are 34 departments and laboratories, areas for experiment, seismological center, scientific library, publishing house and department of postgraduate. 274 employees work in the Nakhchivan branch (2008).Among the scientific workers there are two full members of the Azerbaijan National Academy of Sciences, 5 associate members, 6 doctors of sciences, 21 candidates of sciences. Among the young personnals 30 are post graduate students, 40 are candidates for a degree.

79. Today 221 day time secondary schools act in Nakhchivan Autonomous Republic. 205 out of them are middle schools. 12 are basical schools and 4 are primary schools. Also there are 44 out of school educational institutions, Children-Youth Sport and Chess school, 18 preschool educational institutions.

4. Cultural heritage

80. There are 1162 historical-cultural monuments in Nakhchivan Autonomous Republic. 58 monuments are of the world importance, 455 monuments are of the country importance and 649 monuments are of the local importance. No cultural heritage is expected to be affected due to the Project.

81. The followings are included to the historical-cultural monuments.

The archaeological monuments - 663
The architectural monuments -285
The monumental art monuments - 31
The historical monuments - 36
The places for pilgrimage - 140
The nature monuments - 7

VI. FORECASTING ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

82. This environmental examination addresses only the water distribution network and waste water collection works of periurban towns of Nakhcivan City, to be performed under Tranche 3. Separate environmental assessment reports were prepared for the treatment plants, which are being constructed under the same MFF - Water Supply and Sanitation Improvement Program.

83. The activities to be performed within the scope of this project were examined in two phases:

A. Construction Phase

- Pre-construction activities such as contractor office set ups and necessary equipment stacks
- Construction of the water supply network and sewage collection system per project drawings

84. Environmental effects likely to occur during the construction of the Project are noise, dust, solid and liquid wastes. Effects likely to occur during the construction phase are short term effects and they can not deteriorate the existing conditions.

B. Operational Phase

85. Possible environmental effects during operational phase are minimal and do not include any adverse environmental effects as long as monitoring and mitigation measures, if needed, are executed.

A. Possible Environmental Impacts of the Project

86. Considering the worst-case scenarios, contaminant sources and environmental units to be affected are anticipated for construction phases. Data showing the units to be affected according to the worst-case scenario are given in Table 8.

Table 8. Construction Phase Contaminant Sources and Environmental Units to be affected.

Contaminant Sources	Environmental Units Likely to be Affected
Emissions Arising from Equipments used for the Excavation and Filling Works	Air, Flora and Fauna, Socio-Economic Environment
Dust Released from Excavation and Filling Works	Air and Visual Effects
Waste Water Arising from the Workers	Surface and Underground Waters
Construction Wastes	Surface Waters, Soil, Flora and Fauna, Visual Effects
Packaging etc. Wastes Released from the Construction Materials to be Used	Surface Waters, Soil, Flora and Fauna, Visual Effects
Noise to Occur During the Operation of the Construction Vehicles	Socio-Economic Environment Flora and Fauna

B. Use of Natural Sources

87. During the construction phase the use of natural resources consists of the elements such as land use, water use of the workers and use of diesel source for construction vehicles.

C. Environmental Impact Assessment of the Project

88. Proposed water distribution network and waste water collection system will certainly produce some environmental impacts in project area. But it must be kept in mind that the impacts of project activities are not always negative, it may be positive as well. The attempt should be to minimize the negative impacts by applying necessary mitigation measures and to maximize the positive impacts. Based on the severity and extent of impacts, the impacts are classified as high, medium and low. The environmental impacts during various stages have been predicted. These impacts are described below.

1. Impact Assessment on the Air Quality

89. This section discusses the impact of construction and subsequent operation on the ambient air quality in and around the Project direct impact area.

90. Construction activities have the potential to generate a substantial amount of air pollution. In some cases, the emissions from construction represent the largest air quality

impact associated with the Project, even though, the generation of construction-related emissions is temporary in nature.

91. The emissions generated from common construction activities include;

- Exhaust emissions of particulate matter (PM) and of nitrogen oxides (NOx) from fuel combustion for mobile heavy-duty diesel- and gasoline-powered equipment, portable auxiliary equipment, material delivery trucks, and worker commute trips,
- Fugitive PM dust from soil disturbance and demolition activity,
- Evaporative emissions of reactive organic compounds from paving activity .
- Exhaust emissions of greenhouse gases (GHG) such as carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O),
- Air quality will be affected by fugitive dust and emissions from construction machinery, concrete/asphalt works, and vehicular traffic during the construction phase. Emissions may be carried over long distances, depending on wind speed and direction, the temperature of the surrounding air, and atmospheric stability.

92. The location of the residences, places of work shops, schools, hospitals and the civic cultural and other heritage sites has been reviewed. Some of the residences are close enough to be disturbed by dust. Water is available in the study area although surplus water may not always be readily available in the dry season.

93. The critical sources of air pollution during the construction phase are listed below:

- Concrete and asphalt plants that generate toxic emissions containing unburned carbon particulates, sulfur compounds, and dust from aggregate preparation,
- Earthen haulage tracks that generate dust, particularly during loading and unloading processes.
- Traffic-diversion routes marked along dirt tracks that generate fugitive dust when in use by vehicular traffic.

94. However, emission and dust effects of the construction activities are temporary, and will come into being in **medium** level. This impact will discontinue once the construction is completed. No negative impact will come into being in the operation phase of the Project.

2. Impact Assessment on the Water Quality

95. This section explains how the Project service area will be affected in terms of water resource use, water supply, water body contamination, and alterations in drainage pattern.

96. Water is a critical resource for the local community and resources will be protected during construction and operation. The local water supply system shall not be tapped to meet the campsite and the construction requirements.

97. The surrounding land's drainage system, water resources and treated water quality may be affected by construction and operational activities as follows:

- Surface and subsurface water resources in the Project area may be contaminated by fuel and chemical spills, or by solid waste and effluents generated by the kitchens, by toilets at construction campsites.
- Natural streams and irrigation channels may become silted by borrow material (earth) in the runoff from the construction area, workshops and equipment washing-yards.

98. Surface water resources will be affected by the operation of increased traffic as follows:

- If cross-drainage structures are not adequately maintained, culverts and water channels tend to become choked with debris and eroded soil, adversely affecting the quality of surface water.

99. However, there are no spring water sources in the Project corridor, and no part of the Project is located at the watershed and/or waterlands. A few surface water crossings exist within the project area. Overall, some minor impact will occur on the water resources, and these impacts will be temporary. This impact's magnitude will come into being in **low** level. A series of mitigation measures identified in the following section should take place to minimize and/or avoid the potential negative effects of the construction activities on water quality.

3. Impact Assessment of Noise

100. Potential noise impact arising from the Project would be the construction noise and operational traffic noise. This section presents the assessment on noise impact during construction. The representative noise assessment points to be affected by the Project and potential noise impacts are identified and assessed.

101. Powered mechanical equipment such as generators, excavators, trucks, stabilizers and concrete-mixing plant can generate significant noise and vibration. Whereas various modern machines are acoustically designed to generate low noise levels there is not much evidence that acoustically insulated plant is available in Azerbaijan. The cumulative effects from several machines can be significant and may cause significant nuisances.

102. During construction, the noise must remain below specified levels. The maximum allowable noise levels are specified in Table 9.

Table 9: Maximum Allowable Noise Levels

Land use	**Noise standard (max) in decibel (dBA)**	
	Daytime 07:00-23:00	**Nighttime 23:00-07:00**
Residential Areas	40	30
Commercial Areas	55-60	55-60
Hotels and dormitories	45	35
Industrial areas:		
a) highly qualified workplaces	50	50
b) permanent workplaces within territory or buildings of plants	80	80
c) workplaces of track drivers and service	70	70
d) workplaces of drivers and service for tractors and other equivalent agricultural and melioration mechanisms	80	80
Sensitive areas:		
a) hospitals and sanatoriums	35	25
b) schools, libraries and conference halls	40	40

Source: Noise Standards GOST 12.1.003-83 UDK 534.835.46:658.382.3:006.354; GOST 12.1.036-81 ST SEV 2834-80

103. The noisest construction activities associated with the Project would likely be excavation or exterior finishing, which can generate the noise levels upto 89 dBA from a distance of 5m, per U.S. Environmental Protection Agency, Noise from Construction Equipment and operations, 1971, (See Table 10). Applying the attenuation of point source method and without taking into account of such attenuation by sound barriers or atmospheric

absorptions, noise generated by powered construction machinery and subsequently by vehicular traffic during the construction phase, is likely to affect sensitive receptors located within about 50 m of the Project direct impact area. See Table 10.

Table 10: Typical Construction Noise levels

Phase	**Noise levels** (dBA)
Ground Clearing	84
Excavation	89
Foundation	78
Erection	85
Exterior Finishing	89
Pile Driving	90-105

Source: U.S. Environmental Protection Agency, Noise from Construction Equipmer operations, 1971

Table 11: Noise levels generated by the powered construction machinary

Equipment	**5 m**	**10 m**	**20 m**	**40 m**	**50 m**	**100 m**	**150 m**	**200 m**
Loader-rubber tired	90	80	78	72	70	64	60	58
Crane	85	79	73	67	65	59	55	53
Bulldozer	86	80	74	68	66	60	56	54
Excavator	84	78	72	66	64	58	54	52
Truck	90	80	78	72	70	64	60	58
Electric saw	81	75	69	63	61	55	51	49

104. This impact will be temporary, the impact will disappear upon completion of the Project. The noise effect will come into being **medium** level and mitigation measures desribed in the next section shall be followed.

4. Impact Assessment on Solid Waste and Hazardous Waste Disposal

105. Solid wastes will be generated mostly during the construction operations, such as removal of asphalt surface, dumping base, sub-base and fine sand for embedding operation of the pipes, filling back the excavated soil, paving roads, and other anciliary works within the Project activities. Scrap metals, rocks, asphalt and concrete chunks, remaining gravel and sands will cause the piled up solid wastes.

106. Solid wastes include wood and paper from packaging, sanitary wastes, rubber, plastic and asphalt products. Food containers, cigarette packages, leftover foods, and aluminium foil also contribute solid wastes.

107. Construction chemicals, chemical compounds, such as paints and acids, cleaning solvents will also cause the negative effects in respect of the hazardous impact when they dispose without taking preventing measures to the earth in the workplace and construction site.

108. These impacts will be temporary, and its magnitude will be in the **medium** level. The construction related impacts will discontinue once the construction is completed. A series of mitigation measures identified in the following section is recommended to minimize and/or avoid the potential negative effects of the solid waste and hazardous waste disposal during the construction phase.

5. Impact Assessment on Land Use, Soil Erosion and Soil Contamination

Land Use

109. The land use classification system is not developed yet in Nakhchivan. However, according to inspection and investigations in the Project area and its environment, the Project will not cause the physical divide an established community, and doesn't conflict with any applied and /or applicable habitat conservation plan and natural community conservation plan. The Project has no-conflict with the City's general land use plan including specific plans or zoning ordinances.

110. However, the areas where will be used to acquire borrow material will be impacted most significantly. Utilizing land for project activities, and the subsequent operation of increased traffic on the Project corridor may induce temporary as well as permanent changes in the existing land use pattern.

111. Temporary impacts during the construction in the Project area will be sourced from the following activities, but not limited to;

- Trenching and excavation works for pipe laying and jointing,
- Earth Works for pipe bedding, encasing and trench backfilling,
- Cut and fill and grading activities,
- Transportation of the materials from the excavation,
- Reinstating the road and sidewalk profile,
- Activities for ancilliary works,

Construction Contractor Camp Site

112. The contractor(s) will require land for:

- Contractors' camps and facilities, ie, storage, equipment parking and washing areas,
- Sources of borrow material and earth-fill,
- Aggregate quarries,
- Access roads for haulage,
- Disposal sites and procedures for the safe disposal of surplus construction and waste material.

Temporary impacts, which will be generated during the preparation of the constructor(s)' camp and facilities are;

- Excavation activities,
- Trenching and construction of water pipelines for connecting the water to the facilities,
- Erection of the site buildings,
- Construction of fuel facility,
- Connections the electrical conduits and cabling,
- Perimeter fencing,

Soil Erosion

113. Professional experience suggests that it will be typical for contractors to claim that there is insufficient space to set up erosion control and sedimentation facilities along the working areas. Based upon observation it is not credible that there is no space, and it is not acceptable that there are no opportunities to use at least some form of sediment basin sediment traps.

114. Soil erosion may occur;

- In workshop areas as a result of unmanaged runoff from equipment washing-yards.

• Once the project returns to normal operation, it will be subject to a natural depreciation as high embankments become increasingly prone to soil erosion, causing an increase in dust emissions and a fall in land productivity.

115. The soil erosion will come into being in the magnitude of **Low** level. Mitigation measures to obviate these impacts are developed in the subsequent sections.

Soil Contamination and Surface Run-off

116. • Scarified/scraped asphalt and concrete materials, if not disposed of properly, may contaminate soil resources.

• The possible contamination of soil by construction chemicals, i.e. oils and chemicals at concrete / asphalt application sites, workshop areas, and equipment washing-yards may limit the future use of the land for agricultural purposes.

• Other pollutants such as wash water from concrete mixers, acid and alkaline solutions from exposed soil or rock, and alkaline forming natural elements, may also be presented.

117. Possible construction chemicals, which cause the soil contamination in the Project are are listed below;

• Petrolium products used during construction include fuels, lubricant for vehicles, for power tools, and for general equipment maintenance.

• Chemical pollutants such as paints, acids, cleaning solvents, soil additives used for stabilization, and concrete curring compounds, may also be used on construction sites and carried in runoff.

• Pesticides, insecticides, rodenticides, and herbicides used on construction sites to provide safe and healty conditions.

• Nutrients, fertilizers used on construction sites, when re-vegetating graded and disturbed areas.

118. The soil contamination and surface run-off will come into being in the **medium** level. Mitigation measures to obviate these impacts are developed in the subsequent sections.

6. Impact Assessment on Temporary Traffic

119. There are also concerns about the blocking existing roads and many other footpaths and tracks in or nearby the Project corridor. The Project will also need alternative service roads and footpathes which will be constructed temporarily in or nearby the Project corridor. Needs to use of alternative service roads, pootpaths, and tracks, and blocking the existing roads will create the temporary impacts which cause physical discomfort in or nearby the physical enviroment, which are;

• The increasing the traffic which is substantial in relation to the existing traffic load and capacity of the street system,

• The resulting in a substantial increase in the number of vehicle trips,

• The resulting in a substantial increase in the volume of capacity ratio on roads, or congestion at intersections,

• The resulting in adequate emergency Access.

120. The traffic congestion and road blockins impact magnitude will be in **Low** level. These impacts will discontinue once the construction is completed.

7. Impact Assessment on Flora and Fauna

121. For defining the effects of the project on fauna and flora, existence of the endangered species, endemics and nationally or internationally protected species were examined but none of them was encountered in urban area of the City.

122. The noise and emissions generated by the construction activities can destroy habitat used for nesting and migrating bird species. However, there is no nursery for nesting bird species and/or aquatic community located closer than 500 m to the Project site. This impact can be considered **insignificant**.

123. There are no trees necessary to fell and replant in the proposed project corridor. There are no waterlands and watershed to be affected within the Project area.

124. There are no forest and forest blades located in the Project area. There will be no impact of the Project on the forests and forest blades.

8. Impact Assessment on Socio- Economic Environment

125. While examining the effects in terms of socio-economic environment, construction and operational phases were handled separately. Human groups to be effected negatively or positively after the commissioning of the project were defined and profit and loss relationship was examined.

126. Effects in terms of socio-economic environment are; positive effects on health, employment opportunities, visual values, positive effects on life standards by enhancing the tap water quality and closed system, nonleaky sewage collection, recreation areas, and cultural structures. In this respect, the project doesn't have any harmful effects on the environment. The project will brighten the economic and social structure of the environment. Consequently, the project is a useful one and will not have negative effects on physical, biological and social environment.

127. Economic and social life will be affected **positively** by the Project. Health problems will be removed by using qualified drinking and service water which will enhance the welfare level of the public. With the new waste water lines, sewage will be collected in a closed system and will be conveyed to the future treatment plant area. The possibility of waste water leaking into water lines will be eliminated.

128. Furthermore, employment opportunities will be provided during the construction and operation phases of the project.

D. Mitigation Measures

129. As mentioned in the previous section, the project will have low / medium adverse impacts on physical and biological environment. Some of the possible impacts are of temporary in nature and insignificant in magnitude. Even though the negative impacts on environment are small and insignificant, it will be better to implement some of the mitigation measures to minimize the impacts. These mitigation measures will help to reduce the negative impacts at the same time it will help to maximize the positive impacts. The proposed mitigation measures are listed below.

1. Air Quality

130. The following measures will be implemented to mitigate the impact of construction works on ambient air quality, however, heavy equipment and machines to be used within the construction phase should be mainly new and comply with all national and International

standards. Impact of emissions from ancilliary equipments (welding equipment, pumps etc), construction mechanisms and lories on athmosphere will be minimal;

- Quarry areas and asphalt plants if needed will be located at least 500 m downwind from populated areas, wildlife habitats, and contractors' camps, to minimize the impact of dust emissions.
- Asphalt, hot mix and batching plants will be equipped with dust control equipment such as fabric filters or wet scrubbers to reduce the level of dust emissions.
- The National Ambient Air Quality Standards applicable to gaseous emissions generated by construction vehicles, equipment, and machinery, will be enforced during construction works.
- Heavy construction vehicles should be performed in compliance with their exploitation standards.
- Regular check of technical condition of all vehicles should be prepared and carried out regularly by the contractor's safety manager and approved by SAWMC/EMU/ECO.
- 30 km/h speed limit should be set for movement of heavy construction vehicles on the dirt and service roads.
- All excavation Works, building temporary service roads, and loading/unloading operations should be stopped when wind speed exceeds 12 km/s.
- If the working surfaces become dry and dusty, water will be sprinkled on, and exposed surfaces when work is carried out within 50 m of the side Sensitive Receivers.
- No work will be carried out during the night (21.00hrs to 07.00hrs).
- If works give rise to complaints over dust, the contractor shall investigate the cause and review and propose alternative mitigation measures before works recommence.
- Fuel-efficient and well-maintained haulage trucks will be employed to minimize exhaust emissions. Smoke belching vehicles and equipment will not be allowed and will be removed from the project.
- All diesel heavy construction equipment shall not remain running an idle for more than five minutes.
- Using alternative fueled equipment when feasible (such as biodiesel and electric).
- All diesel-fueled engines used for on- and offsite construction activities shall be fueled only with ultralow sulfur diesel, which contains no more than 15 ppm sulfur.

131. As a general approach, it is recommended that if works are within 15 m of any sensitive receivers, the contractor should install segregation between the works at the edge and the sensitive receivers. The segregation should be a proper and easily erectable sheet in 2.5 m high, and designed to retain dust and provide a temporary visual barrier to the works. Where dust is the major consideration the barrier can take the form of tarpaulins strung between two poles mounted on a concrete base.

2. Water Quality

132. Measures to mitigate the adverse impact on water resources and surface drainage patterns are discussed below:

- Where works are in progress, erosion control and sedimentation facilities including sediment traps and straw bale barriers or combinations thereof will remain in place and be maintained throughout the works to protect local water resources.
- Lubricants, fuels and other hydrocarbons will be stored at least 100m 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).
- Solid Construction material and spoil stockpiles will be covered to reduce material loss and run-off and stockpiles will not be nearer than 100m to water bodies.
- Borrow sites will not be close to sources of drinking water in case of runoff.

• If complaints are received, the incidents and possible sources of water supply disruption will be investigated by the contractor and the EMU/ECO of SAWMC and where the complaint can be substantiated;
o Water samples will be taken and analyzed based on the baseline monitoring results obtained in the preconstruction stage.
o Samples will be taken as soon after the complaint as possible 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 campsites.
• The water ways and drainage streams en-route of the project should not be impeded by the works and the scale of the works does not warrant hydrological monitoring.
• During construction, machinery and transport will be used by the contractor, both have potential of causing contamination to under ground and above ground water assets. There is need to compile temporary drainage management plan before commencement of works.
• Proper installation of temporary drainage and erosion control before works within 50m of water bodies should be done.
• 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.

3. Noise

133. The Project is planned to commence in early 2012 and to be completed at the end of 2014. All construction tasks will be carried out during unrestricted hours (09.00 to 18.00 hour Monday to Saturday, excluding general holidays). The following construction activities will not take place concurrently to minimize the adverse effects of the noise to be generated by the powered mechanical equipments while working in or nearby the downtown of the settlements;

• Trench excavation, slope works, and realign the kerbs,
• Loading activities by loaders,
• Pooring concrete by pump,
• Road paving,

134. There are a few schools and hospitals near the Project. Where schools are nearby, the contractor shall discuss with the EMU/ECO and the school principals the agreed time for operating these machines, and completely avoid machine use near schools during examination times. Where noise is a major consideration (say outside temples) construction should be avoided at sensitive times.

135. Mitigation measures to protect existing sensitive locations from high noise levels in the construction phase, include:

• Monitoring noise levels and facilitating USEPAs in enforcing vehicle noise standards as prescribed in the National Ambient Air Quality Standards.
• Raising building boundary walls facing the highway for sensitive receptors such as schools and hospitals, if they are located closer than 50 m to noise resources.
• To minimize impacts the contractor shall have a unit to;
o Maintain and service all equipment to minimize noise levels, and
o Locate equipment to minimize nuisances, and
o Install acoustic insulation or use portable noise barriers where practicable to limit noise at sensitive receivers.

• Insulation should be provided the noise levels given in the Maximum Allowable Noise Levels (see Table 10) to minimize noise impacts such that the measured noise at the edge of the work.
• As a fall back option to control noise, portable barriers can be introduced using heavy thick ply-board or corrugated metal sheet.
• Nearby people and institutions should be warned about the high noise daytime.
• Mufflers of heavy vehicles should always be kept in good condition.
• Monitoring and controlling noise exposure at the Project corridor should be provided using;
o A sound level meter, and
o A noise dosimeter.
• All noise measurements in the Project corridor should be thoroughly documented. The records should contain at least the following indicators;
o Exposure monitoring,
o Audiometric testing,
o Training.
• Audiometric testing must be offered to the employees by a physician, audiologist, or qualified technician under the direction or supervision of a physician or audiologist.
• The noise limits should be defined as follows;
o Action level,
o Permissible exposure limit.
• A hearing conservation programme should be developed by SAWMC/EMU.
• Any operation by such equipment as percussion piling machine or pneumatic hammer shall be prohibited in the work closer than 50 m to a structure registered as a culturel heritage.

4. Solid Waste and Hazardous Waste Disposal

136. Constructor's Equipment will be cleaned and repaired (other than emergency repairs) in the dedicated facility or and area at the contractor's site or at a repairshop in an industrial park. All contaminated water, sludge, spill residue, or other hazardous compounds will be disposed of outside the construction boundaries, at a lawfully permitted or authorized destination.

• Construction chemicals, chemical compounds, such as paints and acids, cleaning solvents will not be disposed at any place of a construction site, and dumped only in demarcated waste disposal sites, designated by MENR.
• All solid wastes will properly be packaged, and disposed at a lawfully area.
• Contractor's workers shall employ the following measures to minimize exposure to potential pathogens;
1- Wash hands regularly, especially before eating, drinking, smoking, or using the restroom.
2- Wear gloves.
3- Cover wounds with clean, dry bandages.
• Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions.
• The Contractor will furthermore be responsible for the training and education of all personnel on site who will be handling the material about its proper use, handling and disposal.
• All hazardous materials will be stored in a secured, appointed area that is fenced and has restricted entry.
• Storage of hazardous products shall only take place using suitable containers approved by the ECO.
• Hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure.

• Thinners or solvents should not be discharged into sanitary or storm water system when cleaning the machinary.
• Any accidental chemical / fuel spills to be corrected immediately.
• Exercise extreme care with the handling of diesel and other toxic solvents so that spillage is minimized.

5. Land Use, Soil Erosion and Soil Contamination

137. Prior to the commencement of construction the contractor, all subcontractors and all his workers will need to be trained on the requirements for environmental management. In order to ensure that the contractor, subcontractors and workers understand and have the capacity to implement the environmental requirements and mitigation measures there will be regular and frequent training sessions and tool-box talks.

138. At the beginning of the project, the Contractor shall identify named staff to supervise and responsible for mitigation measures for all works including but not limited to earthworks, trenching, drainage re-provisioning, erosion control, materials management, noise and dust control, waste management.

139. Engineering controls will be designed by the contractor as mitigation measures and approved by the EMU (supervising authority) prior to the commencement of the construction works. No construction works will commence until all mitigation measures are in place and approved by the supervising authority.

140. The Project was designed not to interfere with the drainage on adjacent lands and paths and to prevent soil erosion.

141. The contractor(s) will be required to have an environmental engineer to check the implementation of any temporary drainage mitigations on the site and make modifications on a daily basis as necessary.

142. In addition, the following guidelines will be applied to minimize the impact on land used to extract borrow material:

Land Use

143. Project facilities will be located at a minimum distance of 200 m from existing settlements, built-up areas, wildlife habitats, or archaeological and cultural monuments.

144. As far as possible, waste/barren land ie, areas not under agricultural or residential use, and natural areas with a high elevation will be used for setting up Project facilities.

145. The excavation of earth fill will be limited to an approximate depth of 50 cm. This practice will be applied uniformly across the entire extent of the farmland unit acquired for borrowing earth material.

146. Where deep ditching is to be carried out, the top 1 m layer of the ditching area will be stripped and stockpiled. The ditch will initially be filled with scrap material from construction and then leveled with the stockpiled topsoil to make it even with the rest of the area.

147. Ditches or borrow pits that cannot be fully rehabilitated will be landscaped/converted into fish ponds to minimize erosion and to avoid creating hazards for people and livestock.

148. The following restrictions or constraints should be placed on the contractors camp sites, and construction staff in general:

- The use of welding equipment, oxy-acetylene torches and other bare flames where veld fires constitute a hazard.
- Indiscriminate disposal of rubbish or construction wastes or rubble.
- Littering of the site.
- Spillage of potential pollutants, such as petroleum products.
- Collection of firewood.
- Poaching of any description.
- Use of surrounding veld as toilets.
- Burning of wastes and cleared vegetation.

Soil Erosion and Surface Runoff

149. Good engineering practices will help the control soil erosion both at construction sites, particularly in excavation and borrow areas, and along haul tracks.

150. The contractors will be required to include appropriate measures and implement them accordingly. These will include the following measures

- Schedule work so clearing and grading are done during the time of minimum rainfall.
- Temporary stabilization is required within 70 days, if the site will be inactive for more than 30 days.
- Permanent stabilization is required, if the site will be inactive for more than one year.
- Clear only areas essential for construction.
- Perimeter control shall be installed, and temporary and permanent stabilization is required for topsoil stockpiles, and other disturbing areas within seven calender days of site disturbance.
- Highly erodible soils should be avoided.
- Protect natural vegetation with fencing, tree armoring, and retaining walls or tree wells.
- Stockpile topsoil and reapply to re-vegetate the site.
- Cover and stabilize topsoil stockpiles.
- Use wind erosion controls.
- On long or steep, disturbed, or man-made slopes, construct benches, terraces, or ditches at regular intervals to intercept runoff.
- Use seeding and mulch/mats, if necessary.
- Use turfing.
- Use wildflower cover.
- Stockpiles should be covered before heavy rain to prevent wash out due to the runoff. Stockpiles should not be located within 20m of the water courses and there should be an intervening vegetated buffer to control any un-expected run-off.

Soil Contamination

151. The following practices will be adopted to minimize the risk of 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.
- Soil contamination by asphalt will be minimized by placing all containers in caissons.
- Solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated waste disposal sites.
- Debris generated by the dismantling of existing pavement structures will be recycled subject to the suitability of the material.

• Solid wastes generated in the contractor's camp and other workplaces will be managed as follows;
o Construction site's borders should be marked beforehand and signs sould be erected warning people „not to dump garbage' and „not to enter'.
o Construction debris (sand, soil, rocks, asphalt, concrete) should be used as an additional material for filling deep trenches when needed. If not needed, they will be taken to the city's dump site.
o An adequate disposal facilities should be provided for solid wastes in or near the contractor's camp.
• Construction chemicals will be managed as follows;
o Persons mixing and applying chemicals should wear use suitable protective clothing (Personal Protective Equipment-PPE).
o Contractor(s) should submit a detailed PPE Policy for approval of the SAWMC and EMU prior to commence the work.
o Petrolium Products: When storing the petrolium products, the following measures should be taken;
- Creating a shelter around the area with cover and wind protection,
- Lining the storage area with a double layer of plastic sheeting or similar material,
- Clearly labelling all products,
- Keeping the tanks off the ground and stopping the source of the spill,
- Covering the spill with absorbent material

o Special attention should be paid for construction of contractor's fuel facility, and those are;
- 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,
- Fuel facility should be located at least 30 m far from the storage area and other facilities of the camp, and should be protected with a separate wire fence wall,
- The area of the fuel facility should be covered with a shed for the protective measure against the sunshine and rain.
- A proper floor drain should be installed on the slab of the concrete pool for safely discharging the leakages,

o Nutrients: The fertilizer and liming materials into the soil to depths of 10-15 cm.
• Washouting from concrete trucks and mixers should be disposed of into a designated area that can later be backfilled.
• The Contractor will be required to instruct and train their workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination.
• If waste oils or other contaminants are accidentally spilled on open ground the waste including the top 2 cm of any contaminated soil shall be disposed of as chemical waste to a disposal site acceptable to the SAWMC and agreed with the local authority / community.
• Control measures for oily residues, lubricants and refueling are prescribed in the EMP. The maintenance yards that will be created will have dedicated drainage which can capture run-off.
• Oily residues and fuel should be captured at source and refueling and maintenance should take place in dedicated areas away from surface water resources.

6. Temporary Traffic

152. The traffic load will be increased after starting the Project. The works should be carried out on a lane-by-lane basis according to existing traffic flow pattern.

153. The contractor should coordinate with local Traffic Management Department to minimize traffic impact. Construction vehicle trips in and out of the immediate construction zone shall be coordinated and scheduled away from "rush-hour" periods, to minimize general traffic disruption.

154. The following measures should be developed;

- Banning of movements,
- Temporary parking restrictions,
- Pedestrian and cyclist diversion routes where construction prevents access,
- Widening of carriageway,
- Maintaining footways where possible
- Temporary traffic signal,
- One way scheme,
- Maintaining local residential access at all times,
- New temporary pedestrian crossing facilities,
- General traffic diversion routes where roads are closed,
- Conducting a study on pedestarian and vehicular flow,
- Improving the capacity of affected road sections in order to maximize the number of new niches allowed without seriously affected the neighborhood.
- The circulation and liaison works should also be handled by the contractor.

7. Flora and Fauna

155. The mitigation measures on flora and fauna are described below.

- Any existing vegetation should be preserved to the greatest extent possible.
- The Contractor and his employees shall not bring any domesticated animals onto the site.
- The Contractor shall ensure that the work site be kept clean, tidy and free of rubbish that would attract animals.
- No poaching of fauna and flora shall be tolerated by the Contractor or his personnel on Site or elsewhere.
- Contractors will be required to establish their campsites, asphalt plants and concrete batching plant (if needed) on waste/barren land rather than on forested or agriculturally productive land.
- Construction vehicles, machinery and equipment will remain confined within their designated areas of movement.
- Before ground disturbing activities begin, identify and locate all equipment staging areas.

156. Where cut and fill cannot be avoided, slopes shall be designed for long term stability. Permanent vegetation should be used as the priority approach to stabilization of cut and fill areas where slopes are less than or equal to 3:1.

157. The contractor(s) shall provide the sand/gravel (crushed or naturally sieved and washed material) for filling, underlaying the pipes, using of base and sub-base material, asphalt mixture, and concrete mixture in all Project activities from the existing plants in NAR.

158. Staff working on the project should be given clear orders, not to shoot, snare or trap any bird.

159.

VII. PUBLIC CONSULTATION AND DISCLOSURE

160. In this part, informing studies carried out about the project for the public residing on the settlements likely to be affected by it will be explained.

A. Public Consultation Details

161. The proposed WSS project will be constructed in periurban towns of Nakhcivan City for the public residing in this settlement. Hence the public consultation was performed in these towns.

162. The public information and consultation was done to allay any fears of people and to receive any objections/suggestions on the project. Public Consultation Meetings were carried out in Nakhcivan City on 30.05.2011. By giving advertisements in advance, attendance of a wide range of related people to the meetings was encouraged. Opinions, ideas and suggestions of the locals and related people were received during the public attendance meetings and other related studies.

B. Information Disclosure & Public Opinions

163. Concerning the activities performed in the Public Meetings; citizens were informed about the studies to be carried out within the scope of the project, environmental effects of the project and measures to be taken against these effects. The topics discussed were;

-project awareness
-expected start and end of the project
-benefits of the project to society and state and as a whole
-the environmental issues related to the project
-any disadvantages and how these can be mitigated

164. People declared that they have not observed any negative issues with the ongoing construction works in the City. They were aware of the need to improve water supply and sanitation services. Residents also were of the view that the proposed project will improve the public healthy, environmental quality, and socio economic development of the towns. Following are the common queries/comments of the town residents.

1- When will the construction works start?
Answer: The construction of WSS network for each town is expected to start in late 2014-early 2015.
2- How much will be charged for the water and sewage services?
Answer: The long term objective is for WSS services to be self-funding using the „user pays' principle. For water service, it is currently anticipated that there will be a fixed standing charge and a unit charge per cubic meter. The flow meters to be installed will be recording the volumetric usage of water for this purpose. A fixed wastewater collection charge may also be added to the water bills.
3- When will the treatment plants be in service?
Answer: WTP construction has been finished recently. The anticipated date of WWTP construction completion is 18 months after selection of a contractor. We expect the WWTP will be in service by end of 2015.
4- Will the network water be free from hardness which form deposits (scales)?
Answer: Yes. The WTP will be a membrane type plant where hardness ions will be mostly eliminated. The water quality will be greatly improved.

VIII. GRIEVANCE REDRESS MECHANISM

165. PIU of SAWMC has overall responsibility for project implementation and EMU of SAWMC will have overall responsibility for environmental compliance. The Ministry of Ecology and Natural Resources (MENR) is the responsible administrative body from the protection of environmental and natural resources. The affected population and stakeholders may send their grievances, related to the project induced environmental impacts and nuisance to EMU or directly to the MENR.

166. The MENR is obligated to respond to the grievances, which have been received from the population or other interested parties in accordance with the rules of the Government of Azerbaijan.

167. However, the EMU will facilitate the response through implementing the following grievance redress mechanism. During the ongoing public consultation process, the PIU will inform the stakeholders and the public that an EMU within SAWMC will be responsible for environmental compliance and grievance redress. EMU will continuously provide information on the public consultation meetings and post on the media (i.e. wallpapers and or newspapers) the contact details of the persons responsible for grievance collection and response.

168. Upon receiving the grievance (in written or oral form) the EMU will carry out the following actions:

(i) send its representatives to check the claims and monitor the situation
(ii) involve SAWMC and MENR when and where appropriate
(iii) receive expert's conclusion (from PIU personnel, consultant experts or MENR experts)
(iv) submit an instruction on corrective measures to the construction company and the operators during 10 days after receiving the grievance
(v) inform the affected person or persons about the experts' decision and corrective measures applied;
(vi) If the affected person is not satisfied by the decision, they may present further information in support of new case. The subsequent decision of the EMU/MENR is considered finally.

In case the affected stakeholder or person is not satisfied with the response, the grievance maybe the directed to the court. EnvIronmental Management Plan.

169. EMP is a plan or programme that seeks to achieve a required end state and describes how activities that have or could have an adverse impact on the environment, will be mitigated, controlled, and monitored.

170. To implement the mitigation measures described in above chapter, an Environmental Management Plan has been prepared. The Environment Management Plan should be implemented strictly.

171. The EMP will address the environmental impacts during the construction and operational phases of a project. Due regard must be given to environmental protection during the entire project. In order to achieve this a number of environmental specifications/recommendations are made. These are aimed at ensuring that the contractor maintains adequate control over the project in order to:

- Minimize the extent of impact during construction
- Ensure appropriate restoration of areas affected by construction.
- Prevent long term environmental degradation.

172. The contractor must be made aware of the environmental obligations that are stipulated in this document, and must declare himself to be conversant of all relevant environmental legislation. The contractor should also be aware that the SAWMC / Environmental Management Unit (EMU) and Environmental Control Official (ECO) with the Supervisory Engineer will monitor the implementation of the procedures.

Environmental Mitigation/Management Plan

173. Environmental aspects addressed in this EMP include;

For the Construction Management Plan,
1-Ambient Air and Dust,
2-Water Pollution,
3-Noise Pollution,
4-Solid Waste,
5-Hazardous Materials,
6-Improper Land Use,
7-Erosion Control,
8-Soil Contamination,
9-Temporary Traffic,
10-Impact on Flora and Fauna,
11-Improper Site Clean-up.

For the Operation Management Plan,
1-Deterioration / Breaks of Infrastructure,
2-Water Quality Violation,

174. The EMP shall be attached in the bidding documents as guidance to the Bidders / Contractors. The plan must be read in conjunction with the contract documents including the relevant Bill of Quantities, Specifications and Drawings. When carrying out the Works, the environmental objective is to minimize the footprint of damage, disturbance and/or nuisance (of the social and biophysical environment), to properly manage use of water resources and to prevent pollution. This is the responsibility of the Contractor.

1. Construction Mitigation/Management Plan

Environmental Impact during Construction Phase				
Impacts	**Sites**	**Mitigation Measures Recommended**	**Timeframe**	**Responsibility for Implementation and for Monitoring & Enforcement**
Ambient Air and Local Dust	Construction site	• Limit the production of dust and damage caused by dust to the satisfaction of ECO. • Reschedule vegetation clearing activities or earthworks during periods of high wind, if visible dust is blowing off-site. • Regular watering and other treatment of exposed construction areas subject to vehicle and machinery movement. • Ensure that vehicles and equipment are appropriately maintained or covered to minimize air emissions. • Vehicle speeds in construction shall be limited to a maximum of 30 km/h. • Revegetate disturbed areas as soon as possible. • No open burning of wastes to be undertaken	Daily during construction	Construction Contractor(s) / ECO, Supervisory Engineer, and Contractor(s)
Water Pollution	Construction site	• Use erosion control and sedimentation facilities including sediment traps and straw bale barriers or combinations thereof • Store lubricants, fuels and other hydrocarbons at least 100m 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). • Cover solid construction material and spoil stockpiles to reduce material loss	Daily during construction	Construction Contractor(s) / ECO, Supervisory Engineer, and Contractor(s)
Noise Pollution	Construction site	• Maintain machinery and vehicle silencer units to minimize noise	Daily during construction	Construction Contractor(s) / ECO, Supervisory Engineer, and

		• Keep noise generating activities associated with construction activities to a minimum and within working hours. • Notify the residents of Sixmahmud town close to the Project area prior to commencement of the construction phase. • Vehicles and machinery that are used intermittently should not be left idling condition for long period of time. • Equipment used on site will be quietest reasonably available. • Best available work practices will be employed on site to minimize occupational noise levels. • Haul routes for construction traffic entering and leaving the site will be selected to ensure noise levels at noise sensitive receptors are kept at a minimum.		Contractor(s)
Solid Waste	Construction site	• Provide adequate number of „scavenger proof' refuse bins at the construction sites and at the construction camps. • These bins must be provided with lids and an external closing mechanism to prevent their contents blowing out and must be scavenger-proof to prevent the animals that may be attracted to the waste. • Ensure that all personnel immediately deposit waste in the waste bins provided. • Store all refuse and solid waste generated at all work sites in appropriate scavenger proof containment vessels • All waste must be transported in an appropriate manner (e.g. plastic rubbish bags). • Do not dispose of any waste and / or construction debris by burning, or by burying. • Discard all construction waste at a registered waste management facility / landfill site • All soil contaminated, for example by leaking machines, refuelling spills etc. to be excavated to the depth of contaminant penetration, placed in drums and removed to an appropriate landfill site.	Monthly during construction	Construction Contractor(s) / SAWMC/ECO, Supervisory Engineer, and Contractor(s)

Hazardous Material wastes	Construction site	• 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 materials. • Establish an emergency procedure for dealing with spills or releases of petroleum. • Storage of all hazardous material to be safe, tamper proof and under strict control. • Petroleum, chemical, harmful and hazardous waste throughout the site must be stored in appropriate, well maintained containers. • Any accidental chemical / fuel spills to be corrected immediately.	Monthly during construction	Construction Contractor(s) / SAWMC/ECO, Supervisory Engineer, and Contractor(s)
Improper Land Use	Construction site	• Where deep ditching is to be carried out, the top 1 m layer of the ditching area shall be stripped and stockpiled. • Ditches or borrow pits that cannot be fully rehabilitated shall be landscaped/converted into ponds to minimize erosion and to avoid creating hazards for people and livestock. • Apply following restrictions or constraints on the site camp, and construction staff: - Indiscriminate disposal of rubbish or construction wastes or rubble. - Littering of the site. - Spillage of potential pollutants, such as petroleum products. - Collection of firewood. - Poaching of any description. - Use of surrounding veld as toilets. - Burning of wastes and cleared vegetation. • The natural vegetation encountered on the site to be conserved and left as intact as possible.	Monthly during construction	Construction Contractor(s) / EMU/ECO of SAWMC, Supervisory Engineer, and Contractor(s)
Erosion	Construction site	• Protect all areas susceptible to erosion and take measures, to the approval of the ECO. • Where required, cut-off trenches can be installed to divert	Continual during construction	Construction Contractor(s) / EMU/ECO of SAWMC, Supervisory Engineer, and Contractor(s)

		substantial run-off and prevent erosion. • During construction, areas susceptible to erosion must be protected by installing temporary or permanent drainage works and energy dispersion mechanisms • Storm water drainage measures are required on site to control runoff and prevent erosion. • Schedule work so clearing and grading are done during the time of minimum rainfall. • Clear only areas essential for construction. • Avoid highly erodible soils. • Stockpile topsoil and reapply to re-vegetate the site. • Cover and stabilize topsoil stockpiles. • Use wind erosion controls.		
Soil Contamination	Construction site	• Properly treat solid waste generated during construction and at campsites and safely dispose only in demarcated waste disposal sites. • Use construction debris (sand, soil, rocks, asphalt, concrete) as an additional material for filling deep trenches when needed. • Persons mixing and applying construction chemicals should wear use suitable protective clothing (Personal Protective Equipment-PPE). • Submit a detailed PPE Policy for approval of the SAWMC and EMU prior to commence the work. • Clearly label all products. • Keep chemical/fuel tanks off the ground. •Washouting from concrete trucks and mixers should be disposed of into a designated area that can later be backfilled. • Instruct and train workforce in the storage and handling of materials and chemicals that can potentially cause soil contamination. • If waste oils or other contaminants are accidentally spilled on open ground the waste including the top 2 cm of any	Continual during construction	Construction Contractor(s) / ECO, Supervisory Engineer, and Contractor(s)

		contaminated soil shall be disposed of as chemical waste to a disposal site acceptable to the SAWMC and agreed with the local authority / community.		
Temporary Traffic	Construction site	• The Contractor shall coordinate with local Traffic Management Department to minimize construction traffic impact in the following topics: • Temporary parking restrictions, • Pedestrian and cyclist diversion routes where construction prevents access, • Temporary traffic signals, • One way scheme, • Maintaining local residential access at all times, • General traffic diversion routes where roads are closed.	Continual during construction	Construction Contractor(s) / ECO, Supervisory Engineer, and Contractor(s)
Impact on Flora and Fauna	Construction site	• Any existing vegetation should be preserved to the greatest extent possible. •The Contractor and his employees shall not bring any domesticated animals onto the site. • The Contractor shall ensure that the work site be kept clean, tidy and free of rubbish that would attract animals. • No poaching of fauna and flora shall be tolerated by the Contractor or his personnel on Site or elsewhere.	Continual during construction	Construction Contractor(s) / ECO, Supervisory Engineer, and Contractor(s)
Improper Site Clean-up	Construction site	• Ensure that all temporary structures, materials, waste and facilities used for construction activities are removed upon completion of the project. • Fully rehabilitate (e.g. clear and clean area, rake, pack branches etc.) all disturbed areas and protect them from erosion. • Only indigenous plants which are able to establish easily and will need less maintenance because they have already adapted to the local conditions should be considered.	Once at the Completion of work	Construction Contractor(s) / ECO, Supervisory Engineer, and Contractor(s)

*Estimated Costs for implementation of mitigation measures described in the construction phase EMP are insignificant and are considered to be included in the Project Budget.

2. Operation Phase Mitigation/Management Plan

Environmental Impact during Operational Phase				
Impacts	**Sites**	**Mitigation Measures Recommended**	**Timeframe**	**Responsibility for Implementation and for Monitoring & Enforcement**
Deterioration/ Breaks of Infrastructure	Periurban towns of Nakhcivan City	• Provide training for water and wastewater network and metering repair training • Provide O&M training for water and sewer distribution networks; maintaining pressures & detecting leaks • Provide adequate budgets and undertake planned maintenance programs in accordance with specific O&M plans • Provide vocational training for SAWMC staff	Monthly inspection of operation and maintenance	SAWMC WSS Operation Unit, SAWMC
Water quality violation	Periurban towns of Nakhcivan City	• Perform routine water analysis at end points to verify no contaminations are available. • Sample water from end points to verify chlorine dasage is acceptable per EU directives • Full compliance to EU council directive 98/83 EC • If the water quality do not comply with the Directive, water supply at the contaminated location shall be stopped with isolation valves, until acceptable water quality test results and sufficient disinfection are demonstrated as per the Directive.	Continual during operational phase	SAWMC WSS Operation Unit, SAWMC

*Estimated Costs for implementation of mitigation measures described in the operational phase EMP are insignificant and are considered to be included in SAWMC Operation Unit normal operational expenses.

B. Institutional arrangements

175. Supervision and monitoring are fundamental to the successful implementation of an Environmental Management Plan. Therefore, it is vital that monitoring of the extent to which the mitigation measures of this project, which are adhered to by consultants and contractors, takes place.

176. All of the issues described and discussed in this document will require monitoring, and it will be the responsibility of SAWMC to undertake this monitoring according to the specifications of the monitoring plan. The responsibilities of SAWMC will include:

- To draft and implement a monitoring programme to assess compliance with the EMP.
- To establish an Environmental Management Unit (EMU) during the Construction Phase.
- To undertake the monitoring of operations during the operational phase.

177. Any problems that are identified or encountered must be reported to SAWMC so that appropriate action may be taken to rectify the situation.

PIU of SAWMC

178. SAWMC has already a Project Implementation Unit (PIU). This unit is typically a Fully Integrated PIU, as the project implementing unit, which has taken the full responsibility and implement the project using its own structure and staff. In a case when they need an expert staff from other agencies or ministries, they will have all supports of them by reassigning the expert staff to carry out project activities by releasing them from other ministry functions.

Environmental Management Unit (EMU) of PIU

179. The SAWMC's PIU currently has environmental staffs and there will be no need for more human resources. The staff do not need any technical assistance since they have gained satisfactory skills or expertise during the last 4 years of environmental management and monitoring experience under ADB projects.

Appointment of an Environmental Control Officer

180. The position of Environmental Control Official already exists within the PIU, to ensure that the mitigation measures and other requirements set forth in the EMP are adhered to.

181. It is recommended that the Environmental Control Official (ECO) apply the following functions during the Project:

- The ECO should have the ability to understand the contents of the Environmental Management Plan (EMP) and explain it to the contractor, the site staff, the supervisors and any other relevant personnel.
- The ECO would have to be on site on a regular basis, preferably daily to supervise environmental actions associated with construction activities.
- The ECO should be able to understand, interpret, monitor and implement the EMP. This is his most important function.
- The ECO must then give feedback of the monitorings to SAWMC's PIU/EMU and Contractors. This must be in the form of a written report.
- The ECO must ensure that the contractor understands what is to be done to rectify and address any problems that have arisen from the monitoring.

Suggested Environmental Management Unit for SAWMC

182. An environmental management team has been constituted under the PIU of SAWMC in the Project implementation period.

183. The team will manage and monitor all environmental issues and will provide full control on the terms of EMP. A local ECO, a local environmental specialist and a local clerical staff are suggested team members for EMU.

Estimated Costs for Environmental Management

184. The Estimated Cost for the Environmental management for construction period is tentatively estimated. The following table shows the tentative costs.

Table 12 Tentative environmental management cost table

No	Manpower	Man-Month	Rate-Month	Amount (AZN)
2	Local ECO	6	1,000	6,000
3	Local Envir. Specialist	6	1,000	6,000
4	Clerical Staff	6	600	3,600
			Total	15,600 AZN

Feedback to SAWMC's PIU and EMU

185. Reporting to the SAWMC's PIU and EMU should take place during site meetings. In the case of potential "fatal flaws"/crises developing due to implementation of the project, reporting should be done immediately and the potentially adverse activities immediately halted in order that corrective action can be taken.

186. Reporting on the status of implementation of the EMP and the results of the environmental monitoring programme must be recorded and summarised in monthly and semiannually reports by the EMU and submitted to the SAWMC's PIU.

Failure to comply with EMP

187. Outlined below are a number of steps, relating to increasing severity of environmental problems, which will be implemented. The principle is to keep as many issues within the first few steps as possible.

Step 1: The ECO discusses the problem with the contractor or guilty party, and they work out a solution together. The ECO records the discussion and the solution implemented, and submits to EMU.

Step 2: The ECO and Supervisory Engineer observe a more serious infringement, and notifies the guilty party in writing, with a deadline by which the problem must be rectified. All costs will be borne by the contractor.

Step 3: The ECO shall order the contractor to suspend part, or all, the works. The suspension will be enforced until such time as the offending party(ies), procedure or

equipment is corrected and/or remedial measures put in place if required. No extension of time will be granted for such delays and all cost will be borne by the contractor.

Step 4: Breach of contract - One of the possible consequences of this is the removal of a contractor and/or equipment from the workplace and/or the termination of the contract, whether a construction contract or an employment contract. Such measures will not replace any legal proceedings that SAWMC may institute against the contractor.

C. Environmental Monitoring and Supervision

188. The Employer (SAWMC) with its authorized environmentally sub-sections (EMU/ECO), and the Supervisory Engineer (or Environmental Specialist of CMF) will monitor the implementation of the EMP. Overall potential environmental and safety impacts are readily avoidable and can be easily mitigated by adopting good engineering practices.

189. The Employer will ensure that the contract document include the relevant environmental protection clauses. The Contractor that will perform the works will also follow the requirements of the current Azerbaijan construction and environmental regulations. Compliance with the Azerbaijan regulations and the terms of the EMP will be monitored and verified in the monthly reports submitted to the SAWMC by EMU/ECO and the Supervisory Engineer, based on consultations with the Contractor and site visits. The Supervisory Engineer will also look into any new critical issues that may come up during the construction works and suggest actions for various agencies.

190. All environmental measures will be monitored and enforced, together with health and safety measures (accident prevention, etc.) applied by the contractor for his workforce to cover all aspects of rehabilitation works, including control of pollution and wastes at work sites and camps.

191. Various types of monitoring activity exists. Below are brief description of the types that are included in the monitoring requirements of this study.

192. ***Impact Monitoring:*** The biophysical and socio-economical (including public health) parameters within the project area, must be measured during the project construction and operational phases in order to detect environmental changes, which may have occurred as a result of project implementation.

193. ***Compliance Monitoring:*** This form of monitoring employs a periodic sampling method, or continuous recording of specific environmental quality indicators or pollution levels to ensure project compliance with recommended environmental protection standards.

194. Monitoring should be regular and performed over a long period of duration. Interruptions in monitoring may result in generating insufficient data to draw accurate conclusion concerning project impact.

1. Environmental Monitoring

195. The objectives of carrying out Environmental Monitoring for the Project include the following:

- Providing a database against which any short or long term environmental impacts of the project can be determined.
- Monitoring environmental compliance with the EMP.

- Providing an early indication should any of the environmental control measures or practices fail to achieve the acceptable standards.
- Monitoring the performance of the Project and the effectiveness of mitigation measures.
- Taking remedial action if unexpected problems or unacceptable impacts arise.

196. Monitoring in this Project should be developed in two consequent phases, and those are Construction Phase and Operation Phase.

2. Environmental Monitoring Requirements

197. The predicted monitoring requirements in the construction phase and operation phase are below.

Monitoring Plan for Specific Mitigation

Item	*Media*	*Parameter*	*Frequency*	*Action Level*	*Response When Action Level Exceeded*	*Responsibility*
	Construction Phase					
1	**Ambient Air**	***Dust***	Continual	Visual assessment during the Works Impact Monitoring Compliance Monitoring	If dust levels are above acceptable visual levels, implement dust suppression techniques (wetting down area) and/or assess weather conditions and maybe temporarily cease works until conditions ease	ECO, Supervisory Engineer and Contractor
2	**Noise**	***(15 minute) Noise Levels***	Only as required: Periodic attended monitoring at hourly intervals at nearest potentially sensitive receivers.	+20 dBA for short term (< 4 weeks) +10 dBA for medium term (4 – 26 weeks) Impact Monitoring Compliance Monitoring	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.	ECO, Supervisory Engineer and Contractor

3	**Water Quality**	***Quality/ Contaminant concentratns***	Continual	guideline / licence requirements (whichever is Applicable) Impact Monitoring Compliance Monitoring	If contaminant concentrations/licence conditions are exceeded, review disposal options and decide on most applicable. Report any exceedences of licence (of applicable) to issuing authority.	ECO, Supervisory Engineer and Contractor
4	**Waste Management Implications**	***Segregation, Storage and transport of wastes***	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.	ECO, Supervisory Engineer and Contractor
5	**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 acceptablestandrd	ECO, Supervisory Engineer and Contractor
6	**Ecological Resources**	***Fauna and Flora***	Continual	Minimal ecological impacts Impact Monitoring	Required to ensure the recommended mitigation measures are properly implemented.	ECO, Supervisory Engineer and Contractor
7	**Lanscape 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.	ECO, Supervisory Engineer and Contractor

- The Estimated Costs for Construction Phase Monitoring are included in Environmental Management Estimated Costs given in Section IX-B.

Operational Phase

8	**Drinkable water**	***Drinking water quality***	As per EU council directive 98/83 EC	Full compliance to requirements of Council directive 98/83 EC - Target	Close isolation valves to isolate sections where contamination is observed. Cease water supply until	SAWMC, WSS Operation Unit

				Turbidity 0.04 NTU - Target Chlorin Residuals 0.3-0.6 mg/l Impact Monitoring Compliance Monitoring	the water quality is reassured. Immediate remedial action	
9	***Infrastructure***	**Breaks / Deteriorations**	Monthly inspection	Visual Assessment Public Complaints Compliance Monitoring	If breaks/ failures occur, close isolation valves (or plug monholes) immediately and repair / replace to an acceptable standard.	SAWMC, WSS Operation Unit

- The Estimated Costs for Operational Phase Monitoring are minimal and will be handled by SAWMC.

198. Institutional factors determining the effectiveness of monitoring should not be underestimated. There needs to be a firm institutional commitment by the agencies and/or ministeral departments responsible for the monitoring process (i.e. EMU, SAWMC, MENR), particularly in regard to the following:
- Willingness on the part of the institutions involved and organizational personnel to support the monitoring process with the necessary level of resources and authority,
- Maintaining continuity in the monitoring programme,
- Technical capabilities of the personnel involved must be developed,
- Integrity or honesty of the process must be maintained,
- Decisions must be taken based on a thorough review of results,
- Monitoring information must be made available to all agencies and departments concerned,
- Necessary institutional reforms need to be made within the planning and implementation agencies.

3. Reporting

199. The Environmental Monitoring reporting shall be carried out in paper based plus electronic submission upon agreeing the format with the MENR of NAR. All the monitoring data shall also be submitted in CD-ROM.

200. Types of reports that the Environmental Manager (EM) should prepare and submit include monthly Environmental Monitoring reports and semi annual Environmental Monitoring reports. All Environmental Monitoring reports should be made available to the PIU of SAWMC. In addition, semi annual monitoring reports shall be submitted to ADB, by the PIU of SAWMC.

201. The reports will be based on recurrent site inspections as described in Section 8.2.4 and will report on the effectiveness of the mitigation measures; the Contractor's compliance with the environmental specifications; progress on the implementation of the EMP; measures recommended in the events of non-compliance and recommendations for any other remedial actions, etc.

4. Site Inspection

202. Site inspection provides a direct means to initiate and enforce specified environmental protection and pollution control measures. These should be undertaken routinely to inspect construction activities in order to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented. The site inspection is one of the most effective tools to enforce the environmental protection requirements at the works area.

203. The Environmental Control Official of SAWMC should be responsible for formulating the environmental site inspection, the deficiency and action reporting system, and for carrying out the site inspection works. He/she should submit a proposal for site inspection and deficiency and action reporting procedures to the Contractor for agreement, and to the SAWMC for approval.

204. Regular site inspections should be carried out at least once per week. The areas of inspection should not be limited to the environmental situation, pollution control and mitigation measures within the site, the site inspections should also review the environmental situation outside the works area which is likely to be affected, directly or indirectly, by the site activities. The ECO should make reference to the following information in conducting the inspection:

- The IEE and EMP recommendations on environmental protection and pollution control mitigation measures (including dust control measures and good site practice measures for ecological impact),
- Ongoing results of the Environmental Monitoring programme,
- Work progress and programme,
- Individual work methodology proposals (which shall include proposal on associated pollution control measures),
- Contract specifications on environmental protection,
- Relevant environmental protection and pollution control laws.

205. The Contractor should keep the ECO updated with all relevant information on the construction contract necessary for him/her to carry out the site inspections. Inspection results and associated recommendations for improvements to the environmental protection and pollution control works should be submitted to the SAWMC and the Contractor within 24 hours for reference and for taking immediate action.

206. The Contractor should follow the procedures and time-frame as stipulated in the deficiency and action reporting system formulated by the ECO to report on any remedial measures subsequent to the site inspections.

207. The ECO should also carry out additional site inspections if significant environmental problems are identified. Inspections may also be required subsequent to receipt of environmental complaint, or as part of the investigation work for environmental monitoring.

IX. CONCLUSIONS AND RECOMMENDATIONS

A.Findings

208. The screening process carried out in the IEE has not identified any significant negative environmental impacts. It is concluded from the screening test that:

(i) The Project will not result in any unwarranted loss of natural resources and any adverse impact on national heritage sites.

(ii) The Project will not cause any additional hazards to endangered species.
(iii) The Project will not require any resettlement of the people as there is no likelihood of displacing the people.
(iv) The Project will not cause any increase in the affluent-poor income gap.

209. With implementation of this project, Qaracuk, Qarahanbeyli, Bulgan, Tumbul and Hacıniyyet residents will have access to safe healthy drinkable tap water and will have the confidence of a new, solid, nonleaky wastewater infrastucture system. This will consequently have a positive impact on the economic conditions of the poor.

B.Recommendations

210. The Environmental Monitoring Plan developed to guide the specific environmental assessment of schemes with structural measures and institutional arrangement and monitoring shall be fully implemented during construction and operational phases.

C.Conclusions

211. The planned Nakhchivan Periurban Towns Water Supply Network and Sewage Collection System Project is a project to be put into practice so as to meet the water demand and waste water collection needs of the towns healthfully and thus enhance the quality of life. Public look optimistically to the project owing to the fact that they will have easier and healthier access to drinking water and they won't have any problems regarding wastewater discharge they are currently having.

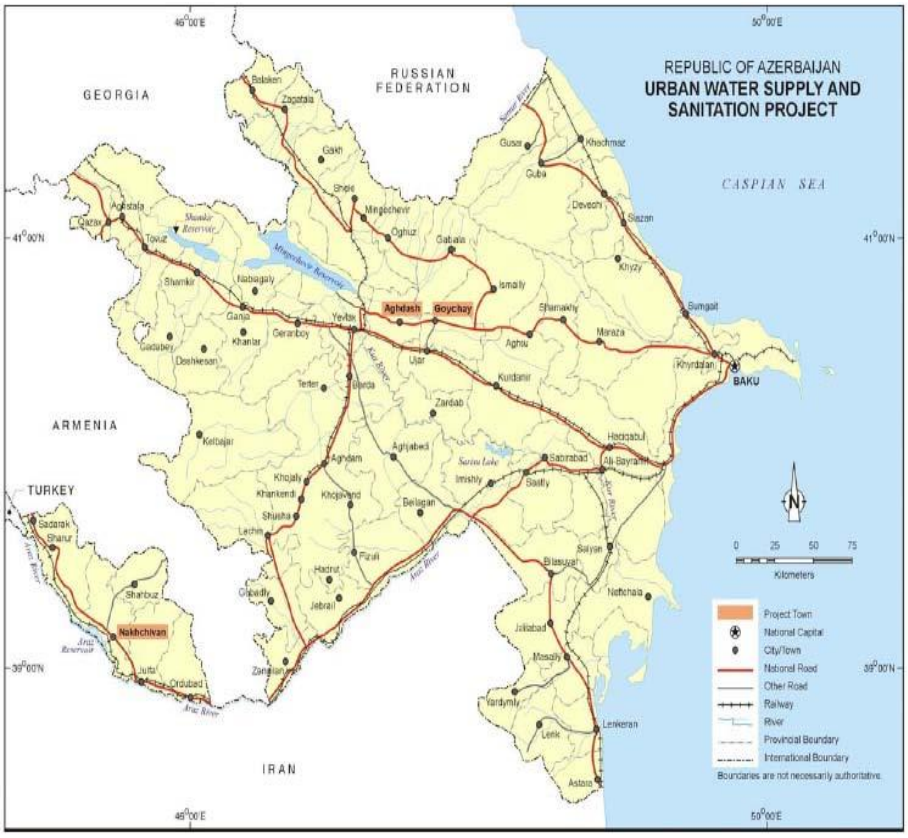
212. Environmental impacts of the construction phase are short term factors and measures will be taken to minimize these impacts. Possible environmental effects during operational phase are also minimal and do not include any adverse environmental effects as long as monitoring and mitigation measures, if needed, are executed.

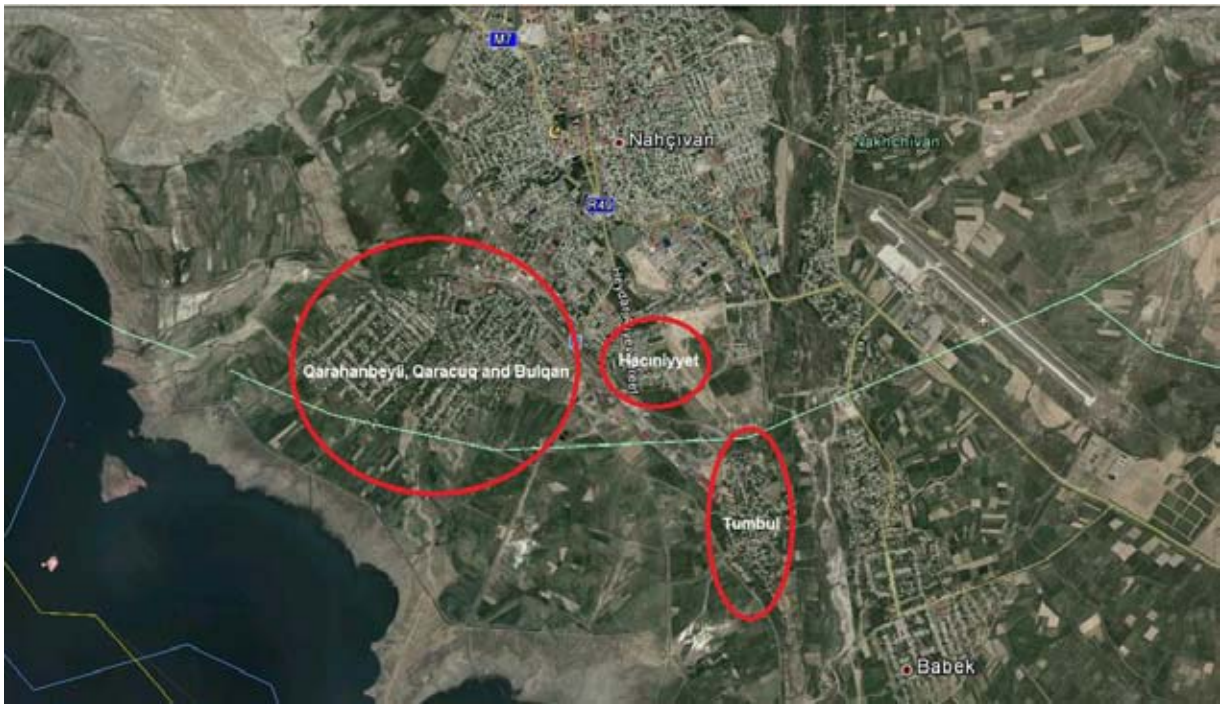
213. Overall, the major social and environmental impacts associated with this WSS project is minimal and can be mitigated to an acceptable level by implementation of EMP and recommended measures and by best engineering and environmental practices.

214. As described within this IEE Report, the project will not have significant negative environmental impacts and the project would help in improving the socioeconomic conditions of this developing state. As per the findings in this IEE Report, no detailed EIA study is required.

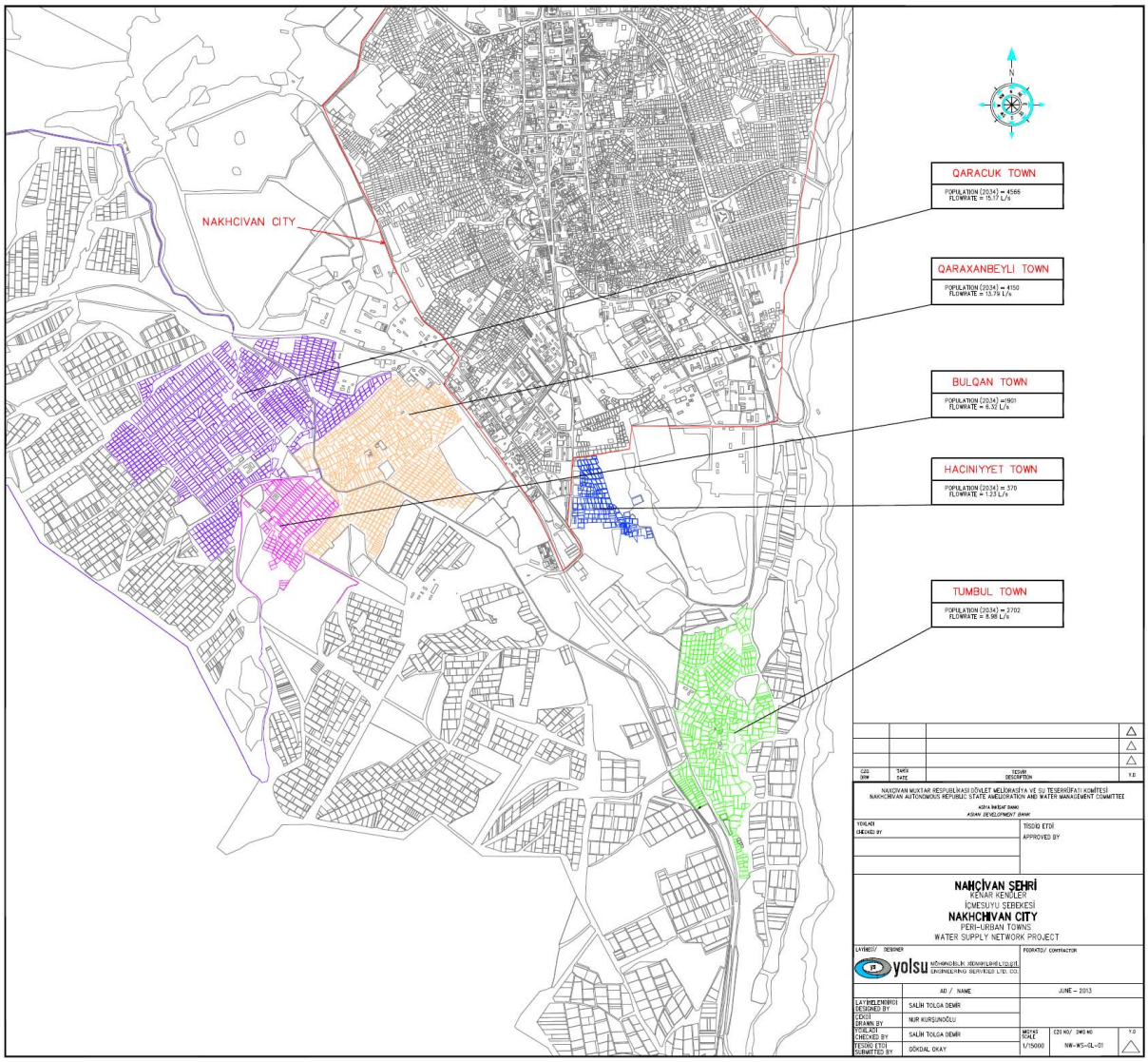
X. APPENDICES

1- Project Location Map and Aerial View of Nakhcivan City





2- Map of Project Towns and Nakhcivan City



3- Pictures

A view of main street in Qarahanbeyli town

Typical path roads between houses

Public Transportation in the towns

Typical drinking water fountain in the towns

A water reservoir of an individual house

A drinking water fountain in Bulgan town (dried out, nonfunctioning)

Another water reservoir of a house

Earth canal (some houses let their used water flow to these canals)

Another canal on the side of the road

Network water stand pipe on the street corner
(Almost all locals use standpipe water for cooking and cleaning purposes)

Groundwater well inside an individual hose

Groundwater well operating

A hand pumped groundwater well in an individual house

Another hand pumped groundwater well in an individual house

A typical septic tank of a house (newly built)

Public Consultations

Public Consultations

4- IEE Approval Letter of Ministry of Ecology and Natural Resources

Naxçıvan şəhərinin inzibati ərazisinə daxil olunmuş Tumbul, Hacıniyyət, Qaraxanbəyli, Qaraçuq və Bulqan kəndlərinin su təchizatı və kanalizasiyasistemlərinin yenidən qurulması və su şəbəkəsinintikintisinin aparılması üçün hazırlanmış ƏtrafMühitə təsirin qiymətləndirlməsi sənədinnekspertizasına dair

RƏY

Azərbaycan Respublikasında "Ətraf-Mühitin Mühafizəsi Haqqında" və Ekoloji Təhlükəsizlik haqqında qanunların və Azərbaycan Respublikasında "Ətraf Mühitə Təsirin Qiymətləndirilməsi Prosesi Haqqında" Əsasnamənin tələblərinə müvafiq qaydada sizin 20 iyun 2013-cü il tarixli 185saylı məktubunuz əsasında Azərbaycan Respublikası ilə Asiya İnkişaf Bankı arasında bağlanmışkredit sazişinə əsasən "Çoxtranşlı su Təchizatı və Kanalizasiya İnvestisiya Proqramı " layihəsi çərçivəsində Naxçıvan şəhərinin inzibati ərazisinə daxil olunmuş Tumbul, Hacıniyyət, Qaraxanbəyli, Qaraçuq və Bulqan kəndlərinin su təchizatı və kanalizasiya sisteminin yenidən qurulması və həmin kəndlərin daxili kanalizasiya və su şəbəkəsinin tikintisi üçün hazırlanmış Ətraf Mühitə Təsirin Qiymətləndirilməsi sənədinə ekoloji ekspertiza qrupu tərəfindən baxılmış və aşağıdakı qənaətə gəlmişdir.

1. Yuxarıda qeyd olunan ekoloji qanunvericiliyin normativ hüquqi aktlarının tələblərinə uyğun olaraq Ətraf Mühitə Təsirin Qiymətləndirilməsi sənədində tikintinin aparılacağı Naxçıvan şəhərinin inzibati ərazisinə daxil olunmuş Tumbul, Hacıniyyət, Qaraxanbəyli, Qaraçuq və Bulqan kəndlərinin daxilindəki ərazilərin ekoloji mühitə təsir mexanizmi nəzərə alınmışdır.
2. Layihədə nəzərdə tutulmuş ərazilərdə aparılan tikinti işləri zamanı ətraf mühitin komponentlərinə (torpaq, su mühitinə və atmosferə) təsir göstərə biləcək amillərin minimuma endirilməsi və yumşaldılması istiqamətində tədbirlər nəzərə alınmışdır. Yuxarıda qeyd olunanları əsas götürərək, Nazirliyin ekoloji ekspertizası Ətraf Mühitə Təsirin Qiymətləndirilməsi sənədlərinə razılıq bildirir.

1. Ətraf Mühit və Təbii Sərvətlərdən İstifadənin Təşkili Şöbəsinin müdiri: Q.Quliyev

2. Ekoloji monitorinq və Ekspertiza sektorunun müdiri: İ.İbrahimova.

3. Təbii sərvətlərdən istifadənin tənzimlənməsi sektorunun məsləhətçisi: L.İsmayılova.

№ 87/04

"21" iyul 2013-cü il

English Translation of IEE Approval Letter by MENR

to the expertized Environmental Impact Assesment Documents for construction of WSS and construction of Water systems network of Tumbul, Hajiniyyet Qarakhanbayli, Qarachuq and Bulqan villages included within the adminisitraive territorial unit of Nakhchivan City

APPROVAL

Pursuant to the regulations of "Environmental Impact Assessment Process" and complying with the "Law on Environmental Protection" and laws on ecological security in the Republic of Azerbaijan, under the "MMF WSS Investment Program" within the loan agreement awarded between The Government of Azerbaijan and The Asian Development Bank according to your letter (No 185) dated 20 June 2013, Environmental Assesment Report prepared for the reconstruction of WSS and construction of internal Water - Sanitation systems network of Tumbul, Hajiniyyet Qarakhanbayli, Qarachuq and Bulqan villages included within the administrative territorial unit of Nakhchivan city
was reviewed by the group of experts and the following decision was made:

1. Corresponding to the orders of normative legal statements of the legislations mentioned above, Ecological Envionmental Impact mechanism was taken into consideration in the Environmental Impact Assesment Documents for the construction areas Tumbul, Hajiniyyet Qarakhanbayli, Qarachuq and Bulqan villages included within the administrative territorial unit of Nakhchivan city.

2. Mitigation measures of possible environment impacts during construction work (impacts on soil, water and air) in the construction areas are taken into consideration. Based on the above mentioned issues, ecological expertize of the Ministry approves the Environmental Assesment documents.

1. Department of Environment and Natural Resources Usage: G.Guliyev - Director

2. Division of Ecological Expertise and Monitoring: I.Ibrahimova – Consultant

3. Division of Natural Resources usage regulation: L.Ismailova- Consultant

№ 87/04

" 21" June 2013