Initial Environmental Examination

July 2017

PAK: Punjab Intermediate Cities Improvement Investment Project
Sialkot City

Updated and revised by M J Edge from the initial draft prepared by the SaafConsult B.V., Netherlands, joint venture with Dev-Consult, Pakistan and NEC Consultants Private Limited, Pakistan, for the Asian Development Bank. This is the draft final version of the document originally posted in April 2017 available on https://www.adb.org/sites/default/files/project-documents/46526/46526-007-iee-01_0.pdf

INITIAL ENVIRONMENTAL EXAMINATION

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PAK: Punjab Intermediate Cities Improvement Investment Project (PICIIP) - Sialkot City

i) Water Supply Improvement
ii) Sewerage and Drainage Improvement
iii) Urban Public Spaces Improvement

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ABBREVIATIONS

µg/m^3	Microgram per Cubic Meter
AAP	Asbestos Abatement Plan
AC	Asbestos Cement
ACM	Asbestos Containing Material
ACP	Asbestos Cement Pipe
ADB	Asian Development Bank
AIR	Asbestos Investigation Report
AMF	Asbestos Management Framework
AMP	Asbestos Management Plan
AP	Affected Person
BOD	Biochemical Oxygen Demand
CAP	Corrective Action Plan
CCMR	Community Complaint Management Register
CDIA	Cities Development Initiative for Asia
CI	Cast Iron
CIU	City Implementation Unit
CO	Carbon monoxide gas
CO	Chief Officer
CO_2	Carbon dioxide gas
COD	Chemical Oxygen Demand
CPEMP	Construction Phase Environmental Mitigation Plan
CSO	Civil Society Organizations
CSP	Construction Safety Plan
DEO	District Environment Officer
DG	Director General
DMA	District Metering Areas
DMC	Developing Member Countries
DNI	Distribution Network Improvement
DO	Dissolved Oxygen
EA	Executing Agency
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
EPD	Environmental Protection Department
ERP	Environmentally Responsible Procurement
FGD	Focus Group Discussion
FS	Feasibility Study
GI	Galvanized Iron
GIS	Geographic Information System
GoP	Government of Pakistan
GoPP	Government of Punjab Province
GRC	Grievance Redress Cell
GRM	Grievance Redress Mechanism
GRS	Grievance Redress System
Ha	Hectare
HSR	Hazardous Substance Rules
IA	Implementing Agency
IEE	Initial Environmental Examination
IFC	International Finance Corporation (World Bank Group)
IG	Imperial Gallon
ILO	International Labor Organization

ISO	International Standards Organization
km	Kilometer
LARP	Land Acquisition and Resettlement Plan
LG&CDD	Local Government and Community Development Department
LGO	Local Government Ordinance
m^3/d	Cubic meter per day
m^3/hr	Cubic meter per hour
M&E	Monitoring and Evaluation
MCU	Motor Control Unit
MGD	Million Gallon per Day
mg/l	Milligram per liter
mm	Millimeter
MO	Municipal Officer
MOU	Memorandum of Understanding
MPN	Most Probable Number
NEQS	National Environmental Quality Standards
NGO	Non-Government Organization
NO_2	Nitrogen dioxide
NOC	No Objection Certificate
NRW	Non-Revenue Water
NSDWQ	National Standards for Drinking Water Quality
^oC	Celsius Centigrade
O_3	Ozone
OHR	Over Head Reservoir
OHS	Occupational Health and Safety
PC	Public Consultation
PEPA	Pakistan Environmental Protection Act
PEQS	Punjab Environmental Quality Standard
PFS	Pre-Feasibility Study
PICIIP	Punjab Intermediate Cities Improvement Investment Program
PM	Particulate Matter
PMU	Project Management Unit
PPE	Personal Protective Equipment
PVC	Poly Vinyl Chloride
REA	Rapid Environmental Assessment
RH	Relative Humidity
RTA	Regional Transport Authority
RTI	Respiratory Tract Infection
SCADA	Supervisory Control and Data Acquisition
SCB	Sialkot Cantonment Board
SCCI	Sialkot Chamber of Commerce and Industry
SMC	Sialkot Municipal Corporation
SO_2	Sulphur dioxide
SPS	Safeguard Policy Statement
SUSC	Sialkot Urban Services Company
TDS	Total Dissolved Solids
TMA	Tehsil Municipal Authority
TOC	Total Organic Compound
TSPM	Total Suspended Particulate Matter
TSS	Total Suspended Solids
UC	Union Council
VESC	Valued Environmental and Social Component
WDM	Water Distribution Main
WHO	World Health Organization

Local Terminology

Chak:	Village
Koel:	Cuckoo
Nullah:	Natural water body, drain

Units

1 Marla	= 225 square feet	= 0.005165 acres
1 Square foot		= 0.0929 square meters
1 Acre	= 43,560 square feet	= 0.404685642 hectares
1 Square meter	= 10.76391 square feet	= 0.0002471 acres
1 Hectare	= 2.4710538 acres	= 10,000 square meters
1 Inch	= 25.4 mm	= 2.54 cm
1 Mile	= 5,280 feet	= 1.609344 kilometers
1 Kilometer	= 0.62137 miles	= 3,280.84 feet
1 Gallon (Imperial)	= 4.54609 liters	= 0.0045461 cubic meters
1 Cubic meter	= 1,000 liters	= 219.96925 gallon (imperial)
1 Cubic meter/second	= 3,600 cubic meters/hour	= 35.31467 cusec
1 Cusec		= 101.941 cubic meters/hour

CURRENCY EQUIVALENTS

(as of 15 March 2017)

Currency unit	–	Pakistan rupee/s (PRe/PRs)
PRs1.00	=	$0.0095
$1.00	=	PRs104.845

EXECUTIVE SUMMARY

A. Introduction

1. The Asian Development Bank (ADB) and the Cities Development Initiative for Asia (CDIA) are partnering with the Government of Punjab Province (GoPP), to undertake the Punjab Intermediate Cities Improvement Program (PICIIP). The PICIIP aims to improve the quality of urban services available in selected cities in Punjab Province (city populations between 250,000 and 1,000,000). The duration of the program will be six years. The PICIIP's overall budget is US$500 million, to be disbursed in two phases. The first phase will fund investments in the intermediate cities of Sialkot and Sahiwal.

2. Urban infrastructure development is an important component of the PICIIP. Major projects planned for Sialkot City in Phase 1 of PICIIP are:

Sector	Sub-Projects
Water Supply	Rehabilitation of 10 No. overhead reservoirs
	Efficiency improvement of 95 No. tube wells, including replacement of 12 No. turbine pumps and motors
	Replacement of approximately 312 km water supply pipelines
	Provision of disinfection units at tube wells and overhead reservoirs
	Provision of bulk metering, pressure gauges and Supervisory Control and Data Acquisition (SCADA) system at selected water production facilities
	Development of Distribution Network Improvement (DNI) zones and Non-Revenue Water (NRW) program in selected zones
	Rehabilitation of Fateh Garh Scheme water distribution system
Sewerage and Drainage	Replacement of 30 km sewers, including unblocking of local drains
	Provision of accessories for sewerage improvement and health and safety equipment for municipal staff
	Rehabilitation of 8 No. disposal/pumping stations
Urban Public Spaces	Kashmir Road improvement/upgrades (3 km length)
	General bus stand, improvement/upgradation
	Rehabilitation of 5 No. parks, including Gulsha-e-Iqbal and Qila
	Upgrading and beautification of 2.5 km of riverbank and upgrading of 1 No. greenbelt.

3. This IEE study examines the environmental implications of the above subprojects.

B. Policy, Legal and Administrative Framework

4. All subprojects undertaken as part of PICIIP were screened, classified and assessed based on ADB's Safeguard Policy Statement (SPS) 2009, and GoPP environmental legislation. The proposed subprojects fall within the jurisdiction of the Environment Protection Department (EPD) of the Environmental Protection Agency (EPA), Punjab.

5. As per EPD EIA/IEE regulations, none of the water supply, sewerage and drainage, and urban public services (transport and green space) improvement subprojects fall under

Schedule I or Schedule II of the Provincial Regulations. Accordingly, as per local regulations, none of the subprojects under PICIIP in Sialkot require an EIA or an IEE.

6. Based upon the Rapid Environmental Assessments (REAs) conducted at the commencement of the environmental assessment (refer to Annexure 1), one or more of the subprojects to be implemented in Sialkot during Phase 1 of PICIIP have been classified as Category B. Accordingly, ADB require that an IEE is prepared covering all of the subprojects proposed in Sialkot under PICIIP (Phase 1).

C. Environmental and Social Baseline Conditions

7. Sialkot is located in Province Punjab, approximately 125 km from Lahore in the northeast of Pakistan, in close proximity to the Indian border. It lies at an elevation of approximately 250 m above sea level).

8. It is bounded to the north by Indian held Jammu and Kashmir, to the northwest by District Gujrat, to the southwest by the District Gujranwala, to the northeast by District Sheikhupura and Narowal District, the latter separated from Sialkot in 1981.

9. Its total area is 3,107 square kilometers. In the southeast Nullah Daik separates District Narrowal from District Sialkot and flows to Lahore. To the west of Sialkot, there is a vast fertile plain. The soil in the floodplain of the Nullah Daik and River Chenab is also very fertile. Hence Sialkot District is primarily agricultural in nature and intensively cultivated.

10. Sialkot District's climate is hot and humid during the summer (April until October) and cold during the winter (November to March). The maximum and minimum temperature during the month of June, the hottest month, are around 40°C and 25°C respectively. The maximum and minimum temperature during the month of January, the coolest month, are around 19 °C and 5 °C respectively. The average monthly temperature varies 11.6°C in January to 32.2°C in June.

11. The mean annual rainfall is 957 mm, over half of which falls in the summer monsoon months of July and August, which often results in flooding.

12. Sialkot is situated in the catchment of the Upper Rachna Doab, which is bounded by the Ravi and Chenab rivers. It sits over abundant shallow and deep groundwater aquifers which are used by both the city water supply system and inhabitants with wells for their water supplies. The Chenab River flows to the northwest of Sialkot, and the Marala Ravi Link Canals flow to the west. Sialkot is traversed by three seasonal streams, comprising Aik Nala, to the south of the city, Bhaid Nala, between the Cantonment and the rest of the city, and Pahlu Nala, north of the Cantonment.

13. The general slope of the land within the Doab is to the south-west and the area is an active flood plain, although floods are to a large extent controlled by irrigation and power generation works carried out on the Indian side of the border. The area is underlain by Pleistocene deposits to a depth of several thousand meters. The first 200 m of these deposits consist of approximately 70% silty sand interspersed with limited clay layers. The strata are generally heterogeneous with little vertical or lateral continuity.

14. Major source of domestic (potable) water is groundwater which is abstracted through deep well turbines. Sewage is conveyed through sewer lines and disposed of through disposal stations into the nullahs (surface water courses) without any form of treatment.

15. Agriculture is by far the main economic activity in the project area. Major crops of Sialkot District are wheat, rice and sugarcane. About 2.17 % of the total area of the District is

under plantation of economically important trees, such as Shisham and Keeker. Mulberry are used in the construction and manufacture of sports goods and furniture. The indigenous trees are Lasoora, Bairy, Siris, Keeker, Phali, Khajoor, Toot and Paper Mulberry, commonly found along the edges of agricultural fields. A number of introduced and invasive species are also common, including Mesquite, Safeda, Sheesham, Bohar and Bakain. These are common around urban areas.

16. Livestock rearing is also practiced extensively, and milk animals are common.

17. There are very few areas of pristine undisturbed environment.

18. Several species of wildlife have adapted to the changed habitat. These include: jackal, jungle cat, Bengal fox, small Indian mongoose, shrew, hog deer, ravine deer, black buck, blue bull, hares and rodent pests including porcupine, fruit bats and wild boar.

    Bajwat Game Reserve occupies approximately 54 km^2 of the Bajwat region in the Sialkot District. About 16 km2 of the area around Marala Headworks is also protected within the game reserve and is of considerable importance for wintering waterfowl. There are no protected areas or endangered species of either plants or animals at the project sites.

19. Sialkot City is an industrial city and famous for its leather, sports and surgical products. There are at least 264 tanneries, 244 leather garment producing units, 900 leather sports goods producing units, 57 rice husking mills and 14 flour mills in the city. The facilities of a dry port and recently built airport have contributed significantly towards its economic growth and Sialkot is now the third largest economic hub in Punjab after Lahore and Faisalabad.

20. The city has a number of intensively developed commercial areas, including the area immediately north of the Fort. In addition to the older, more traditional areas high-end commercial, financial and related activities have been developed, making the city, once single-centered on the commercial areas around the fort, now multi-cantered.

21. Settlement in Sialkot started with the 5,000-year-old fort on the central hill and has proceeded to expand in a more or less organic, low-rise manner since. The only formally planned part of Sialkot is the Cantonment Area. The traditional rural settlement pattern of tightly developed compact villages, chaks, have had a significant influence on Sialkot's urban form and settlement patterns as they have become absorbed into the main urban area. Sialkot has a number of higher secondary educational institutes and health facilities.

D. Potential Environmental Impacts and Mitigation

22. The potential environmental impacts of the proposed subprojects are summarized below. The majority, if not all, of the proposed interventions relate to refurbishment and rehabilitation of existing water supply systems, existing sewerage systems and the rehabilitation and upgrading of urban public spaces.

23. The permanent footprint of the work is very limited and within existing developed land takes and utility corridors. There are no proposed works on any greenfield site.

Sector	Sub-Projects	Potential Environmental Issue
Water Supply	Rehabilitation of 10 No. overhead reservoirs	Construction noise and dust Traffic – construction materials Waste management Fuel spills and diesel storage

Sector	Sub-Projects	Potential Environmental Issue
	Efficiency improvement of 95 No. tube wells, including replacement of 12 No. turbine pumps and motors	Construction noise and dust Traffic – construction materials Waste management
	Replacement of approximately 312 km water supply pipelines and Rehabilitation of Fateh Garh Scheme water distribution system	Disruption of access to business and homes Public and worker safety issues Construction noise and dust Traffic – construction materials Release of mal-odors and gasses Disruption in water supply Waste management Asbestos waste (asbestos cement pipes) Disruption in other utilities Disposal of silt and spoil Fuel spills and diesel storage
	Provision of disinfection units at tube wells and overhead reservoirs	Construction noise and dust Traffic – construction materials Waste management Fuel spills and diesel storage
	Provision of bulk metering, pressure gauges and Supervisory Control and Data Acquisition (SCADA) system at selected water production facilities	Construction noise and dust
	Development of Distribution Network Improvement (DNI) zones and Non-Revenue Water (NRW) program in selected zones	Disruption of access to homes
Sewerage and Drainage	Replacement of 30 km sewers, including unblocking of local drains	Disruption of access to business and homes Public and worker safety issues Construction noise and dust Traffic – construction materials Release of mal-odors and gasses Waste management Asbestos waste (asbestos cement pipes) Disruption in other utilities Disposal of silt and spoil Fuel spills and diesel storage
	Provision of accessories for sewerage improvement and health and safety equipment for municipal staff	No anticipated impact
	Rehabilitation of 8 No. disposal/pumping stations	Construction noise and dust Traffic – construction materials Release of mal-odors and gasses Disposal of silt and spoil Fuel spills and diesel storage
Urban Public Spaces	Kashmir Road improvement/upgrades (3 km length)	Disruption of access to business Temporary relocation of vendors and hawkers Public and worker safety issues Traffic disruption Construction noise and dust Waste management

Sector	Sub-Projects	Potential Environmental Issue
		Disruption in other utilities Disposal of silt and spoil Fuel spills and diesel storage
	Main Bus Terminal, improvement/upgradation	Disruption of access to business Temporary relocation of vendors and hawkers Public and worker safety issues Traffic disruption Construction noise and dust Waste management Disruption in other utilities Disposal of silt and spoil Fuel spills and diesel storage
	Rehabilitation of 5 No. parks, including Gulsha-e-Iqbal and Qila	Public and worker safety issues Traffic disruption Construction noise and dust Waste management Disposal of silt and spoil Fuel spills and diesel storage
	Upgrading and beautification of 2.5 km of riverbank and upgrading of 1 No. greenbelt.	Public and worker safety issues Traffic disruption Construction noise and dust Waste management Disposal of silt and spoil Fuel spills and diesel storage

24. The potential environmental impacts during the construction phase include air pollution due to dust generation from excavation, transportation, mixing of construction materials, disposal of construction waste, vehicular emissions, soil, water and air pollution due to disposal of construction and domestic waste, noise impacts due to movement of vehicles, construction machines and construction activities, traffic congestion due to increased volume of traffic at roads and due to road blockage for construction, soil and water pollution due to generation of sanitary wastewater from workers' camps, and health and safety concerns for the workers.

25. The potential environmental impacts during the operational phase impacts include health impacts from mishandling and storage of liquid chlorine at water supply facilities and contamination of water reservoirs from algal growth.

26. The nature of the anticipated environmental impacts will be localized and temporary and reversible in nature, that is the impact is limited to the time of construction activity. No longer term or irreversible impacts are foreseen.

27. The potential environmental impacts during the construction phase can be readily managed through the implementation of appropriate mitigation measures set out in a Construction Phase Environmental Management plan (CPEMP) and by way of overall supervision by the Sialkot Municipal Corporation (SMC).

28. The staff of the SMC will require training on the implementation of the EMP during the construction and operational phases of the project. The SMC will require the assistance of the Project Management Unit (PMU) and City Implementation Unit (CIU) Safeguard specialists for environmental training, implementing the EMP, compliance against EMP and generation of compliance reports.

29. A comprehensive EMP has been prepared in this IEE for the subprojects. It includes actions proposed for mitigation of negative impacts and effective monitoring of the implementation of proposed mitigation measures during construction and operational phases. The construction specific CPEMP will be prepared in the light of EMP and will be made part of the contract document for contractors. The contractors will be responsible for implementation of mitigation and monitoring measures. The SMC will also carry out external monitoring.

30. The following cumulative and induced impacts may occur as a result of project implementation:

- Continued depletion of the groundwater table resulting from increased groundwater abstraction, as a consequence of improving the service provision (objective of 24/7 service supply). The significance of further depletion by enhanced abstraction is assessed to be low in the short-term, providing opportunities are explored for securing alternative potable water supplies in the long-term;
- Increased water supply is likely to lead to an increase in sewage flow and sullage (wastewater from cooking and washing). This will need to be accommodated by the construction of sewage treatment facilities, understood to be planned for implementation in Phase 2 of PICIIP;
- Improvements to the bus terminal will increase the opportunities for commercial activities therein. In the context of Sialkot, however, the increase in commercial activities is deemed to be insignificant; and
- Enhanced traffic flows as a consequence of road improvements may result in increases in vehicle emissions to air, potentially resulting in a deterioration to urban air quality along main transport routes. This impact is, however, assessed to be insignificant given that it is offset by reductions in vehicle emissions consequent upon a reduction in traffic congestion.

31. As noted above the majority of construction projects will give rise to a number of impacts on environmental resources. Subprojects under Phase 1 of PICIIP are no exception; however, all of the impacts are assessed to be temporary (short-term) and reversible, resulting in no discernible impact in the longer-term if the subprojects are implemented in accordance with an agreed and approved EMP.

32. By comparison, there are a number of positive impacts arising from project proposals that are deemed to have a significant long-term benefit to the local community with access to the improved urban services. These positive impacts include:

- Enhanced and continuous supply of potable water;
- Improved quality of potable water, including increased provision of disinfection;
- Reduction in the occurrence of water borne diseases through a reduction in the potential for contamination of water supply lines, increased disinfection and removal of potential breeding areas for insects (areas of stagnant water) by redevelopment of public open spaces;

- Conveyance of wastewater to areas beyond the city limits (urbanized area) through rehabilitation of the sewer lines and reduction in seepage to ground within urbanized areas;
- Reduction in traffic congestion, traffic conflicts and vehicle emissions to air;
- Improved public amenity in the main bus terminal; and
- Provision of recreational facilities in the City and overall enhancement of the aesthetics of public open spaces

E. Public Consultations

33. Public consultations have been carried out at three stages:

- during the initial formulation of project proposals in the Pre-Feasibility Study;
- during the development of project proposals in the Feasibility Study, as part of the preparation of the IEE. Concerns expressed by stakeholders at this stage have been incorporated into final project design; and
- at the completion of the draft IEE, to inform stakeholders of the project components, the anticipated environmental impacts, proposed measures to mitigate these impacts and the scope and content of the preliminary EMP.

34. The Public Consultations have revealed that the overwhelming majority of stakeholders are in favor of, and supportive of, the proposed projects, due to many challenges experienced in the city with respect to water supply, sanitation and transportation services. Possible socioeconomic impacts are both positive and negative. Positive impacts include the creation of job opportunities for local people and provision of safe, continuous supply of services.

F. Conclusion and Recommendations

35. The water supply, sewerage, transport route improvements, and green spaces development projects proposed under PICIIP are feasible and sustainable from engineering, environmental, and socio-economic points of view.

36. The positive environmental and social benefits of the projects far outweigh any temporary, short-term potential negative impacts that might occur, primarily during construction stage activities.

37. Implementation of the EMP is required and the environmental impacts associated with the subprojects need to be properly mitigated. Existing institutional arrangements are available for the implementation of the EMP. Additional human and financial resources will be required by the SMC to comply with environmental safeguard requirements. The proposed mitigation and management plans are practicable but require additional resources.

I. INTRODUCTION

A. Punjab Intermediate Cities Improvement Investment Program

38. In its Mid-Term Development Framework 2013-2016, the Government of Punjab Province (GoPP) included an urban sector development strategy, comprising 106 urban projects involving a variety of physical and nonphysical investments.

39. As part of the Mid-Term Development Framework implementation, GoPP requested the Asian Development Bank (ADB) and Cities Development Initiative for Asia (CDIA) to undertake a comprehensive urban sector assessment[1], the precursor to the Punjab Intermediate Cities Improvement Investment Program (PICIIP).

40. One key challenge identified in the urban sector assessment was the deficiency in adequate urban infrastructure which, despite various efforts by the government, has not been able to keep pace with the rapid population growth. Access to clean water, basic sanitation facilities, and good hygiene practices are essential for sustainable urban development. Without these basic services, the lives of millions of people, children in particular, are at risk.

41. The urban sector assessment identified improvements of water supply and sanitation services, as well as street management, as top priorities for making Punjab cities more livable and sustainable.

42. The PICIIP aims to improve the quality of urban services available in five selected cities in Punjab Province, the most populous province in Pakistan, with city populations ranging between 250,000 and 1,000,000. Five intermediate cities (Sahiwal, Sialkot, Sargodha, Rahim Yar Khan and Bahawalpur) have been proposed for inclusion in PICIIP because of their proximity to the China-Pakistan Economic Corridor, which provides economic opportunities for increased trade and regional cooperation, and because they encompass a mix of socio-economic growth models, ranging from well-established industrial cities to cities that grew embryonically from rural marketing centers to major service centers.

43. The duration of the program will be six years. The PICIIP's overall budget is US$500 million, to be disbursed in phases.

44. Phase 1 of PICIIP will fund investments in the intermediate cities of Sialkot and Sahiwal.

B. Sub-Projects Identified for Implementation in Sialkot City

45. Urban infrastructure development is an important component of the PICIIP. Sectors identified during urban sector assessment (prefeasibility study) conducted in April 2016, for investment during Phase 1 of PICIIP, are water supply improvement, sewerage and drainage improvement, and improvements to urban public spaces, including transport routes and green spaces.

46. Work undertaken during the Feasibility Study has focused on the following main projects:

[1] *Medium Term Integrated Climate Resilient Urban Infrastructure Investment Program and Pre-Feasibility Study.* ADB, Manila. 2016

Water Supply Improvement Project: Rehabilitation of water supply tube wells, overhead reservoirs and water distribution pipelines will be carried out at different parts of the city. These projects will improve the water quality and water supply situation in the city. In some locations, new water supply infrastructure will also be installed. Implementation of a new Supervisory Control and Data Acquisition (SCADA) system and bulk metering of water supply will also be the part of water supply improvement project.

Sewerage and Drainage Improvement Project: Rehabilitation of sewerage and drainage network and disposal stations will be carried out throughout different parts of the city. The existing sewers will be replaced in some locations.

Urban Public Spaces Improvement Project: Improvements and upgrades to 3 km length of Kashmir Road and one general bus stand will be carried out under this part of the project. In addition, rehabilitation and upgrading of five existing parks and provision of green belts in different parts of the city will be the green spaces development projects.

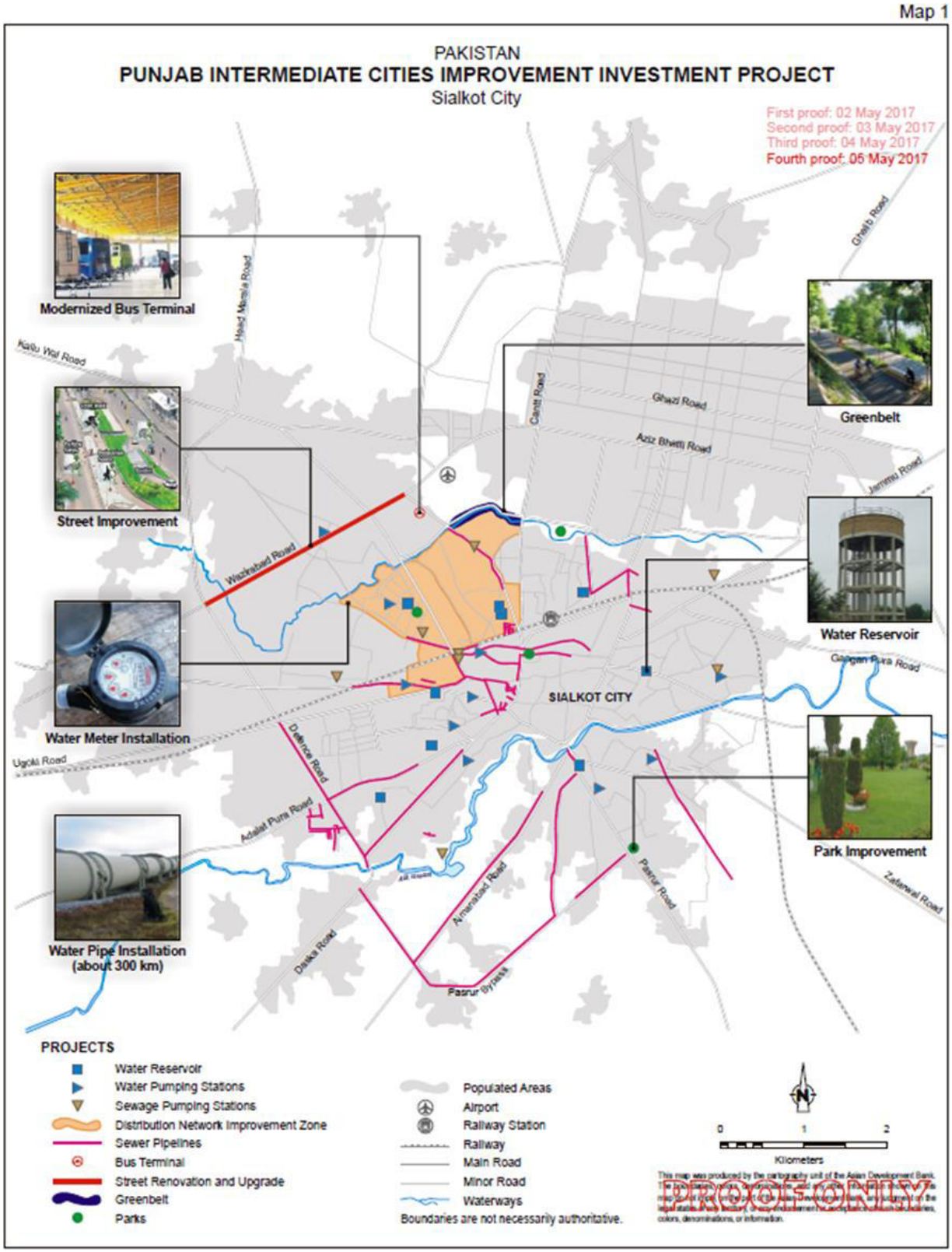
47. The sub-projects to be implemented in Phase 1 of PICIIP for Sialkot City are summarized on Table 1.1, whilst an overview of the subproject components is illustrated on Figure 1.1. Further details of each of the sub-projects are provided in Section 3.

48. This Initial Environmental Examination (IEE) examines the environmental implications of the subprojects proposed for Sialkot itemized on Table 1.1. A separate IEE examines the environmental implications of the subprojects proposed for Sahiwal City.

Table 1.1: Phase 1 Subprojects for Sialkot City under PICIIP

Sector	Sub-Projects
Water Supply	Rehabilitation of 10 No. overhead reservoirs
	Efficiency improvement of 95 No. tube wells, including replacement of 12 No. turbine pumps and motors
	Replacement of approximately 312 km water supply pipelines
	Provision of disinfection units at tube wells and overhead reservoirs
	Provision of bulk metering, pressure gauges and Supervisory Control and Data Acquisition (SCADA) system at selected water production facilities
	Development of Distribution Network Improvement (DNI) zones and Non-Revenue Water (NRW) program in selected zones
	Rehabilitation of Fateh Garh Scheme water distribution system
Sewerage and Drainage	Replacement of 30 km sewers, including unblocking of local drains
	Provision of accessories for sewerage improvement and health and safety equipment for municipal staff
	Rehabilitation of 8 No. disposal/pumping stations
Urban Public Spaces	Kashmir Road improvement/upgrades (3 km length)
	General bus stand, improvement/upgradation
	Rehabilitation of 5 No. parks, including Gulsha-e-Iqbal and Qila
	Upgrading and beautification of 2.5 km of riverbank and upgrading of 1 No. greenbelt.

Figure 1.1: Overview of Subproject Components, Sialkot



C. Scope of the IEE

49. The ADB requires the consideration of environmental issues in all aspects of the Bank's operations. The requirements for environmental assessment are described in the ADB's Safeguard Policy Statement (SPS), 2009. Further details are provided in Section 2 of this IEE report.

50. The objectives of this IEE were to:

    i) Assess the existing environmental conditions in the areas where the subprojects are located, including the identification of any environmentally sensitive areas;

    ii) Describe and assess the proposed activities, identify and evaluate the potential impacts and assess their significance; and

    iii) Propose appropriate mitigation measures that can be incorporated into the development activities to minimize any adverse impacts, whilst ensuring that any residual impacts, if any, are acceptable and monitored adequately.

51. This IEE was carried out based on the Prefeasibility Study (PFS) undertaken in 2016 and conceptual engineering designs prepared during the current Feasibility Study (FS) stage of PICIIP. It is anticipated that the IEE may be updated, as required, during the project's implementation stage in order to reflect any modifications arising from finalization of sub-project designs.

52. An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklists for urban development, sewerage and water supply was conducted during the initial stages of this IEE. The REAs are reproduced in Annexure 1 and indicate that the proposed sub-projects are considered unlikely to cause any significant long-term, irreversible, adverse impacts (refer to Annexure 1).

53. The environmental assessment requirements of the Punjab Environmental Protection Act, 1997 (Amended 2012) vary from the requirements of the ADB. The Government of Punjab's environmental regulations categorize development projects into two schedules, according to their anticipated potential environmental impact. Projects with the potential for more adverse environmental impacts (as per Schedule II of the Act) are required to be assessed through an Environmental Impact Assessment (EIA), whilst those projects falling within Schedule I of the Act require only an IEE.

54. The sub-projects proposed for Sialkot City under Phase 1 of PICIIP do not fall within either Schedule I or Schedule II of the Punjab Environmental Protection Act, 1997 (Amended 2012) and, therefore, require neither an IEE or an EIA under current Pakistan legislation.

55. Notwithstanding local requirements, based upon the REAs, the proposed sub-projects have been classified as Category B (environment) as per ADB's SPS (2009). An IEE has, therefore, been prepared in accordance with ADB SPS's requirements for environment category B projects. The IEE provides mitigation and monitoring measures in order to ensure no significant adverse impacts as a result of the implementation of the subprojects.

56. Field studies were undertaken by a team experienced in conducting environmental assessments of development projects in Pakistan. This team conducted the preliminary scoping, survey and assessment activities, public consultations and coordinated the field sampling and analysis.

57. The study process began with scoping and field reconnaissance during which the REAs were prepared as a basis for establishing the potential impacts and categorization of

project activities. The potential environmental impacts and concerns requiring further study in the IEE were then identified and the methodology elaborated in order to address all interests. Subsequently, both primary and secondary baseline environmental data were collected from the locations of the proposed works and the intensity and likely location of potential impacts assessed in relation to environmentally sensitive receivers based on the work expected to be carried out. The significance of impacts from the construction and operation of the projects was then assessed and, for those impacts requiring mitigation, measures were proposed to reduce impacts to within acceptable limits.

58. Public Consultations (PCs) have been carried out during both the PFS and FS stages in line with ADB guidelines. Under ADB requirements the environmental assessment process must also include meaningful public consultation during the completion of the draft IEE. To this end, a PC workshop has been held with interested stakeholders following completion of the initial draft IEE. The PC process included verbal disclosure of the subproject as a vehicle for discussion. Interviews were conducted with local families and communities. The results of these PCs have been included in this report.

D. Implementation Arrangements

59. The Local Government and Community Development Department (LG&CDD) of Punjab will be the executing agency (EA) of the project. A Project Management Unit (PMU) has been established to support LG&CDD. Under the guidance of the Project Steering Committee, LG&CDD will be responsible for the overall execution of the project.

60. The Sialkot Municipal Corporation (SMC), under the City Government of Sialkot, will be the implementing agency of the proposed projects. A City Implementation Unit (CIU) has been established to support SMC in day to day project implementation.

61. Consultants will be engaged to assist with project implementation, audit monitoring, and institutional strengthening.

62. A new urban services company in Sialkot will operate and maintain the urban services.

63. The executive branch of SMC is divided into five departments and a Municipal Officer (MO) heads each of the departments (Finance, Planning and Coordination, Regulation, Infrastructure and Services) to carry out its functions.

64. The MO Infrastructure and MO Services are responsible for water, sewerage, drainage, sanitation, roads, streets and street lighting, firefighting and park services.

E. Structure of Report

65. This IEE reviews information on existing environmental attributes of the study area. Geological, hydrological and ecological features, air quality, noise, water quality, soils, social and economic aspects and cultural resources are included.

66. The report assesses the probable impacts on the environment due to the proposed subproject.

67. This IEE also proposes various environmental management measures.

68. Details of all background environmental quality, environmental impact/pollutant generating activities, pollution sources, assessed environmental quality and related aspects have been provided in this report. References are presented at the end of the report.

69. Following this Introduction, the report generally follows ADB guidelines and includes:

- Policy, Legal and Administrative Framework;
- Description of the Subprojects;
- Description of the Environment;
- Assessment of Potential Environmental Impacts and Mitigation Measures;
- Assessment of Alternatives to the proposed sub-projects;
- Institutional Arrangements and Environmental Management and Monitoring Plans;
- Information Disclosure, Public Consultation and Participation;
- Findings and Recommendations; and
- Conclusions.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

70. Several statutes contain direct legislation on environmental protection in Pakistan, namely the Pakistan Environmental Protection Act (1997), the Punjab Environmental Protection (Amendment) Act (2012), the Forest Act (1927), and the Punjab Wildlife Act (1974). In addition, the Land Acquisition Act (1894) also provides powers in respect of land acquisition for public purposes. There are also several other items of legislation and regulations that have an indirect bearing on the sub-projects or general environmental measures.

A. Statutory Framework

71. The Constitution of Pakistan distributes legislative powers between the federal and provincial governments through two 'lists' that are attached to the Constitution as Schedules. The Federal List covers the jurisdictions over which the federal government has exclusive legislative power, while the Concurrent List contains jurisdictions over which both the federal and provincial governments can enact laws.

72. "Environmental pollution and ecology" is included in the Concurrent List; hence, both the federal and the provincial governments can enact laws in this jurisdiction. However, to date, after the 18th Constitutional Amendment, the Federal Ministry of Environment was dissolved and the provincial governments are now authorized to formulate environmental laws and regulations. The key environmental laws affecting the subprojects are discussed below.

i. Pakistan Environmental Protection Act, 1997

73. The Pakistan Environmental Protection Act, 1997 (PEPA) is the basic legislative tool empowering the government to frame regulations for the protection of the environment. The act is applicable to a wide range of issues and extends to air, water, soil, marine, and noise pollution, and to the handling of hazardous wastes. The key features of the law, in as far as it has a direct bearing on the proposed subprojects, relate to the provisions setting out any requirement for an IEE and an EIA for development subprojects. Section 12 (1) requires that: "No proponent of a sub-project shall commence construction or operation unless he has filed with the Federal Agency an Initial Environmental Examination (IEE) or, where the subproject is likely to cause an adverse environmental effect, an Environmental Impact Assessment (EIA), and has obtained from the Federal Agency approval in respect thereof." The Pakistan Environmental Protection Agency (EPA) has delegated the power of review and approval of environmental assessments to the provincial environmental protection agencies, in this case the Punjab EPA.

ii. Punjab Environmental Protection (Amendment) Act, 2012

74. After the 18th Constitutional Amendment in the Constitution of Pakistan, the Federal Ministry of Environment was dissolved and the provinces were accorded jurisdiction over the environment. The Punjab EPA has formulated its own Act, the major content of which is the same as the PEPA, 1997. Minor amendments/changes have been made, as follows:

a. The name of the Act has been changed to "Punjab Environmental Protection (Amendment) Act, 2012".

b. For the words "Federal Government", wherever they occur, the word "Government" shall be substituted; For the words "Federal Agency", wherever they occur, the words "Provincial Agency" shall be substituted;

c. For the word “National”, wherever it occurs, the word “Punjab” shall be substituted; and

d. All the other clauses, sub-clauses, sections and sub-sections are almost identical.

75. Since these subprojects fall within Punjab province, any approval required would need to be obtained from Punjab province.

iii. Punjab Environmental Protection Agency Review of IEE and EIA Regulations

76. The Punjab Environmental Protection Act provides for two types of environmental assessments: IEEs and EIAs. EIAs are carried out for subprojects that have the potential for ‘significant’ environmental impacts, whereas IEEs are conducted for relatively smaller sub-projects with relatively less potential for significant impacts. The Punjab Environmental Protection Agency Review of the IEE and EIA Regulations categorizes the subprojects that require an IEE and an EIA. Schedules I and II, attached to the Regulations, list these types of subprojects.

77. The Regulations also provide the necessary details on the preparation, submission, and review of IEEs and EIAs. The following is a brief step-by-step description of the approval process:

a. To determine whether a sub-project is categorized as requiring an IEE or EIA, use the two schedules attached to the Regulations.

b. An EIA or IEE is conducted as per the requirements outlined in the Pakistan EPA guidelines.

c. If the project is located in the provinces, then the EIA or IEE is submitted to the concerned provincial EPA; if it is located in Islamabad and federally administrated areas, then it is submitted to the Pakistan EPA. The Fee (depending on the cost of the sub-project and type of report) is submitted along with the EIA or IEE document.

d. The IEE/EIA is also accompanied by an application in the format prescribed in Schedule IV of the Regulations.

e. The EPA conducts a preliminary review of the report and replies within ten (10) days of the submission. It either a) confirms completeness, or b) asks for additional information, if needed, or c) returns the report and asks for additional studies, if necessary.

f. If the issue is confirmation of completeness, then the EPA is required to make every effort to complete the IEE and EIA review process within forty-five (45) and ninety (90) days, respectively.

g. The EPA accords their approval, subject to certain conditions:

- ✓ Before commencing construction of the sub-project, the proponent is required to submit an undertaking accepting the conditions.
- ✓ Before commencing operation of the sub-project, the proponent is required to obtain from the EPA a written confirmation of compliance with the approval conditions and requirements of the IEE.

h. An Environmental Management Plan (EMP) is to be submitted with a request for obtaining confirmation of compliance.

i. The EPAs are required to issue confirmation of compliance within fifteen (15) days of receipt of the request and complete documentation.

j. The IEE/EIA approval is valid for three years from the date of operational phase No Objection Certificate (NOC).

k. After completion of construction, a monitoring report is to be submitted to the EPA, followed by annual monitoring reports, during operations.

78. The water supply, sewerage and drainage, and urban public services (transport and green space) improvement subprojects do not fall under either Schedule I or Schedule II of the Provincial Regulations. Therefore, none of the subprojects in Sialkot require an EIA or an IEE as per local regulations.

iv. Other Relevant Laws

79. A number of other federal and provincial laws are important in the context of environmental management. The main laws that potentially affect the sub-projects proposed for Sialkot are listed below:

a. **The Punjab Wildlife Protection Ordinance, 1972,** empowers the government to declare certain areas to be reserved for the protection of wildlife and to control activities within in these areas. It also provides protection to endangered wildlife species. As no activities are planned in these areas, no provision of this law is applicable to the proposed sub-projects.

b. **The Forestry Act, 1927,** empowers the government to declare certain areas as reserved forests. As no reserved forests exist in the vicinity of the proposed sub-project, this law will not affect to the proposed sub-projects.

c. **The Antiquities Act of 1975** ensures the protection of Pakistan's cultural resources. The act defines 'antiquities' as ancient products of human activity, historical sites, or sites of anthropological or cultural interest, and national monuments, etc. The Act is designed to protect these antiquities from destruction, theft, negligence, unlawful excavation, trade, and export. The law prohibits new construction in the proximity of a protected antiquity and empowers the Government of Pakistan to prohibit excavation in any area that may contain articles of archaeological significance. This project site is not in the proximity of a protected antiquity.

d. **Safety Regulations** directly or indirectly govern occupational health and safety (OHS) issues during the currently studied production activities. These regulations mainly include three laws and regulations: (i) PEPA Laws, 2000; (ii) Labor Laws; and (iii) Electricity Rules,1937.

B. ADB Requirements

80. ADB safeguard policies require that:

iv) impacts are identified and assessed early in the project cycle;

v) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and

vi) affected people are informed and consulted during project preparation and implementation.

81. The policies apply to all ADB-financed projects, including private sector operations, and to all project components.

82. ADB's environmental policy guidelines are as follows:

a. Use a screening process for each proposed project, as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.

b. Conduct an environmental assessment for each proposed project to identify potential direct, indirect, cumulative, and induced impacts and risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Assess potential transboundary and global impacts, including climate change. Use strategic environmental assessment where appropriate;

c. Examine alternatives to the project's location, design, technology, and components and their potential environmental and social impacts and document the rationale for selecting the particular alternative proposed. Also consider the no project alternative.

d. Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an EMP that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle.

e. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a Grievance Redress Mechanism (GRM) to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance.

f. Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.

g. Implement the EMP and monitor its effectiveness. Document monitoring results, including the development and implementation of corrective actions, and disclose monitoring reports.

h. Do not implement project activities in areas of critical habitats, unless (i) there are no measurable adverse impacts on the critical habitat that could impair its ability to function, (ii) there is no reduction in the population of any recognized endangered or critically endangered species, and (iii) any lesser impacts are mitigated. If a project is located within a legally protected area, implement additional programs to promote and enhance the conservation aims of the protected area. In an area of natural habitats, there must be no significant conversion or degradation, unless (i) alternatives are not available, (ii) the overall benefits from the project substantially outweigh the environmental costs, and (iii) any conversion or degradation is appropriately mitigated. Use a precautionary approach to the use, development, and management of renewable natural resources.

i. Apply pollution prevention and control technologies and practices consistent with international good practices as reflected in internationally recognized standards, such as the World Bank Group's Environmental, Health and Safety Guidelines (EHS Guidelines). Adopt cleaner production processes and good energy efficiency practices. Avoid pollution, or, when avoidance is not possible, minimize or control the intensity or load of pollutant emissions and discharges, including direct and indirect greenhouse gases emissions, waste generation, and release of hazardous materials from their production, transportation, handling, and storage. Avoid the use of hazardous materials subject to international bans or phaseouts. Purchase, use, and manage pesticides based on integrated pest management approaches and reduce reliance on synthetic chemical pesticides.

j. Provide workers with safe and healthy working conditions and prevent accidents, injuries, and disease. Establish preventive and emergency preparedness and response measures to avoid, and where avoidance is not possible, to minimize, adverse impacts and risks to the health and safety of local communities.

k. Conserve physical cultural resources and avoid destroying or damaging them by using field-based surveys that employ qualified and experienced experts during environmental assessment. Provide for the use of "chance find" procedures that include a pre-approved management and conservation approach for materials that may be discovered during project implementation. ADB's safeguard policies require that both ADB's and developing member countries' (DMCs') safeguard requirements are complied with.

83. ADB uses a classification system to reflect the significance of a project's potential environmental impacts. A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories:

Category A. A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An EIA is required.

Category B. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An IEE is required.

Category C. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed.

Category FI. A proposed project is classified as category FI if it involves investment of ADB funds to or through a Financial Institution.

84. Based upon the REAs conducted at the commencement of the environmental assessment (refer to Annexure 1), one or more of the sub-projects to be implemented in Sialkot during Phase 1 of PICIIP have been classified as Category B. Accordingly, ADB require that an IEE is required covering all of the subprojects proposed in Sialkot under PICIIP (Phase 1).

C. Environmental Standards

i. National Environmental Quality Standards (NEQS)

85. The National Environmental Quality Standards (NEQS) were first promulgated in 1993 and were amended in 1995 and 2000. The standards have been adopted in Punjab where they are known as the Punjab Environmental Quality Standards (PEQS).

86. Standards for the following types of effluent and emissions are specified in the NEQS and may be relevant to the specified projects:

a. Municipal and liquid industrial effluent parameters (32) for discharge to inland waters, sewage treatment facilities, and the sea;
b. Industrial gaseous emissions (16) into the atmosphere;
c. Motor and vehicle exhaust and noise (3);
d. Ambient air quality (9);
e. Drinking water quality (33); and
f. Noise for residential, commercial, industrial, and silence zones.

ii. World Bank Group Environmental, Health and Safety (EHS) Guidelines

87. ADB advocates adherence to environmental standards set out in the World Bank Group (IFC) Environmental, Health and Safety Guidelines (EHS Guidelines).

88. Of relevance to the sub-projects proposed for Sialkot applicable standards have been developed for air emissions for general application, ambient air conditions at property boundaries for general purpose, limits for process wastewater, domestic sewage and contaminated storm water discharges to surface water and ambient noise levels.

89. ADB's SPS requires that the most stringent standards are applied as far as practicable.

90. Table 2.1 to Table 2.3 summarize applicable standards from the EHS Guidelines. The National/Punjab Environmental Quality Standard (NEQS and PEQS) values are also given against each value for comparison to the local requirements. The standards (most stringent) to be applied for PICIIP subprojects are highlighted in green on each Table.

91. Noise level guidelines for noise levels measured outdoors are given on Table 2.1.

Table 2.1: Comparison of International and Local Noise Level Guidelines

Category of Area/Zone	Limit in dB(A) One Hour L_{Aeq}			
	WHO/IFC		NEQS/PEQS	
	Day Time (07:00 – 22:00)	Night Time (22:00 – 07:00)	Day Time (07:00 – 22:00)	Night Time (22:00 – 07:00)
Residential area (A)	55	45	55	45
Commercial area (B)	70	70	65	55
Industrial area (C)	70	70	75	65
Silence zone (D)	55	45	50	45

Source: Guidelines for Community Health, World Health Organization (WHO), 1999

92. Noise impacts should not exceed the levels highlighted in green on Table 2.1 or result in a maximum increase in background levels of 3dB at the nearest receptor location off-site.

93. Occupational Health and Safety requirements with respect to noise are contained in the relevant EHS Guidelines which can be found at: www.ifc.org/ehsguidelines.

94. Guidelines for wastewater and ambient water quality apply to projects that have either direct or indirect discharge of process wastewater, wastewater from utility operations or storm water to the environment. Process wastewater may include contaminated wastewater from utility operations, storm water and sanitary (domestic) sewage.

95. Discharges of process wastewater, wastewater from utility operations or storm water to surface water should not result in contaminant concentrations in excess of the local ambient water quality criteria. Such criteria (PEQS) are set out on Table 2.2, together with the more stringent criteria normally stipulated by international agencies.

Table 2.2: Comparison of International and Local Limits for Process Wastewater, Domestic Sewage, and Contaminated Storm Water Discharged to Surface Waters, for General Application

(milligrams per litre, except for pH, bacteria, and temperature)

Pollutant or Parameter	Typical Limit	PEQS
pH	6–9	6-9
BOD	30	80
COD	125	150
Oil and grease	10	10
Total Suspended Solids	50	200
Metals, Heavy metals, total	10	-
Arsenic	0.1	1.0
Cadmium	0.1	0.1
Chromium, Hexavalent	0.1	-
Chromium, Total	0.5	1.0
Copper	0.5	1.0
Iron	3.5	8.0
Lead	0.1	0.5
Mercury	0.01	0.01
Nickel	0.5	1.0
Selenium	0.1	0.5
Silver	0.5	1.0
Zinc	2.0	5.0
Cyanide, Free	0.1	-
Cyanide, Total	1.0	1.0
Ammonia	10	40
Fluoride	20	10
Chlorine, total residual	0.2	1.0
Phenols	0.5	0.1
Nitrogen, total	10	-
Phosphorus, total	2.0	-
Sulfide	1.0	1.0
Coliform bacteria	< 400 MPN/100 ml	-
Temperature increase	< 3°C	< 3°C

Note: MPN, most probable number

96. The effluent should not exceed the levels highlighted in green on Table 2.2 and should result in a temperature increase of no more than 3° C at the edge of the zone where initial mixing and dilution take place. Where the zone is not defined, use 100 metres from the point of discharge.

97. Air quality guidelines issued by the IFC apply to facilities or projects that generate emissions to air at any stage in the project life-cycle.

98. Emissions of air pollutants can occur from a wide variety of activities during project implementation, including construction, operation and decommissioning stages in the project life cycle. Sources of pollution to air can include point sources, fugitive sources and mobile sources and can arise either from process activities or materials handling and storage.

99. Guideline values for specific pollutants are set out on Table 2.3, derived from World Health Organization (WHO) Guideline values and NEQS/PEQS. US EPA air quality standards are less stringent than WHO standards and have not, therefore, been considered further.

100. WHO recognizes interim targets above the guideline values for most pollutants with the exception of NO_2.

101. Air emissions from sub-project activities should not exceed the levels highlighted in green on Table 2.3.

Table 2.3: Comparison of International and Local Ambient Air Quality Guidelines

(micrograms/m^3, except CO which is milligrams/m^3)

Pollutant	Averaging Period [2]	WHO Guideline Value [1]	NEQS/PEQS
Sulphur dioxide (SO_2)	Annual mean	-	80
	24 hours	20	120
	10 minutes	500	-
Carbon Monoxide (CO)	8 hours	-	5
	1 hour	-	10
Oxides of Nitrogen as NO_2	1 year/Annual mean	40	40
	24 hours	-	80
	1 hour	200	-
Ozone (O_3)	8 hour daily max	100	-
	1 hour	-	130
Particulate Matter TSPM	Annual mean	-	360
	24 hours	-	500
Particulate Matter PM_{10}	1 year/Annual mean	20	120
	24 hours	50	150
Particulate Matter $PM_{2.5}$	1 year/Annual mean	10	15
	24 hours	25	35
Lead	1 year/Annual mean	-	1
	24 hours	-	1.5

1 Source: WHO, Air Quality Guidelines Global Update, 2005

2 Averaging period is stated to be 1 year for WHO guideline values and annual mean for NEQS/PEQS.

III. DESCRIPTION OF SUBPROJECTS

102. Under the first phase investments of the PICIIP it is proposed to implement urban development sub-projects in Sialkot in the following sectors:

- Water supply;
- Sanitation; and
- Urban public spaces improvements, with respect to transportation infrastructure and the development and upgrading of green spaces.

103. This Section provides an overview of the existing situation in Sialkot, and outlines the subproject proposals designed to address some of the current deficiencies in the provision of urban services. Where applicable, solutions and approaches which are alternative to the proposed subprojects are considered and discussed further in Section VI.

A. Water Supply Improvement Projects

i. Current Status

104. The urban population of Sialkot is served by 95 operational tube wells, together with 15 additional tube wells in the cantonment area. The total number of operational tube wells is, therefore, 110.

105. The design discharge of each tube well is 1.5 cusecs (153 m^3/hour); however, the actual discharge is somewhat lower and varies depending upon the age and condition of the tube well. The nominal rating of all the tube wells is 149.5 cusec (15,249 m^3/hour) or 80 million gallons per day (MGD), although this is expected now to be less than 100 cusecs (10,200 m^3/hour) given the declining water table and the condition of the pumps.

106. All tube wells operate on average 12 hours a day. Based on average discharge and operation time, the estimated total production for Sialkot City (excluding the cantonment) is approximately equivalent to 38.4 MGD (that is less than 50% of design capacity), while the per capita production is equivalent to 79.8 gallons per capita per day. These are raw estimates since accurate production data are not available due to the absence of metering and monitoring of tube well discharges.

107. Based on the current and projected populations for the Sialkot and the projected per capita water demand of 33 gallons per day, both current (year 2015) water demand and future (year 2035) water demand is estimated to be less than available supply. Industrial water demand is assumed to be only 15% of the total water consumption as it is assumed that larger industrial establishments have a private water supply. Commercial and institutional demands have been assumed to be 15% and 10% of the total water consumption respectively.

108. The design life of the tube wells is 15 years. Twenty-nine (29) tube wells are more than fifteen years old, while eleven (11) tube wells are more than twenty years old. In its short-term plan, Sialkot Municipal Corporation (SMC) recommends the construction of eleven (11) new tube wells. The SMC has also been re-boring tube wells during the past few years owing to the reduced discharge and efficiency of the tube wells. However, the turbines for these tube wells have not been installed due to a lack of funding. Overall twelve (12) tube wells have been re-bored and still await turbine replacement.

109. Currently the tube wells do not have pressure gauges or flow meters. This makes it difficult to operate them efficiently and there is no way to measure the performance of the tube

wells or establish how much water is being lost in the network. There is no integrated control system such as a Supervisory Control and Data Acquisition (SCADA) for the tube well installations or pressure gauges at the sites, which would enable some pumps to be switched off when not required.

110. While chlorination facilities are in place at the tube well pumping stations, it is not clear whether the water is being chlorinated on a regular basis with the correct dosage.

111. The piped water system in Sialkot is supplied from the tube wells which pump water directly into the system. Valves have been installed on the network; however, the valves are not utilized given the interconnectivity of the network and sufficient production capacity of the system. Moreover, most of the valves have been buried under the ground due to construction activities, and there is a lack of knowledge about their precise location. The system operates on the basis that if one or two tube wells are dysfunctional, other tube wells in the vicinity feed the system, thus catering for emergency needs.

112. There are eleven (11) elevated or overhead reservoirs (OHR) distributed throughout the piped network, with a total storage capacity of 1,568 m^3 (345,000 gallons), although these are currently not in service. Reportedly they were taken out of service due to security concerns, as it was considered that the water supply could be deliberately contaminated at the reservoirs. The storage represents 0.54 hours of storage, excluding system losses.

113. Approximately 75% of the area within the city limits receives water from the SMC system. It is understood that good pressures are achieved at household connections throughout the system, with limited complaints from the consumers. The adequacy of the pressure is confirmed since almost all households have an overhead reservoir which is filled directly by the SMC supply up to second floor and without the need for local pumping facilities.

114. Many of the pipelines are reported to be old and in poor condition, so leakage and unaccounted for water is expected to be high. Water quality is also reported to be poor, especially by consumers in the low-income areas of the city. The main complaints relate to odor, and there is a perception that there is ingress of sewage into the water supply pipelines.

115. Major network expansion in the city was undertaken during 1914, 1937, 1963 and onwards. However, no major project targeting network improvement, in terms of replacement of rusted or damaged pipes, has been initiated by the city government since the installation of the network. Moreover, the SMC does not have any mechanism for leak detection or identification and replacement of damaged pipes. Overall 52% of the network is identified as rusted and damaged requiring replacement. The total length of the network requiring replacement is calculated to be 186 km.

ii. Proposed Projects

116. The current water supply infrastructure is primarily confined to the 16 UCs that comprise the existing Tehsil Municipal Authority (TMA) area of jurisdiction. Given the poor condition of this infrastructure, its rehabilitation will comprise the priority investments.

117. Despite current estimated daily water production exceeding current estimated water demand, the system is not able to provide a 24 hours, 7 days per week service at present. The water supply system is beset with a number of issues, as noted above, and which may be summarized as follows:

- Inefficient tube wells operating at below design discharge;

- Absence of control and monitoring of tube well operations, the pipe network and customer consumption;
- Inadequate and non-continuous supply, notwithstanding that production exceeds demand, on account of high system losses, potentially as high as 50%, resulting from damaged and rusted pipes;
- Lack of maintenance of the piped network;
- Significant potential for contamination from the ingress of sewage or contaminated surface water and groundwater, given that the sewage pipe network and the piped clean water supply network are laid in close proximity to each other;
- Lack of monitoring of water quality, including chlorination dosing; and
- Lack of storage capacity in the system – the system is direct discharge from tube wells. Failure of a well or pump, or in the event of load shedding, impacts the overall capacity of the supply system.

118. The following sub-projects are proposed to address these issues:

a. Rehabilitation of Tube Wells

119. The objective of this subproject is to restore ninety-five (95) tube wells to their original design rating such that a total capacity of 149.5 cusec (15,249 m^3/hr) can be achieved. As noted above, SMC has been re boring wells to deal with the problem of reduced discharge. In most of the cases re-boring has been done; however, the rehabilitation work in many instances has yet to be completed. The rehabilitation works required at the 95 tube wells within the existing service area are as follows:

    - o Replacement of turbine pumps and motors at twelve (12) re-bored tube wells, at the locations indicated on Figure 3.1;
    - o Provision of new switchgear and electrical installations (26 tube wells);
    - o Installation of Chlorination units at all 95 tube wells; and
    - o Improving the efficiency of 60% of the tube wells (57 in number) through the provision of bulk meters, pressure gauges, non-return valves, air valves, installation of capacitors, upgrading of delivery pipes as required;

b. Development of Distribution Network Improvement (DNI) Zones: As a pilot, it is proposed that two union councils (Model Town and Water Works) are declared as DNI zones where water meters (8,800 postpaid and 800 prepaid meters) will be installed at all properties and bills raised and charged accordingly based upon supply and consumption. These DNI zones will be supplied water for 24 hours per day, 7 days per week. The intervention location of two DNI zones and proposed intervention of pipe replacement in these two DNI zones is shown in Figure 3.2, Figure 3.3 and Figure 3.4 below.

b. Rehabilitation of Distribution Network

Replacement of Rusted/Damaged Pipes

120. Approximately 75% of the city has coverage for water supply through a piped network.

121. The major portion of the city is supplied by the piped network constructed by SMC while some public buildings and large installations have their own arrangements (tube wells and OHRs).

Figure 3.1: Locations of Replacement Turbine Pumps

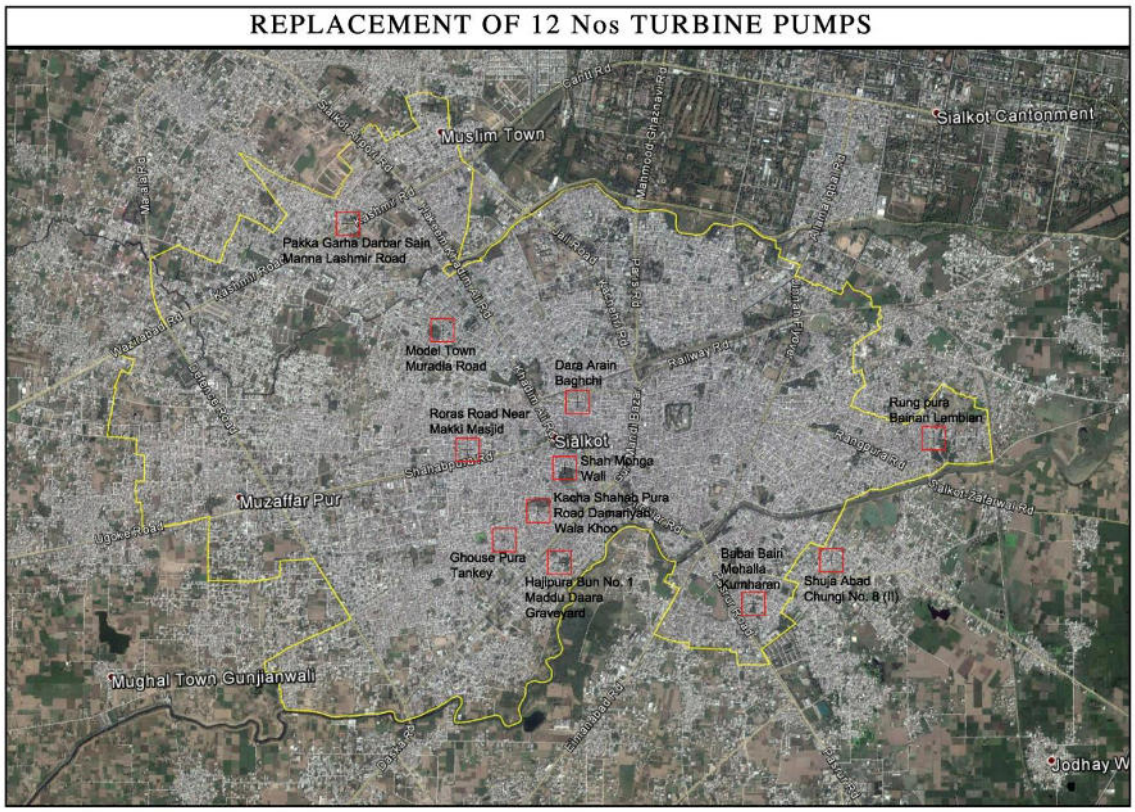


Figure 3.2: DNI Zones (Model Town and Water Works)

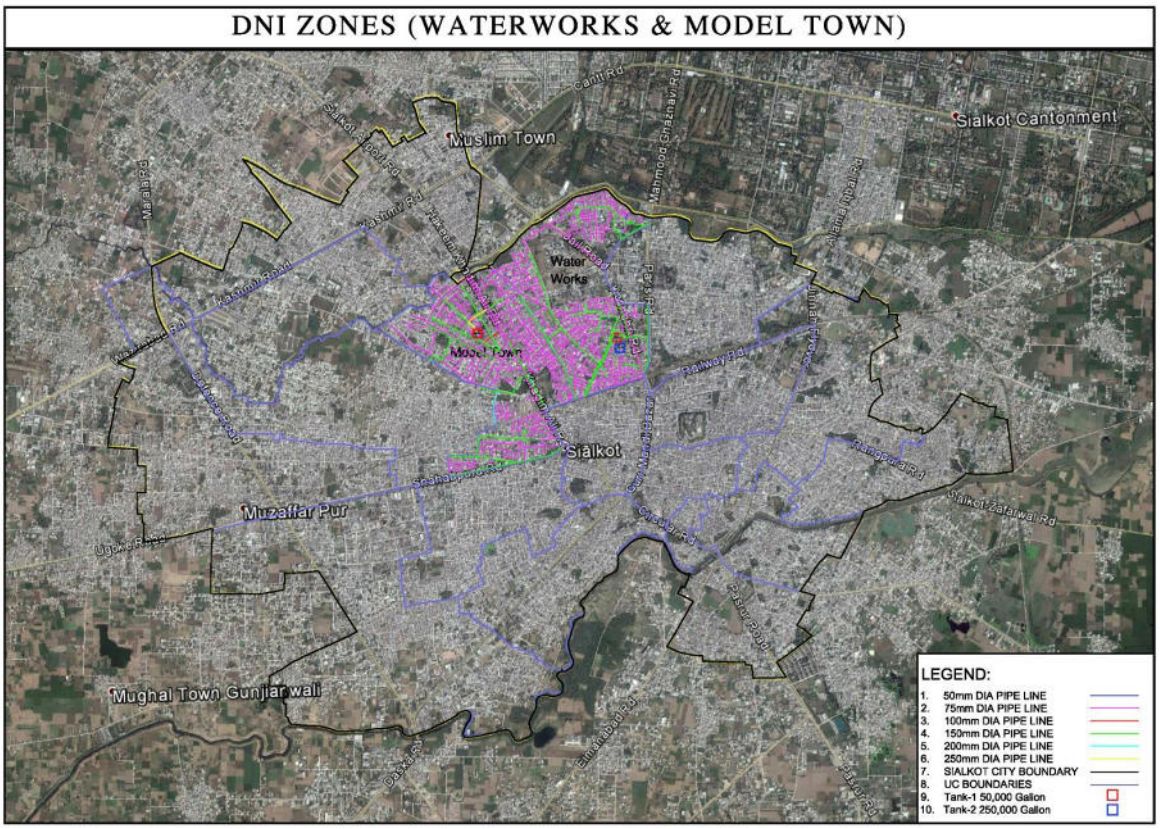


Figure 3.3: Proposed DNI Zone at Model Town

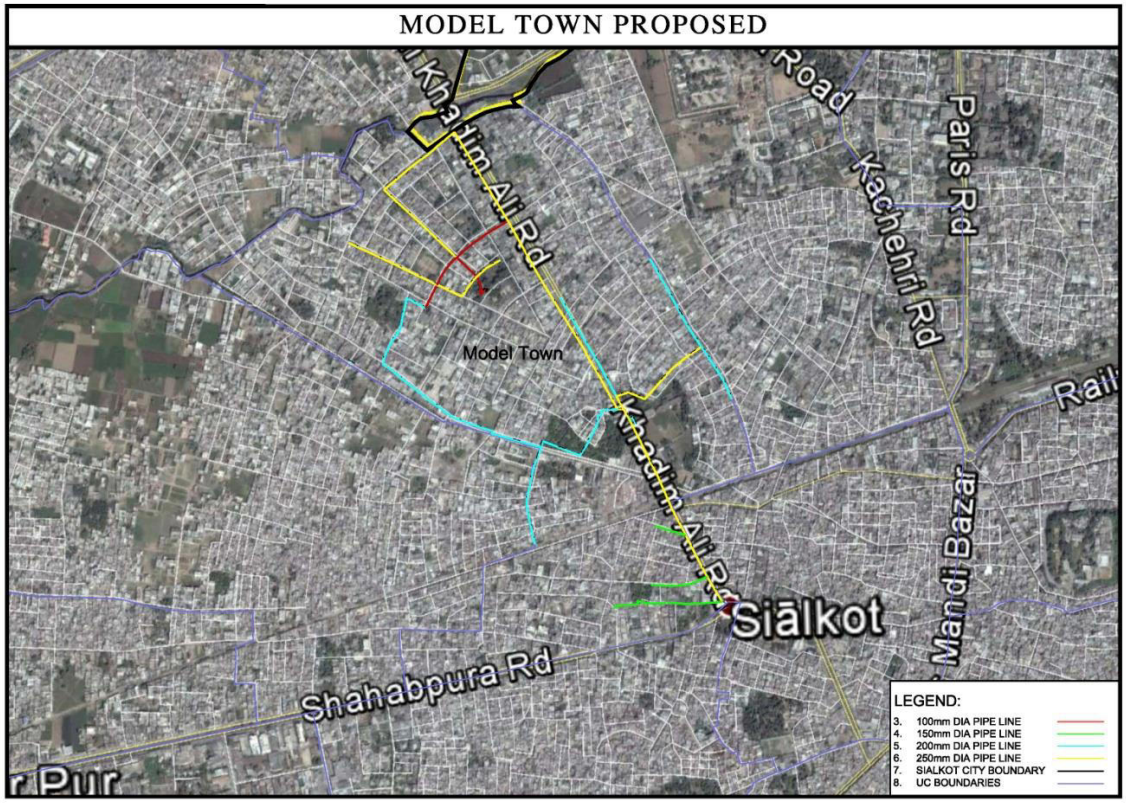
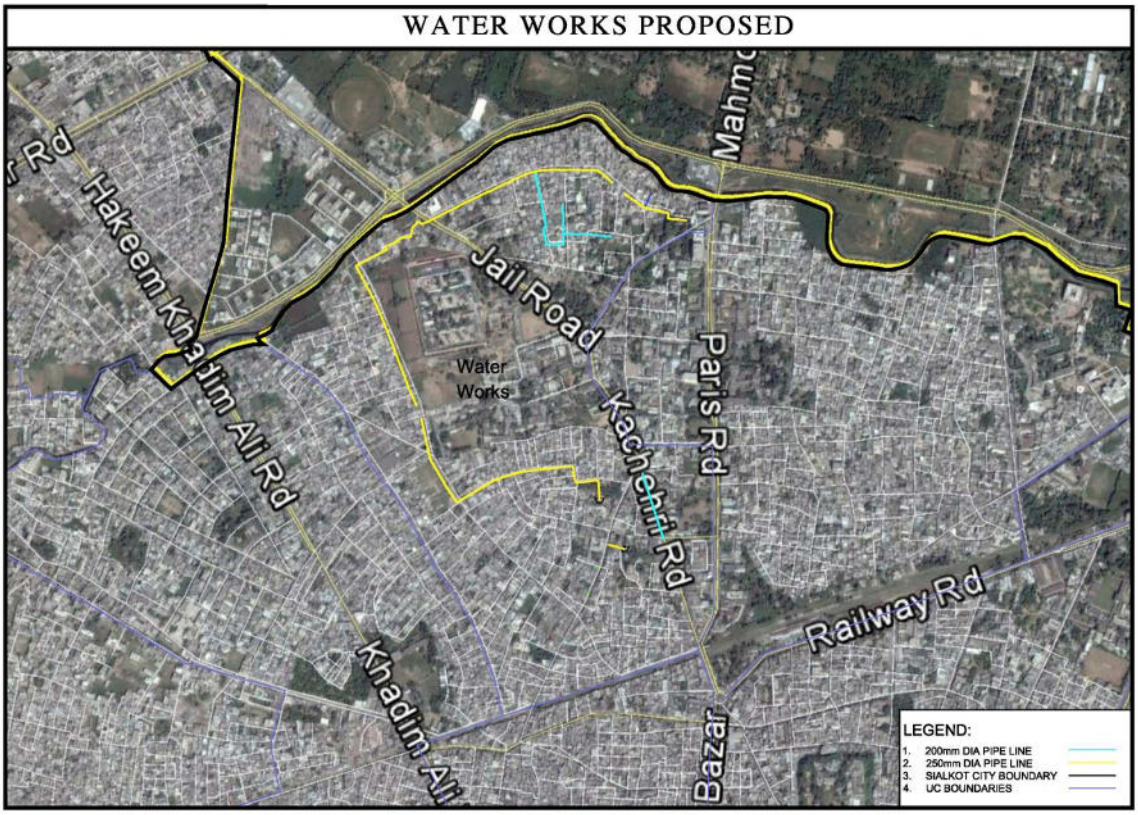


Figure 3.4: Proposed DNI Zone at Water Works

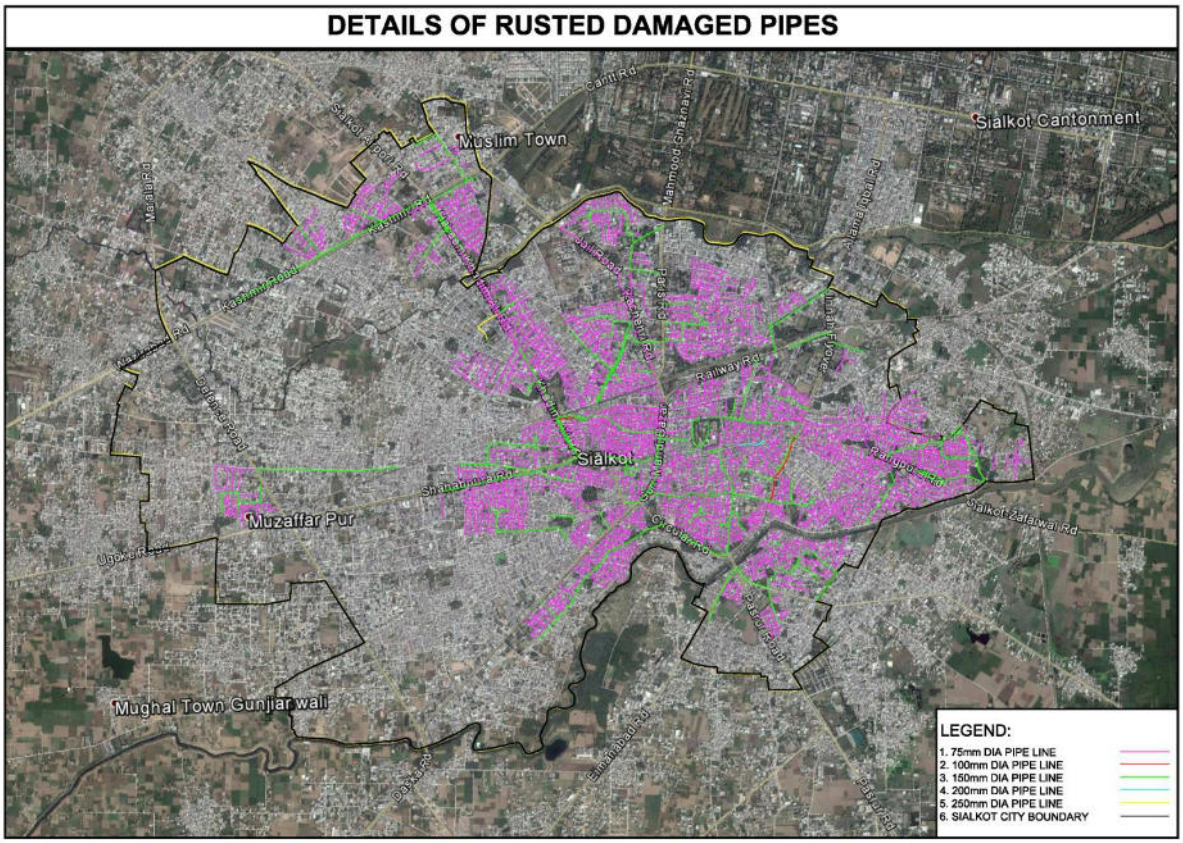


122. A number of privately constructed housing schemes, including the WAPDA colony, MAG town, and the Government Polytechnic staff colony have poor condition/rusted networks, which are proposed to be replaced as a short-term investment plan.

123. A total of 49 km of the network is assessed to be in poor condition, with the pipes (Cast Iron, Mild Steel and PVC pipes) needing to be replaced. Pipeline sizes range in diameter from 50-254 mm.

124. The location of rusted/damaged pipes is illustrated on Figure 3.5.

Figure 3.5: Location and Sizes of Damaged and Rusted Pipes to be Replaced



Replacement of Asbestos Cement Pipe

125. A large proportion of the water supply network comprises asbestos cement pipes (ACP). In view of the proven detrimental effects of asbestos on health, it is proposed to discontinue the use of the asbestos cement pipes and replace them with PVC pipe as part of the medium-term investment plan.

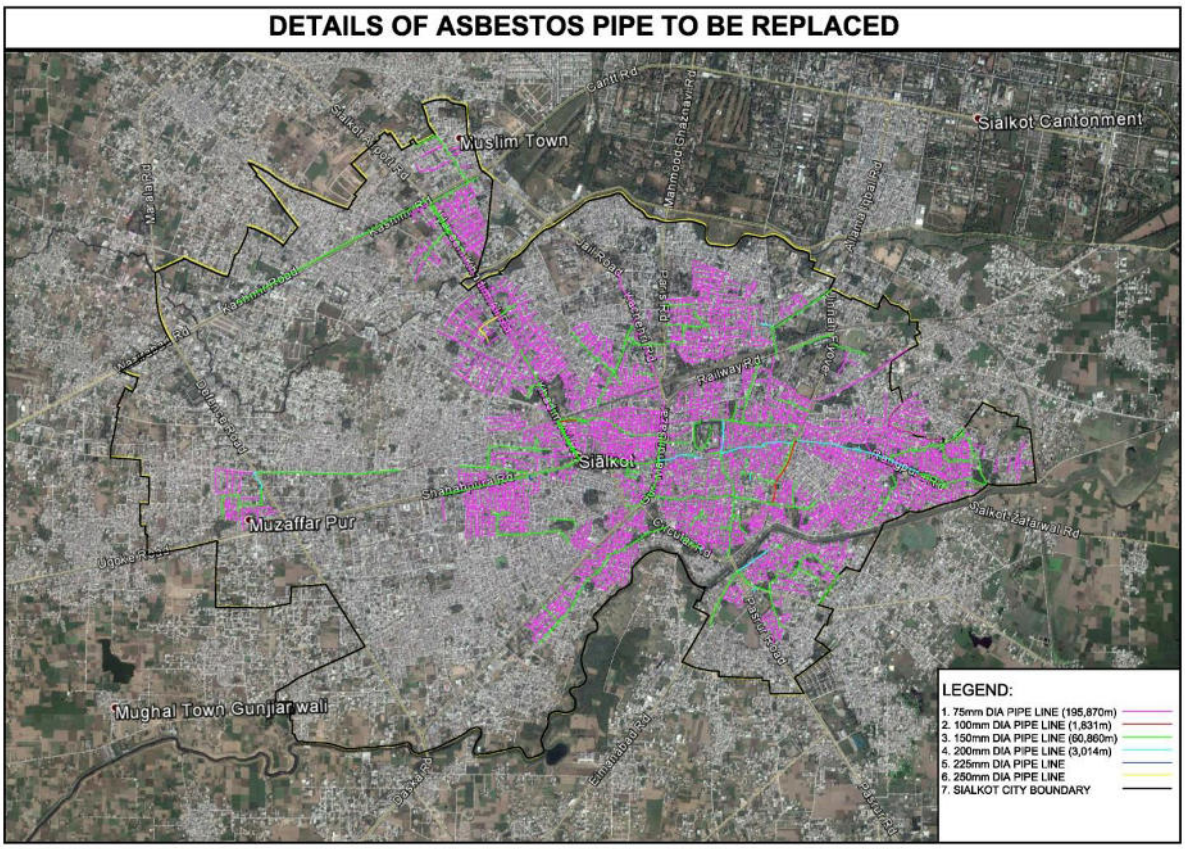
126. It is estimated that about 262 km of ACP requires to be replaced because it is damaged or on health considerations (Figure 3.6).

127. The asbestos content of the ACP is not known currently, but is unlikely to be sufficiently high as to warrant the pipes being classified as hazardous waste. Subject to confirmation of the asbestos content, and the *in situ* condition of the ACP, it is proposed that two methods of management may be adopted:

- Where the ACP are in good condition and have not degraded or weathered, the pipes would be left *in situ*, buried, disconnected and undisturbed, since there is normally sufficient space to lay new pipe adjacent to the existing pipework. This is a commonly adopted method of management of redundant pipes, both in Pakistan and in developed countries (for example, United States); and
- If the ACP have been exposed and are weathered, severely degraded and/or broken, or, because of space constraints require removal, the ACP would be extracted under strict procedures (as set out in an Asbestos Management Framework) and disposed to an approved secure landfill, at a location yet to be confirmed. It is anticipated that a sanitary landfill capable of receiving ACP waste will be developed in Phase 2 of PICIIP.

128. In the absence of a suitable disposal facility currently, the second approach is not considered to feasible at present. Accordingly, the only safe and viable approach in the short-term is to leave all ACP buried *in situ* regardless of its condition and to ensure that the locations of all ACP is recorded accurately. Once a suitable disposal facility has been developed, it would then become feasible to remove and dispose of degraded ACP.

Figure 3.6: Location and Sizes of Asbestos Cement Pipes to be Replaced



Rehabilitation of Fateh Garh Distribution System

129. A water supply scheme was constructed for Bogra in Fateh Garh Union Council, serving approximately 400 households. The scheme consists of tube wells and a water distribution network.

130. Due to technical flaws the scheme has never operated and has not been functional since the construction was completed. SMC staff report inadequacy of the distribution network

(inappropriate design) limiting the supply of water to the target population. The tube wells installed are functional and can be used if the pipe network is replaced. The scheme is proposed to be rehabilitated through replacing and upgrading the pipe network.

c. Rehabilitation of Existing Overhead Reservoirs

131. The current water supply system functions by direct supply from tube wells. There is no storage capacity built into the system, other than above ground private storage tanks on the premises of consumers, at the end point of the distribution system. Should the pumps and tube wells fail temporarily for any reason (for example, power failure) then supply is limited to the available capacity held within the private storage tanks.

132. Typically, about 3-4 hours' system storage is considered necessary to balance supply and demand, without giving consideration to fire-fighting water availability and the impact of load shedding, which is frequent in Sialkot.

133. Bringing the reservoirs back into service could provide for a more efficient, more reliable and more available supply. If a 24/7 supply is to be provided using District Metering Areas (DMAs), it will be necessary to bring the reservoirs back into service. In addition, re-instating the OHRs will provide security against power supply load shedding, which is currently prevalent. It is anticipated that OHRs could, if required, be filled concurrently with pumping directly into the network, such that they fill during low demand and empty during peak demand.

134. A condition survey of the OHR conducted during the Feasibility Study concluded that nine (9) out of eleven (11) reservoirs could be rehabilitated. The location and capacity of the OHRs to be rehabilitated is indicated on Table 3.1 and shown on Figure 3.7.

135. The other two (2) OHRs are in good condition and do not require any rehabilitation (OHRs at Shahab Road and Tiba Tank).

136. Almost all the reservoirs require plastering, fillers, finishing of structures, replacement of doors installed and replacement of delivery and rising mains. The connections of the OHRs into the distribution system and tube wells need also to be reinstated by the construction of new connecting pipelines.

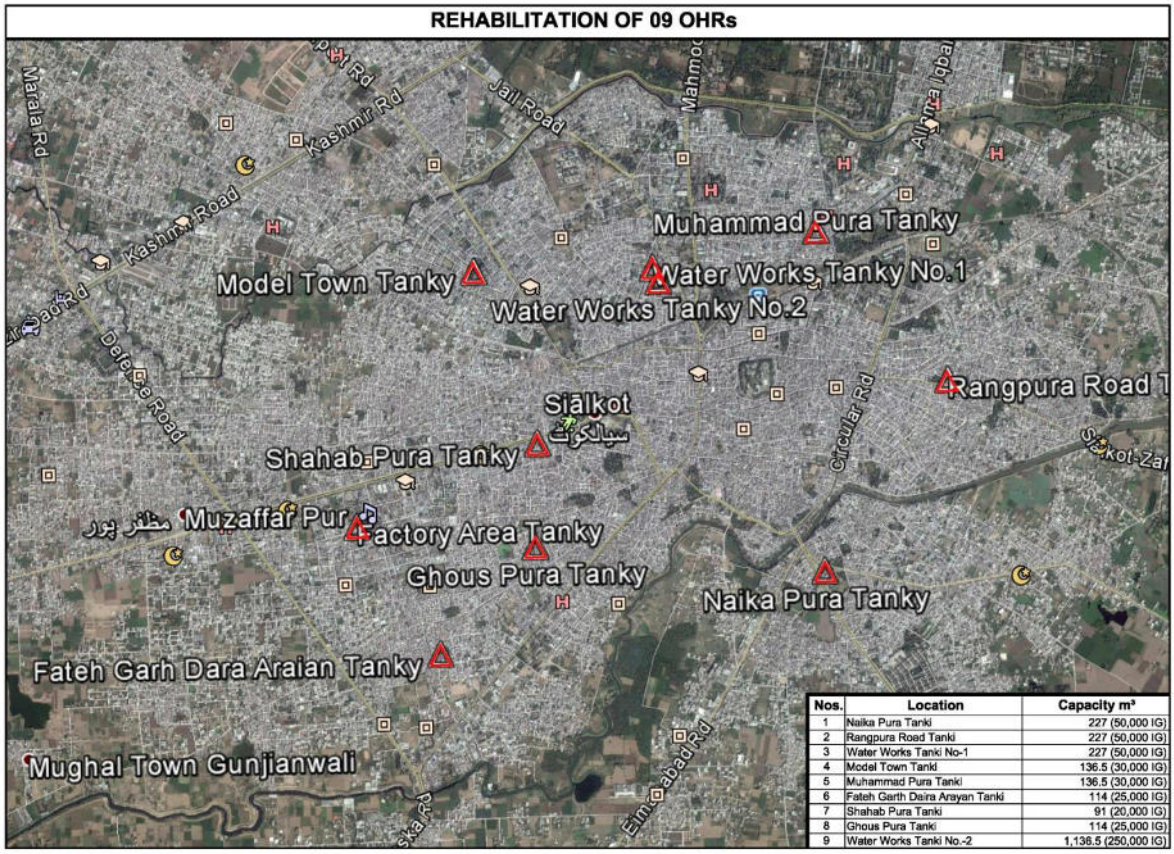
Table 3.1: Detail of Nine OHRs to be Rehabilitated

#	Location	Capacity (m^3 and Imperial Gallons)
1	Naika Pura Tanki	227 (50,000 IG)
2	Rangpura Road Tanki	227 (50,000 IG)
3	Water Works Tanki No. 1	227 (50,000 IG)
4	Model Town Tanki	136.5 (30,000 IG)
5	Muhammad Pura Tanki	136.5 (30,000 IG)
6	Fateh Garth Daira Arayan Tanki	114 (25,000 IG)
7	Shahab Pura Tanki	91 (20,000 IG)
8	Ghous Pura Tanki	114 (25,000 IG)
9	Water Works Tanki No. 2	1,136.5 (250,000 IG)

137. In summary, the rehabilitation works will include:

- Replacement of doors and windows;
- Plastering, fillers and minor structural repairs;
- Replacement of delivery and rising mains;
- Provision of chlorination (disinfection) system at each OHR; and
- Connection of inlet and outlet pipe work sand valves.

Figure 3.7: Location of Overhead Reservoirs to be Rehabilitated



d. Installation of SCADA System

138. It is proposed that a Supervisory Control and Data Acquisition (SCADA) system be installed to facilitate more efficient water supply system operation at DNI zones.

139. This system will allow automatic operation of tube well pumping stations based on the reservoir levels and system pressure. It will enable real time measurement of flows and pressures throughout the system, and will enable accurate assessment of water losses, thus helping to reduce Non-Revenue Water (NRW).

140. SCADA is essentially a real-time industrial process control system used to centrally monitor and/or control remote or local industrial equipment, such as valves, pumps, sensors, etc. SCADA is a combination of telemetry and data acquisition, which will perform the functions of:

i. data acquisition;

ii. networked data communication; and

iii. data presentation.

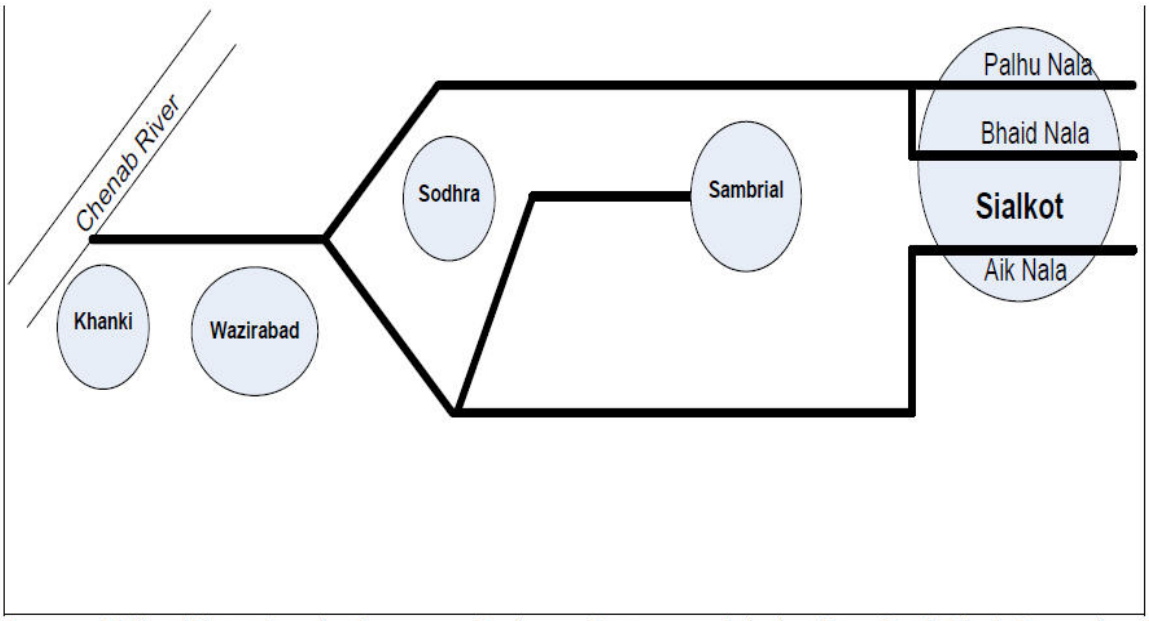
B. Sewerage and Drainage Improvement Projects

i. Current Status

141. Sialkot is traversed by two water channels or nullahs, the Bhaid and Aik Nullahs. The Bhaid Nullah drains the northern part of the municipal area and part of the Cantonment while the Aik Nullah drains the southern part of the municipal area. The Bhaid Nullah has a relatively small catchment area but receives wastewater from many industries and is highly polluted. It also has limited carrying capacity, which is exacerbated by many encroachments along its banks. The Aik Nullah originates in Jannu Hills, is 66 km in length, has a much larger catchment but generally presents less of a threat to the town than does the Bhaid Nullah.

142. Both wastewater and storm water drainage are collected by a combination of sewers and open drains which eventually discharge into either the Aik or Bhaid Nullah or a tributary of the Bhaid Nullah, the Ganda Nullah, adjacent to the city core area. Water from all nullahs flows through the town and eventually drains into the Chenab River. Figure 3.8 presents a schematic overview of the sewerage and drainage disposal system.

Figure 3.8: Sewerage and Drainage Disposal System



Source: Sialkot Water Supply, Sewerage Drainage Strategy and Action Pan, Draft Final, December 2010 GHK Consulting Ltd.

143. Sialkot has a relatively well-developed sewerage system. There are essentially six separate catchment areas that comprise the sewerage system. Sewage from these catchment areas is collected by the sewerage network and conveyed to disposal stations from where raw sewage is discharged to the Aik, Bhaid or Ganda Nullahs.

144. Due to the dispersed nature of industries in Sialkot, the sewage received at the disposal stations contains a mix of domestic and industrial wastewater. During storms, a considerable quantity of storm water also finds its way into the sewerage system, either through interconnections or through the practice of lifting manholes during flood events to alleviate flooding.

145. The total length of the sewerage network in Sialkot city is 178 km, while overall coverage is approximately 49%, with the rest of the city served through covered or open drains.

146. Approximately 15 km of the network is reported to be choked and non-operational, whilst 15 km is reported to be in poor condition and in need of replacement.

147. Contamination of the water supply system with sewage has been cited, by the SMC, as a serious issue. This is reportedly caused by the proximity of water supply and sewerage pipes, possibly laid in a common trench, in addition to the poor condition of the pipes.

ii. Proposed Projects

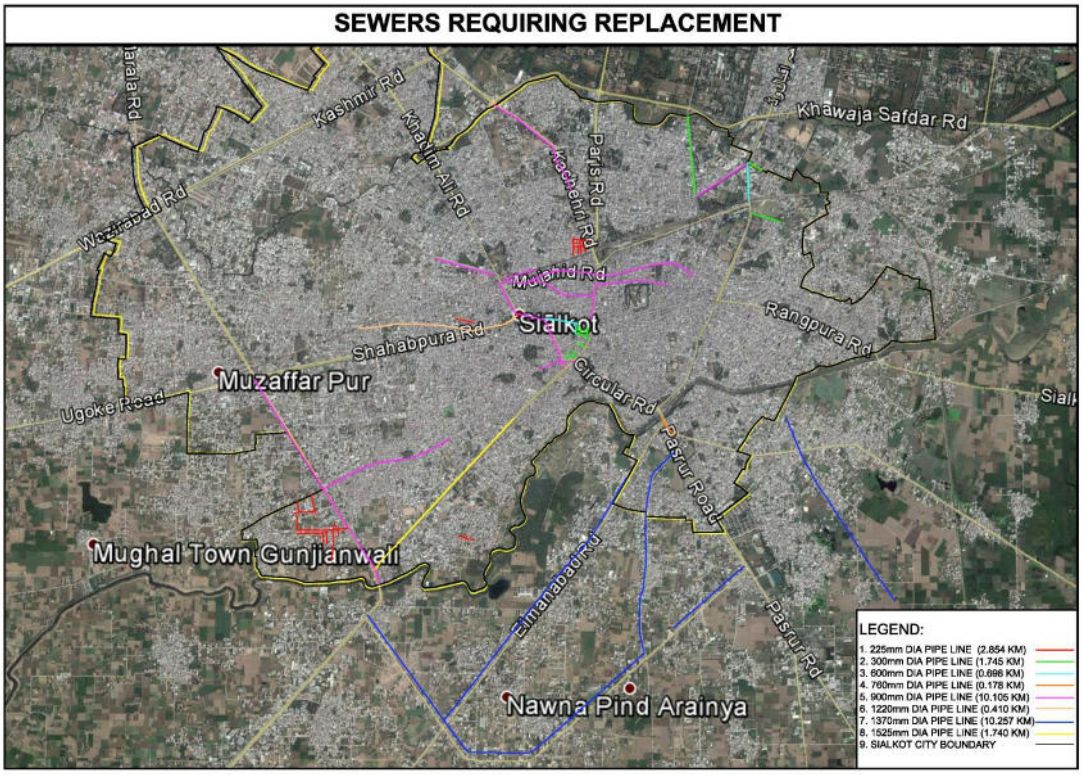
a. Sewerage Pipes Needing Replacement

148. Based upon the Feasibility Study, there are 28.2 km of sewers that require replacement (Table 3.2). The locations of the sewers to be replaced are shown on Figure 3.9.

Table 3.2: Detail of Sewers Requiring Replacement

#	Sewer Diameter (mm)	Sewer Length to be Replaced (km)
1	1,524	1.740
2	1,370	10.257
3	1,219	0.410
4	914	10.105
5	762	0.178
6	609	0.898
7	304	1.746
8	225	2.854
Total		**28.188**

Figure 3.9: Sewers Requiring Replacement



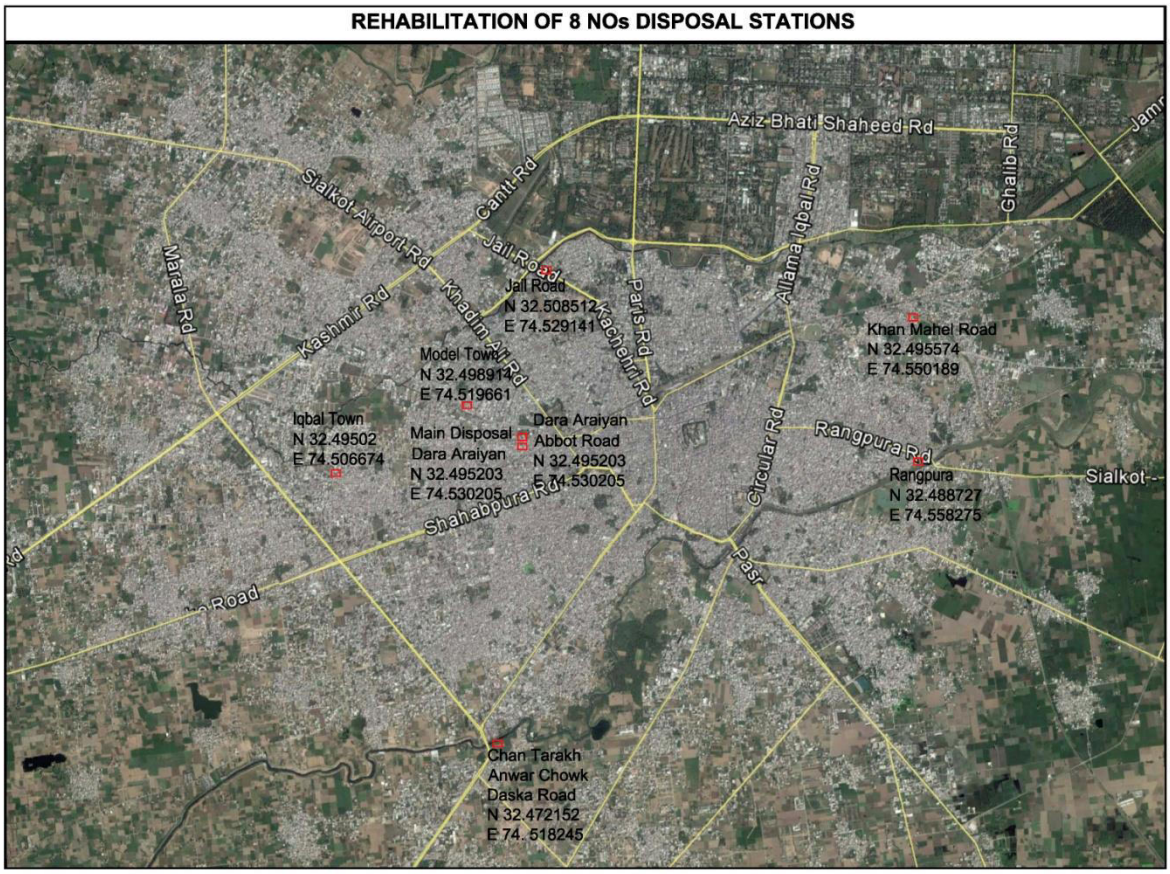
149. Replacement of the older, corroded pipes in the network, in conjunction with providing appropriate separation of the pipes, is designed to reduce the contamination of the water supply system from the sewerage system.

b. Rehabilitation of Disposal Stations

150. Eight disposal (pumping) stations have been assessed in the Feasibility Study to be in very poor condition, with respect to electrical, mechanical and civil works. It is proposed to rehabilitate and upgrade the eight pumping stations in order to increase capacity, in the process avoiding the overloading of upstream sewers.

151. The rehabilitation work includes the replacement of pumps and motors, improvement of electrical panels, and the repair and maintenance of pumps, motors and civil works. The locations of the disposal stations to be rehabilitated and upgraded is shown on Figure 3.10.

Figure 3.10: Disposal Stations to be Rehabilitated and Upgraded



C. Urban Public Spaces Improvement Projects - Transportation

i. Current Status

152. The urban transport sector in Sialkot is considered to be in a poor state of development. Planning in this sector has not kept pace with increasing population (annual growth rate of 2.2%), the relatively high levels of economic activity, and high rates of growth in motorized vehicle volumes (from 3.4% between 2005-2010 rising to 10% annual growth for the 2012-2015 period).

153. Traffic congestion is growing within the urban area of Sialkot city. Nearly all primary roads and some secondary roads, which carry significant traffic volumes, are dual carriageways with substantial road width, narrow central medians and footpaths.

154. Road surfaces are generally in an acceptable condition in many parts of the city; however, in some cases road pavements are crumbling due to poor maintenance. Notwithstanding this, the road network is beset with many problems, including:

- significant congestion at most times of the day;
- poor road layouts and inefficient junction layouts and configurations;
- minimal traffic management facilities and control measures, including poor placement and maintenance of traffic signals;
- disorganized and opportunistic roadside parking which inhibits traffic flows, particularly in the old parts of the city where major commercial activity is concentrated;
- inadequate provision for non-motorized transport and public transport; and
- encroachments on pavements (where provided), which are rarely available for pedestrian use.

155. These problems result in poor utility of road space, road congestion, inefficient mobility and threats to economic growth.

156. Public transport is not adequately developed. Only intercity bus routes passing through two major corridors pass through suburban areas. The majority of travelers use motor bikes for commuting, adding to congestion.

157. Two bus terminals situated on Jail Road are operating in Sialkot. One is owned by Daewoo that handles luxury intercity bus services. The second, the Main Terminal, belonging to Sialkot Cantonment, is spread over an area of 6.69 hectares.

158. Around 1,200 plus bus departures a day are reported from the Main Terminal. Terminal operation is, however, poorly managed and lacks many basic facilities such as adequate waiting rooms.

159. SMC has expressed interest in developing a bus terminal at a new site in the south of city.

160. Currently the transport sector is administered through multiple organizations, whereas, the government is geared to assign the responsibility to Regional Transport Authority (RTA) at the district level. City authorities are deficient in professional resources and require to be equipped with professional manpower and training to bring improvements in the urban transport sector.

ii. Proposed Projects

a. Road improvement/Upgrade

161. The design concept for road network upgrades is based on the objective of road space sharing through the adoption of an inclusive design that accommodates and caters for pedestrians, public transport operations, an improved level of traffic control, efficient mobility and reinforced road safety and access management for all modes of transport. Improved road design includes provision for the following:

- Footpaths having bare minimum width of 1.52 m on both sides of all roads, after upgrading the road side drainage underneath the footpaths.
- Controlled road side parking in any excess space available between footpaths and main carriageways;
- One-way cycle lanes having a width of 1.52 m, to be provided at the outer edge of the outer lane of the main carriageway;
- For crossing routes/intersections, traffic signals are proposed where road widths are not adequate and traffic volumes are high enough. For locations offering wide road space and adequate weaving lengths, roundabouts are proposed;
- Priority crossings are to be identified for intersections on minor streets where traffic volumes are low;
- At signalized junctions, primary and secondary signal heads and normal and overhead gantry poles are proposed to be installed to follow normal British practice; and
- National road marking and road signage standards should be followed and maintained.

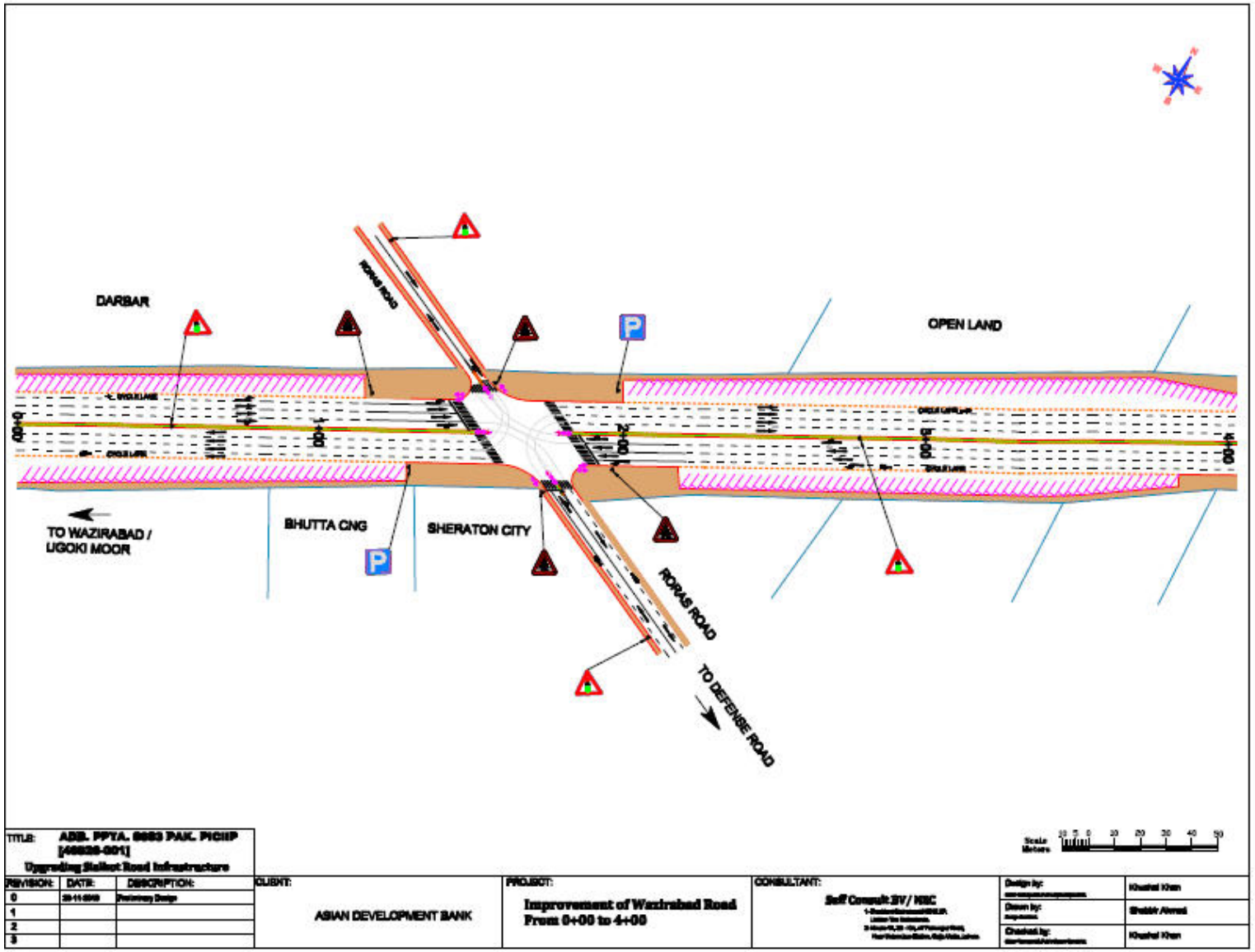
162. Overall, the Feasibility Study has identified and proposed upgrades to 17 (seventeen) roads in Sialkot, measuring 41.3 km in length, and the following associated works:

- the creation of 82.6 km length of footpaths and a similar length of cycle lanes to promote walking and bicycle usage;
- 66 bus bays and bus stoppage facilities;
- 155 pedestrian crossing facilities;
- 21 signalized crossings; and
- 6 locations for roundabouts.

163. To demonstrate the viability of modern multiuse public space management to urban transport route planning in Sialkot, it is proposed that a 3 km long section of Kashmir Road, the main road in the city, is upgraded in Phase 1 of PICIIP. The following specific interventions are proposed (refer to Figure 3.11 for an example of the proposed works):

i. Road pavement (rehabilitation);
ii. Intersections improvement;
iii. Traffic signals;
iv. Storm water drainage;
v. Walkways;
vi. Regulatory signage;
vii. Markings and cat eyes;
viii. Curbstones;
ix. Bicycle track;
x. Parking;
xi. Bus stops;
xii. Street furniture; and
xiii. Face uplifting of buildings.

Figure 3.11: Proposed Layout of One Section of Kashmir Road



b. Improvement of Bus Terminal

164. The existing Main bus terminal is divided into three departure bays on the main Jail Road. The first departure area is for buses, the second departure area is for small buses known as flying coaches and the third area is for wagons.

165. The infrastructure at present includes Sialkot Cantonment Board staff office, waiting rooms for men and women, a police post, a number of shops facing the bus terminal and the backside of these buildings comprises various shops facing the wagon terminal.

166. Many bus service companies and transporters that use the bus terminal do so without any office; bus staff have desks and chairs in the open from where they issue tickets and operate the bus services.

167. The Cantonment area bus terminal (Main Terminal) is proposed for revamping, to include the following:

    i. Upgrading of existing structures and shops;
    ii. Improvement of the layout and location of bus bays;
    iii. Provision of overhead cover for bus stands;
    iv. Provision of bus bays closer, and more accessible, to the existing shops;
    v. Development of lounges and waiting rooms for bus passengers;
    vi. Provision of enhanced utilities, including public conveniences and the provision of drinking water;
    vii. Provision of overhead lighting;
    viii. Development of cafes and dining facilities;
    ix. Development of parking bays for drop off and pick up of passengers and for parking of busses; and
    x. Provision of storm water drainage.

168. There are 95 shops and 14 kiosks in the bus terminal area which will be affected with the bus terminal upgrade. There are 10 other shops on the opposite side of the bus terminal which are unlikely to be impacted by the upgrade.

169. The guiding principles for the re-design and upgrading of the bus terminal are that the existing structures and shops will not be demolished and the impact to the livelihood of the affected parties during construction activities will be minimized to the maximum extent possible. Compensation will be provided to any affected parties.

D. Urban Public Spaces Improvement Projects - Green Spaces Development Projects

i. Current Status

170. There is lack of green spaces in Sialkot city and those parks that do exist are not well maintained.

ii. Proposed Projects

171. The following green space development projects are proposed:

- Rehabilitation of Gulshan e Iqbal Park;
- Rehabilitation of Capt. Saroosh Shaheed Park, Model Town;
- New Park along Khawaja Safdar Road on Defence land
- Development of green belts along circular road and drain side;
- Rehabilitation of Qila public space and restaurant development; and
- Rehabilitation of Captain Shroosh Park.

172. The proposed conceptual designs for three of these areas are set out below. They serve as templates for the types of improvements and developments to be implemented at other locations in Sialkot.

a. Redevelopment of Gulshan e Iqbal Park

173. This park was recently redeveloped with a water structure, fitness area and landscaped gardens. However, the TMA Sialkot would prefer the PICIIP to redevelop the park according to international standards.

174. Generally, the approach for the park's re-design is to provide a sporting and recreational green area for the needs and demands of all age groups (children, youth, adults and elderly) regardless of sex, physical abilities, including poor and vulnerable groups.

175. The existing water structure will be redeveloped into an 2,000 m^2 amphitheater for the youth to meet, relax and perform in the open air. This area can also function as an outdoor movie theatre if a movie screen is installed.

176. The existing fitness features, now grouped in a walled area, will be replaced along the proposed jogging track. The existing walking routes will mostly remain intact. A 2,000 m^2 childrens' play area will be developed with play structures and benches under shady trees. Each bench will be accompanied by a bin to take care of solid waste.

177. Separate washroom blocks for men and women will be provided. These washrooms will be constructed according to international standards for wheelchair access. Two toilets per block will be constructed, including bars and handles for handicapped users.

178. A 6,000 m2 landscaped walking route for elderly and handicapped will be incorporated into the existing park design, to which benches under shady trees as meeting and resting place will be added, as well as proper lightning to assure safety and comfort for its users.

179. A badminton court, table tennis tables and a landscaped garden, which will be fenced-off for girls use only, will be provided to take care of the needs and demands of girls above the age of 12.

180. A café with shaded terrace will be provided within the park. This terrace will be covered with a wooden structure grown with bougainvillia to provide for a shady and flowery environment to relax and have a snack or drink.

181. Two adjacent fenced-off 6,000 m^2 sporting areas will be developed separately for boys and girls to allow for their sporting and recreational demands in the open air. These

sporting areas will be multi-functional, with spaces available for cricket, hockey, baseball and tennis.

182. Waste bins will be provided next to each bench and close to the access gates. Lightning will be situated next to all access gates and at regular intervals along the walking routes and jogging tracks, next to the washrooms and around the sporting areas.

b. Redevelopment of Qila Park

183. The area located on the hill of the Sialkot fort contains offices and a park surrounded by wide roads. Proper car parking space is not available. The TMA has indicated that the police station and adjacent buildings will be demolished in favour of the development of a restaurant with a view over the city and a childrens' play area.

184. Two parking areas will be provided for cars, of both office workers and residents of the inner city of Sialkot. Parking for motorcycles will also be provided.

185. Together with the development of a pedestrian bridge from the Qila Park to the Bazaar area this will allow for visitors of the bazaar area to have easy access to the inner city, in which motorised transportation will be restricted from 11 am-6 pm.

186. The circular road will be closed to the west of the Qila and, in conjunction with the demolition of the police station, this leaves ample space for a walk way lined with King palm trees and a hill view restaurant, with a large terrace covered by a wooden structure grown with Bougainvillia to provide shade.

187. Adjacent to the restaurant, 2,000 m^2 landscaped gardens with shaded benches will form a meeting place for the elderly to enjoy the view of their city.

188. In the former park, a 2,000 m^2 children's play area will be developed, fenced off with shrubs and benches for the watching care takers under shady trees.

189. The auditorium area will remain as it is.

190. A 6,000 m^2 multifunctional sporting area will be fenced-off for playing cricket, hockey, baseball and tennis. Each game will be indicated by its own coloured lineage. Special daily hours will be allocated for the use of girls only.

191. A 1,500 m^2 picknic area, with picknic tables in the shade of trees, and with places for food stalls will be located close to the government offices. Here, both government employees and visitors to the inner city can enjoy their lunch in the open air.

192. A 2,000 m^2 fenced-off area for girls only will be developed where girls can sit and relax and enjoy the grassy environment with flowers or play badminton and table tennis.

c. Development of the Sialkot Food Corner

193. The green belt between the canal and the Khawaja Safdar Road is presently undeveloped and unattractive due to the bad odour from the contaminated canal, in which companies dump their untreated wastewater, and the traffic flow.

194. With the proposed improvements to drainage and storm water management this green belt area will become suitable for use as public space.

195. It is proposed that the land will be divided into (refer to Figure 3.12 and Figure 3.13):

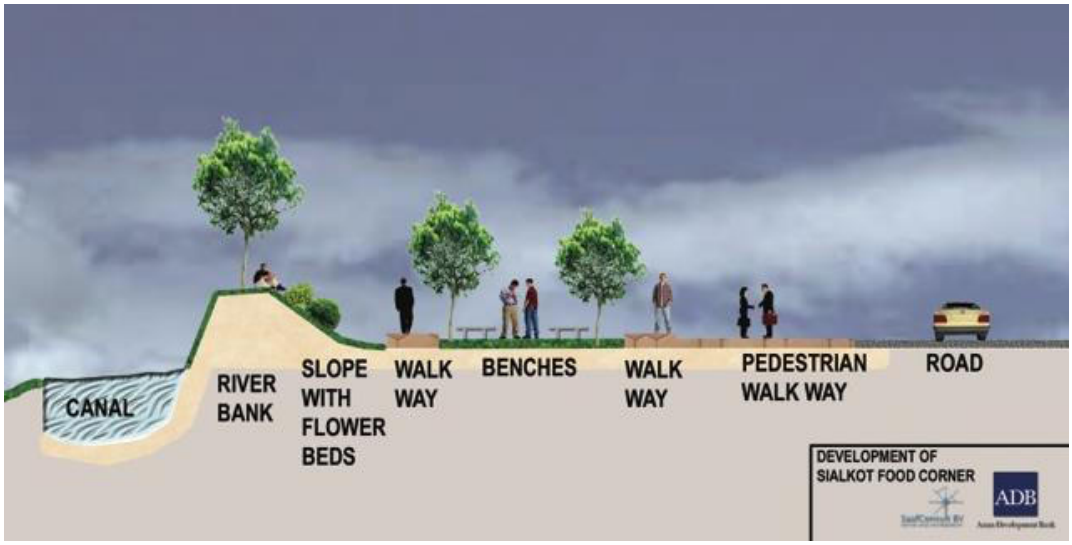
- a higher located canal bank with a walkway under King palm trees;
- a lower part comprising a 1,000 m^2 childrens' play area and a 1,000 m^2 resting and meeting place for the community under shady trees; and
- a 3 m wide pedestrian walkways with ample space for food stalls. Picnic tables on the green lawn will provide for a place to enjoy a snack or light meal.

196. A walking route will be developed and public washrooms will be provided with the appropriate size to allow access for wheelchair users, separated for male and female users.

197. Landscaped green shrubs and flower beds on the slope to the canal will provide for an attractive sight for passing cars.

Figure 3.12: Plan of the Proposed Sialkot Food Corner

Figure 3.13: Section Through the Proposed Sialkot Food Corner



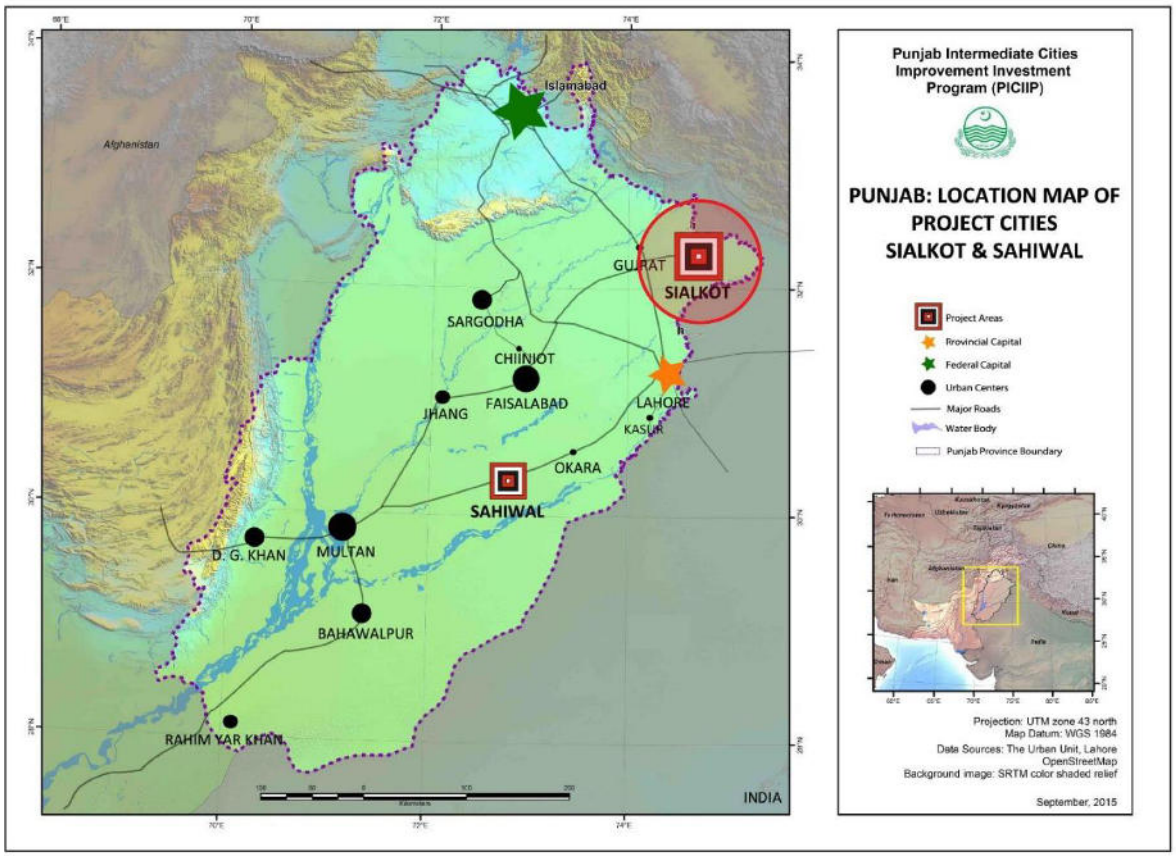
IV. ENVIRONMENTAL & SOCIAL BASELINE CONDITIONS

198. This Section describes the overall baseline environmental and social conditions of the area in which the subproject sites are located. The Section describes pertinent aspects of the physical resources, ecological resources and social resources of Sialkot City and adjacent areas.

A. Physical Resources

199. Sialkot is located in Province Punjab, approximately 125 km from Lahore in the northeast of Pakistan, in close proximity to the Indian border (Figure 4.1). It is an industrial city and famous for its leather, sports and surgical products. The city is not just an industrial fort, but has a colorful culture that is strongly interspersed with its vibrant past.

Figure 4.1: Location Map of Sialkot



i. Geography

200. Sialkot is situated at 32º 30‘ North latitude and 74º 30‘ East longitude, at 256 m above sea level. It is bounded in the north by Indian held Jammu and Kashmir, in the northwest by District Gujrat, in the southwest by the District Gujranwala, in the northeast by District Sheikhupura and Narowal District, the latter separated from Sialkot in 1981.

201. Its total area is 3,107 square kilometres. In the southeast Nullah Daik separates District Narrowal from District Sialkot and flows to Lahore. To the west of Sialkot, there is a vast fertile plain. The soil in the floodplain of the Nullah Daik and River Chenab is also very fertile.

202. There are two canals in the Sialkot District, namely the Upper Chenab and the Marala Ravi Link. These canals were derived from River Chenab and Marala Head Works in 1937 and 1955. In 1949, B.R.B canal was derived from Upper Chenab at Bambanwala.

ii. Climate

203. Sialkot is hot and humid during the summer and cold during the winter. The summer season runs from April and continues until October, whilst the winter season is from November to March.

204. June is the hottest month. The maximum and minimum temperatures during the month of June are about 40º and 25º Celsius respectively (Table 4.1).

205. January is the coolest month. The maximum and minimum temperatures during the month of January are about 19º and 5º Celsius respectively. The months of November and March are pleasant (Table 4.1).

206. Sialkot experiences significant seasonal variations in temperature with the average monthly temperature varying from 11.6º Celsius in January to 32.2º Celsius in June, with an average temperature over the coldest three months of the year of about 12.7º Celsius, rather lower than Lahore (Table 4.1).

iii. Rainfall

207. The mean annual rainfall is 957 mm, over half of which falls in the summer monsoon months of July and August, often resulting in flooding.

208. Sialkot has one of the most modern weather forecasting and flood warning centers in the country. This facility is equipped with radar and is internationally linked.

209. Summary details of temperatures and precipitation recorded at Sialkot are set out on Table 4.1.

Table 4.1: Monthly Climate Information for Sialkot

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temp Mean Value Cº	11.6	13.8	18.6	25.0	30.0	32.2	29.8	29.0	27.9	23.7	17.8	12.8
Mean Peak Temp. Cº	18.5	21.0	25.7	32.8	38.0	39.9	34.9	33.6	33.6	31.7	26.1	20.1
Mean Lowest Temp. Cº	5.0	7.1	11.8	17.3	22.0	25.1	25.1	24.8	22.3	16.0	9.6	5.6
Mean Monthly Rainfall (mm)	41.1	43.8	53.7	30.1	28.0	65.6	288.4	259.1	94.1	14.5	9.1	30.4

Source: Sialkot Weather Forecasting Center

iv. Relative Humidity

210. Maximum values of relative humidity are observed during the months of January and December. The values range between 76% and 36% during morning and evening times respectively.

211. Minimum values of relative humidity are observed in May, ranging from 45% to 22%, between the morning and evening times respectively.

v. Hydrology

212. Sialkot is situated in the Upper Rachna Doab, which is bounded by the Ravi and Chenab rivers. The Chenab River flows to the northwest of Sialkot, and the Marala Ravi Link Canals flow to the west.

213. Sialkot is traversed by three seasonal streams, comprising the Aik Nala, to the south of the city, the Bhaid Nala, between the Cantonment and the rest of the city, and the Pahlu Nala, north of the Cantonment.

214. The general slope of the land within the Doab is to the southwest and the area is an active flood plain, although floods are to a large extent controlled by irrigation and power generation works carried out on the Indian side of the border.

215. Sialkot sits over abundant shallow and deep groundwater aquifers which are used by both the city water supply system and inhabitants with wells for their water supplies.

vi. Geology

216. The area is underlain by Pleistocene deposits to a depth of several thousand metres. The first 200 metres of these deposits consist of approximately 70% silty sand interspersed with limited clay layers. The strata are generally heterogeneous with little vertical or lateral continuity.

217. The historic center of Sialkot is located between two seasonal watercourses (Bhaid Nullah and Aik Nullah). It occupies land that is elevated up to about 10 m above the surrounding areas. Apart from the central area, the city is generally flat. Overall, there is an east to west fall, from around 253 m in the east to about 245 m in the west, an average fall of about 1 in 1000.

vii. Floods

218. Every year Sialkot District is beset by floods which cause devastation and disruption of normal life. The situation is sometimes aggravated due to excessive rains, flash floods in 'Nullahs' and high floods in rivers.

219. Three rivers, that is the Chenab, Jammu Tawi and Munaawar Tawi, threaten Bajwat in the north. The area in the south of Marala Head works, including some villages of Sambrial, is affected by the downstream discharge of River Chenab. Pasrur Tehsil is mainly hit by flood in Deg Nullah.

viii. Seismicity

220. Pakistan lies in a seismically active zone. Seismic observations indicate that hundreds of shocks occur in the region every year. According to the seismic zoning map of Pakistan (Figure 4.2), included in Pakistan Building Code Seismic Provisions (2007), the project area falls under seismic zone 2A, with a peak horizontal ground acceleration of from 0.08 to 0.16.

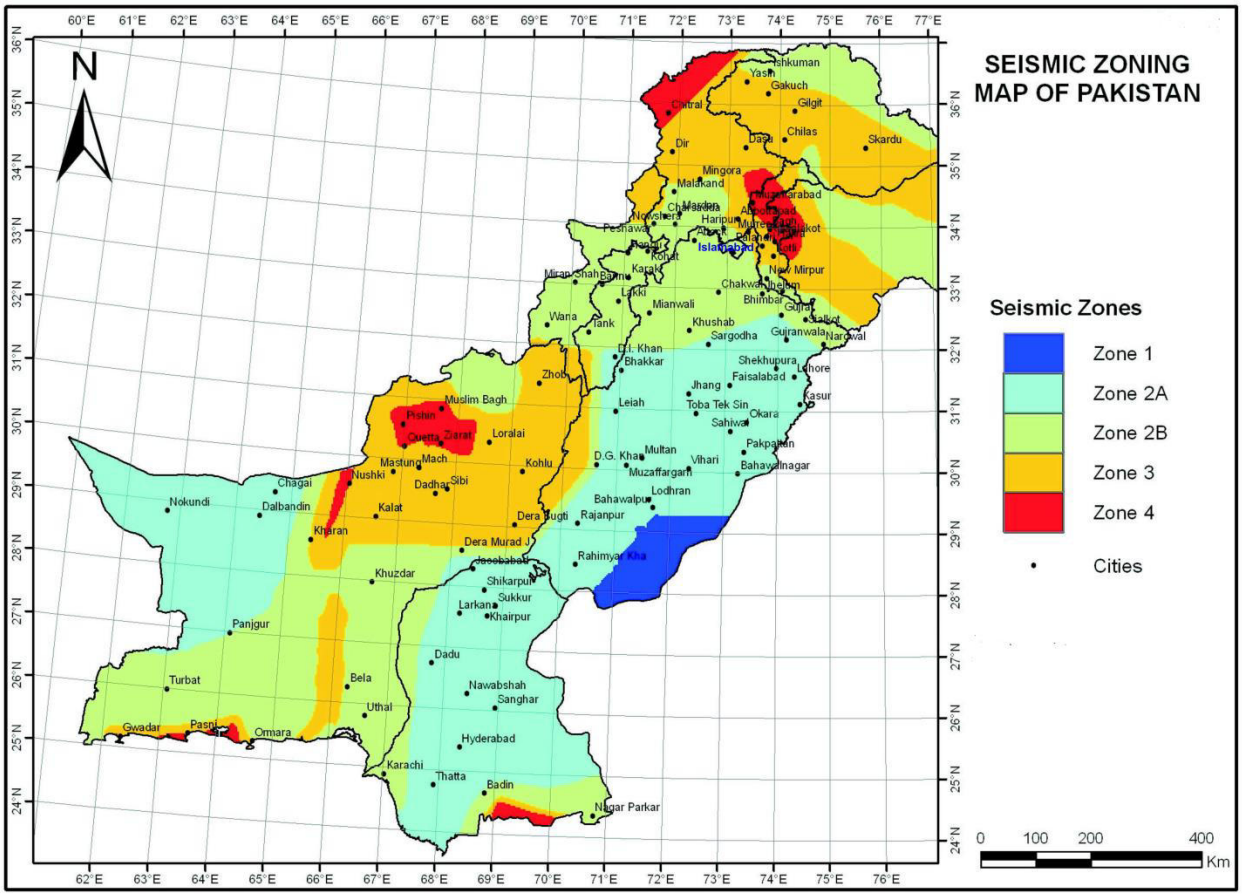
ix. Groundwater

221. Groundwater is the sole source of potable water exploited in Sialkot.

222. A shallow water table lies in the range of 13 m to 34 m below ground level, the upper levels of which produce limited quantities on mineralized water.

223. At a depth of 137 m to 152 m below ground level greater quantities of good quality groundwater are available and this is where the city‘s supplies are derived.

Figure 4.2: Seismic Zoning Map of Pakistan



224. The water table in recent years has been falling at a rate of 0.30 m per year. This is because of a combination of factors including pumping down and decreased rainfall and recharge. It is not clear whether the aquifer is being overexploited, but this is considered unlikely at present levels of abstraction in view of the wide dispersal of the tube wells.

225. The quality of groundwater of Sialkot city is summarized on Table 4.2. Compared to the National Standards for Drinking Water Quality (Pakistan EPA, 2010) and WHO Guidelines current groundwater quality does not meet all of the standards required for potable water. Turbidity is on the high side, whilst there is ubiquitous contamination by coliforms.

Table 4.2: Groundwater Quality Analysis

Parameter	Value [1]	NSDWQ/WHO
pH	7.7 – 7.87	6.5 – 8.5
Turbidity, NTU	1.4 – 10.8	< 5
Total Dissolved Solids (TDs), mg/l	300 – 320	< 1,000
Fluoride, mg/l	0.03 – 0.1	≤ 1.5
Nitrate, mg/l	0.6 – 1.2	≤ 50
Arsenic, mg/l	*BDL	≤ 0.05 / 0.01
Total Coliform, MPN/100 ml	12 - >23	Not detectable
Fecal Coliform, MPN/100 ml	1.1 - >23	Not detectable

[1] Source: PICIIP Feasibility Study Report, December 2016, * **BDL** Below Detection Limit

x. Wastewater Quality

226. The quality of the wastewater flowing in the Sialkot sewerage system is summarized on Table 4.3.

Table 4.3: Wastewater Quality Analysis

Parameter	Value
Biochemical Oxygen Demand (BOD_5), mg/l	61 - 226
Chemical Oxygen Demand (COD), mg/l	114 – 764
Total Suspended Solids (TSS), mg/l	50 – 760
Total Dissolved Solids (TDS), mg/l	420 – 800
Oil & Grease, mg/l	4 – 7

Source: PICIIP Feasibility Study Report, December 2016

B. Ecological Resources

i. Ecology

227. The Sialkot District was originally a part of the ecological zone called thorn forest. However, with the introduction of an extensive irrigation network of canals for the development of agriculture, industrial development and urbanization, the biological features and characteristics have been greatly changed. Most of the District is now deemed to be classified as agricultural zone with human related or human dependent fauna and flora.

228. Most parts of the Punjab are under very intensive irrigated cultivation. Sialkot District is no exception.

229. Sialkot District is host to a variety of flora. The indigenous trees are Lasoora, Bairy, Siris, Keeker, Phali, Khajoor, Toot and Paper Mulberry. These are commonly found along the edges of agricultural fields.

230. Approximately 2.17 % of the total area of the District is under human forest plantation with trees of economic importance, such as Shisham, Keeker and Mulberry, that are used in construction and the manufacture of sports goods and furniture.

231. Other introduced species are Mesquite, an invasive species, and Safeda. Sheesham Bohar and Bakain are also seen in and around the urban areas.

232. Livestock rearing is also practiced extensively, and milk animals are common. The use of chemical fertilizers and pesticides is very common.

233. Several species of wildlife have adapted to the changed habitat. These include: jackal, jungle cat, Bengal fox, small Indian mongoose, shrew, hog deer, ravine deer, black buck, blue bull, hares and rodent pests including porcupine, fruit bats and wild boar.

234. The avifauna which has survived the modified habitat include doves, black partridge, cuckoos, koel, woodpeckers, parakeets, bulbuls, babblers, black drongo, bee eaters, finches, owls, hawks and house sparrow.

235. The reptilian species of this modified habitat include krait, cobra, saw scaled viper, rat snake and monitor lizard.

ii. Protected areas / National Sanctuaries

236. There are several areas of land in Pakistan devoted to the preservation of biodiversity through the dedication of national parks and wildlife sanctuaries. However, there are no protected areas or national sanctuaries near the area of works and subproject sites.

237. Bajwat Game Reserve occupies about 54 km^2 of the Bajwat region in the Sialkot District. In addition, about 16 km^2 of the area around Marala Head works is also protected within the game reserve and is of considerable importance for wintering waterfowl.

238. Fortunately, from a planning perspective, all development activities foreseen under PCIIP are remote from these environmentally sensitive areas. These areas will not, therefore, be affected by any of the proposed interventions.

C. Economic Development

i. Overview

239. Sialkot is a major industrial center, specializing in leather products, surgical instruments, diesel engines, pharmaceuticals, steel rolling mills, textiles and sports goods. There are at least 264 tanneries, 244 leather garment producing units, 900 leather sports goods producing units, 57 rice husking mills and 14 flour mills in the city.

240. The history of industrialization of Sialkot is very old. The Damascene craftsmen of Sialkot (koftgars or koftars) were famous during the Mughal era for their fine swords and daggers. Papermaking in Sialkot dates back to the time of the Mughal Emperor Akbar and was famous all over the world. Brick making was another historic skill of the people of Sialkot and those bricks were known as the "Sialkoti Bricks" throughout South Asia. Most of the states in the South Asian region relied on the Sialkoti bricks for the erection of forts, castles, monuments, public buildings, infrastructure construction, etc.

241. In recent times Sialkot has achieved fame all over the world because of its sports equipment and Surgical Instruments manufacturing industry. The most successful sports manufacturing firms now have international collaborations with the well-known sports brands like Adidas (Germany), Puma (Germany), Nexo Sports (Canada), Nike (USA), Dita (UK), Mikasa Sports (Japan) and Slazenger (UK). In the recent past, however, lack of modernization and allegations of child labor usage have resulted in a loss of market share to new entrants in the business, from Thailand, Korea and China. The Sialkot Chamber of Commerce and Industry has now reduced significantly the incidents of child labor usage within the industry with the collaboration of the United Nations (ILO). Most of the companies have adopted the ISO standards.

242. The facilities of a dry port and recently built airport have contributed significantly towards its economic growth and Sialkot is now the third largest economic hub in Punjab after Lahore and Faisalabad. It is commercially linked with the Lahore Stock Exchange through its Sialkot branch, known as the Sialkot Trading Floor (STF). The State Bank of Pakistan and the Export Promotion Bureau of Pakistan has branch offices in Sialkot.

243. After Karachi, Sialkot is Pakistan's second largest source of foreign exchange earnings through its exports and remittances from overseas manpower. For the past several decades, the manufacturers and exporters of the city have been awarded the annual National Exports Award by the Federation of Pakistan Chambers of Commerce and Industry. Sialkot has an Industrial Estate and an Export Processing Zone. Another Export Processing Zone is planned along the Sialkot-Lahore Motorway. The per capita income of Sialkot is ranked among the highest in Pakistan.

ii. Land Use

244. Land uses in Sialkot City are mixed, and in many cases incompatible. Sialkot would benefit from stronger land use controls, to prevent potentially harmful activities from being located near residential areas and vice versa. Table 4.4 presents the areas and proportions of various land uses in Sialkot:

Table 4.4: Land Use Distribution in Sialkot

#	Land Use	Area		% of Total Area
		Acre	Sq. Km.	
1	Residential	1,836.81	7.44	46.0
2	Commercial	363.44	1.47	9.1
3	Agricultural	169.32	0.69	4.2
4	Public Buildings	151.96	0.62	3.8
5	Religious	38.10	0.15	1.0
6	Education	87.48	0.35	2.2
7	Health	52.05	0.21	1.3
8	Industry	322.36	1.31	8.1
9	Graveyard	91.02	0.37	2.3
10	Parks/Open Spaces	256.13	1.04	6.4
11	Vacant Area	284.52	1.15	7.1
12	Unidentified Parcels	338.00	1.37	8.5
Total Area		**3,991.19**	**16.17**	**100**

245. Sialkot has very few green areas or parks (Table 4.4), with the most prominent being Gulshan-e-Iqbal Park, off Narowal Road, a park in the Cantonment and the stadium. There is a need for more open spaces, more space for industrial activities and a better-defined road network, in both core city and contiguous areas.

246. Eleven arterial roads radiate out from the Sialkot City center and link it with surrounding agricultural areas, other cities and Sialkot International Airport, which lies about 20 km to the west of the City Centre. The airport road also connects to the Dry Port and proposed new Tanneries' Industrial Estate. This may become Sialkot's major growth direction.

247. Industries and housing estates have developed in a ribbon pattern along all of the north, west and south radial roads. Agricultural communities close to the roads and to industries are fast becoming urbanized.

iii. Industrial Land Use

248. Industries have developed in a ribbon pattern along all of the north, west and south radial roads, as have housing estates. Industrial land uses within the central city are scattered throughout the area along Wazirabad Road and in the small Industries estates along Haji Pura, Daska, Emanabad, Narowal, Defense, Kullowal roads and north of the Railway Station.

249. Commercial land uses, once concentrated in the area around the fort, are now found in outlying areas such as Defense Rd., Paris Rd., Saddar in the Cantonment and along major roads.

250. There are about 3,000 large, medium and selected small industries in Sialkot District, some located in the central city areas and many along the arterial roads leading out of the city. Together, they employ about 22,300 persons.

251. Industries located along Gujranwala Road include Redo factory, Micro Corporation, Europlus, Saga Sports, Taj Mahal Factory, Phonix Cutlery, Remix Factory, Tata Sports, Motor Bike Apparel, numerous leather goods factories, Awan Sports, Taylon Industries, Pakol Industry and many more. Sambrial Road has significant tanneries along it, particularly between the two canals, east of the Dry Port. On Pasrur Road, there are mixed land uses along the segment closer to Sialkot urban area, but there are many rice mills along the outer segments of this road. There are however no significant developments along Eminabad Road and Zafarwal Road outside urban limits.

252. There is an industrial complex in Sambrial, in the vicinity of the airport. This includes an export processing zone, a dry port and a number of industries around it and all along Wazirabad Road, which passes through Sambrial. These industrial developments, as stated earlier, are near the airport. An industrial estate for tanneries is also proposed near the airport. For this purpose, an area of 155 hectares (384 acres) has been acquired.

iv. Commercial

253. The city has a number of commercial areas, including the area immediately north of the fort. In addition to the older, more traditional areas high-end commercial, financial and related activities have been developed, making the city, once single-centered on the commercial areas around the fort, now multi-centered.

v. Institutional

254. Institutional land uses are also prominent, in areas such as Katchary Road, Beetshania Hospital, Allama Iqbal Memorial Hospital, the WAPDA offices and similar areas.

vi. Settlement Patterns

255. Settlement in Sialkot started with the 5,000-year-old fort on the central hill and has proceeded to expand in a more or less organic, low-rise manner since. The only formally planned part of Sialkot is the Cantonment Area. The traditional rural settlement pattern of tightly developed compact villages, chaks, have had a significant influence on Sialkot's urban form and settlement patterns as they have become absorbed into the main urban area.

256. The dominant and most problematic current settlement pattern is an unplanned and uncontrolled sprawl. This takes three main forms:

- individual industrial developments, primarily along major traffic arteries;
- small-scale commercial or individual houses developed in an ad hoc manner, and
- the larger scale "housing societies" where significant sized pieces of land are converted from agriculture to multi-unit private residential development. These again occur without planning approval

vii. Agriculture

257. The majority of the population in Sialkot District depend on agriculture. The major crops of District Sialkot are wheat, rice and sugarcane. Their average annual production over the period 1998-2001 was 453,000, 242,600 and 11,000 metric tons, respectively. A variety of vegetables are also grown in the District.

258. There are two seasons called Rabi and Khareef. Study of cropping patterns indicates an increasing stress on food crops, mainly wheat and rice, and the cash crop cotton.

viii. Livestock

259. The population of cattle, buffaloes, sheep and goats was 195,000, 471,000, 42,000 and 137,000 head respectively. For poultry, there were 954 broiler, 134 layer and 9 breeding poultry farms, having a rearing capacity of 1,115,000, 747,000 and 63,000 birds respectively. The annual availability of hides and skins is estimated at 536,000 pieces. There exists a scope for dairy farms, animal/poultry feed and cattle/sheep/goat fattening farms.

ix. Irrigation

260. The source of Upper Chanab Canal and Marala Ravi Link Canal is Marala Head works located in the north-west of Sialkot District.

261. Upper Chanab Canal irrigates Kharif crops of Daska Tehsil. The Marala Ravi Link Canal irrigates parts of Sialkot, Pasrur and Daska Tehsils.

262. Rice is in abundance in canal fed areas. Irrigation from well is carried on throughout the District wherever water can be found, except in the Bajwat, Doshi and riverine circles where wells are hardly necessary. In the Aik and Charhari circles, constant supply of water is found everywhere. Irrigation from the Degh consists mainly of over spill, but in the lower reaches, lift by Jallars is sometimes employed.

x. Power

263. Sialkot does not have an adequate, reliable and uninterrupted 24/7 power supply. Interruptions are frequent forcing industries, other businesses and many residents who can afford it to rely on back-up diesel generators. These are costly, environmentally degrading and generally a poor second option.

264. Power generation and primary distribution is generally beyond a single urban center's capacity to manage and relies on provincial and national government support. A city with reliable power enjoys an immediate competitive advantage. Solar options are increasing in popularity and should be promoted for institutional and residential use, but the technology has not reached the stage whereby it can be the sole source for heavier industry.

xi. Industrial Activity

265. Sialkot is well known for its sports goods, such as footballs, hockey sticks, cricket bats, all kinds of sports gloves and sportswear, and enjoys an excellent reputation in the international market. The basic raw materials are leather and mulberry wood that are available locally.

266. The Pakistan sports good industry is facing severe competition from countries including China, Taiwan, India and South Korea. There is a need to modernize and mechanize the Industry for the improvement in quality and consequently in export.

267. Sialkot enjoys specialized skills in surgical instrument manufacturing. Products are exported to high income markets, including the USA, Germany and France.

268. Stainless steel and steel forgings, both imported as well as local, are major industrial inputs. The other materials required are processed chemicals. The manufacturers have concerns about the quality of the local steel, as it reportedly doesn't conform to health grade steel. Steel is mainly imported from Japan, France, Germany and Taiwan. Due to

volatile prices of imported raw material the Sialkot based firms find it difficult to do long term forecasting. There is a shortage of good quality Titanium because its import is banned. Titanium is, thus, taken from ship breaking which causes air bubbles in the material.

269. The Leather industry makes up the second largest export-earning sector after textiles in Pakistan. Currently, the Sialkot sector of Leather is contributing around USD 457 million in 2013 but has the potential to multiply volume of exports with the improvement of quality and diversification in the range of products manufactured. Leather is the basic raw material. Pakistan is fortunate that the raw material required by the industry is available in the country in abundance. Local availability of raw materials and low wage cost gives the country a competitive edge in the world market.

270. The issues being faced by the leather industry are insufficient level of modernization and technology up gradation, low labor productivity, lack of confidence among small manufacturing establishments, environmental problems, new regulations of environmental and social compliance and lack of market information. There is stiff competition from regional players such as China, India, Turkey, Thailand, Indonesia, etc. However, there are opportunities in terms of room for capacities utilization, product diversification and new markets. Sialkot can diversify further in Leather Goods for industrial use sector.

xii. Water Supply Service

271. Sialkot's water supply is good by Pakistan standards. There are about 43,469 connections in the town (39,658 domestic), which serve about 87% of the population within the old Municipal Corporation limits but only about 35% of the total urban population, excluding the Cantonment. However, according to the Administrator TMA Sialkot, the water supply coverage recently has increased closer to 50%. There are approximately 5,500 connections in the Cantonment, covering an estimated 38,500 people or about 47.5% of the civilian population of the Cantonment.

272. The existing distribution system consists of one large interconnected system and four small discreet systems on the western side of the city. The estimated total length of main is about 198 km. The water supply distribution network is very old with rusted pipes, which result in mixing of sewage in the water supply lines, and significant amount of drinking water is wasted due to leakages.

xiii. Sewerage System Service

273. Sialkot is served partly by sewers and partly by open and covered drains. The sewers are in poor condition and blocked in many places. The main system served the center of the city and the area to the west, discharging up to a 1,372 mm diameter trunk sewer along Roras Road, which conveys wastewater to a main pumping station at Mianapura. This was intended to lift wastewater into the Bhaid Nullah.

274. The majority of the existing drains do not function due to filling in by adjacent shop owners and/or use of drains for dumping solid waste.

xiv. Solid Waste Management

275. Sialkot's solid waste management (SWM) system is in a state of disarray. The city currently generates about 350 tons of municipal solid waste daily, or about 125,000 tons per year. Of the 125,000 tons per year of municipal solid waste generated, only 25 percent enters the municipal waste system, leaving 75 percent of the population without waste collection. Practically all-municipal waste is burned, dumped or buried illicitly on vacant land throughout the city, causing significant environmental damage and posing a health hazard.

276. Population growth and increase in its economic activity means that Sialkot's daily waste generation is destined to accelerate to about 195,000 tons per year by 2020, and then to about 300,000 tons per year by 2030. Furthermore, poor solid waste management impedes road efficiency, blocks drainage leading to flooding, and generally contributes to a degraded urban environment.

277. Numerous examples of individual recycling efforts are noted throughout the city involving plastic bottles, cardboard and metal. Private entrepreneurs, both informal and semi-formal are undertaking this. There is no official recycling facility in Sialkot to take direct advantage of this collection; instead, there are at least 8 smaller facilities processing plastic bottles and generating employment.

xv. Transport

278. Sialkot is about two hours by road from Lahore and four hours by road from Islamabad. Sialkot is linked with the National Highway N-5 through Gujranwala and Wazirabad. A dual carriage-way is available between Sialkot and Wazirabad.

279. A new bridge on the Chenab River, called the Shahbazpur Bridge, is under construction to the north-east of Gujrat. Once completed, it will connect Sialkot to N-5 at Gujrat.

280. The Sialkot-Lahore Motorway (M-11) is also under construction.

281. All the bus and commuter coach stations are located on the Jail Road. A bus service operated by Daewoo Express is available from Sialkot to Rawalpindi, Lahore, Gujranwala and Multan.

282. Sialkot's internal public transit consists almost entirely of informally operated small buses/vans and auto rickshaws, which together account for 20% of inner city traffic. Only two formal bus routes operate within the city. In addition, several of the larger industries operate their own employee transport services to facilitate easy access to work and home.

283. The absence of any significant traffic management means that transit operations are not efficient and both constrain and are constrained by the multiple road uses and resulting congestion. For intercity transport there are three bus terminals, including the Daewoo Terminal handling luxury bus connections to Lahore, Islamabad and other urban centers.

284. The Sialkot Chamber of Commerce & Industry (SCCI) has signed an MOU with American bus company FOTON to provide air-conditioned local transport to the citizens with CNG fuel. However, the main mode of transport within the city at present is the auto rickshaw. Although no proper taxi service exists in the city, there are many rent-a-car service outlets.

285. Although the road network in the city is well developed, and recently executed road improvements carried out through joint efforts of SCCI and the Government has resulted in improved road surface conditions in most of city areas, the main problems lies in traffic management. Road junction layouts, utilization of road space, absence of pedestrian facilities, uncontrolled road side parking and absence of enforcement of traffic regulatory control measures result in severe congestion and pollution. Additionally, irrespective of the public transit initiative referenced above, public transport overall is inadequately developed with only two formal bus routes operating in the city.

286. Sialkot is served by Pakistan Railways through the Sialkot Junction. Sialkot used to be a junction in the British era with trains leaving for Jammu and Gurdaspur. Plans are under consideration to open the border for an international train service between Sialkot and Jammu. Express trains to and from Narowal, Lahore, Rawalpindi, Faisalabad, Multan,

Bahawalpur and Karachi are available daily. The Railway station is situated in the center of the city. Other suburban train stations are Ugoki and Sambrial.

287. Sialkot International Airport is the first-ever private-sector airport of Pakistan managed by the SIAL consortium. It is located near Sambrial and is noted for having the longest runway in Pakistan. Direct flights are available from Sialkot International Airport to Karachi, Islamabad, Abu Dhabi, Sharjah, London, Muscat Kuwait, Dubai and Jeddah. Pakistan International Airlines has plans to start non-stop flights from Sialkot to Manchester, London, Barcelona. Hajj flights have started from the Sialkot International Airport last year in 2009.

288. A small Sialkot Cantonment Airport, located in the Sialkot Cantonment, is in use byf the aviation wing of the Pakistan Army. This airport was also used as a public airport by PIA for operating a Helicopter service from Sialkot to Islamabad in 1995-1996.

289. Sialkot Dry Port carries the honor of being the first-ever private-sector dry port in Asia. It was established in 1986 near Sambrial, about 20 km from Sialkot City under the control of the Sialkot Dry Port Trust.

D. Social and Cultural Resources

i. Employment

290. Sialkot has more than 3,000 factories. These provide the majority of employment. This will have a significant impact on present and future Sialkot. The following summary points are of particular interest with respect to the Sialkot District (specific data for Sialkot urban center is not available, but may be somewhat different given the industrial focus):

- Overall labor force participation is below the national average at 45% compared to 53.5% nationally;
- The official unemployment rate is 6.6% compared to a national average of 5.3%;
- The share of employment in the informal sector is close to the national average at 69% for Sialkot compared to 72.9% nationally;
- Informal Sector employment comprises:
  - 33% in manufacturing;
  - 16% in construction;
  - 33% in trade and hospitality; and
  - 10% in personal services,
- Sialkot has the lowest unemployment for all levels of education compared to national averages and other surveyed Districts;
- The distribution of employment by major occupation groups is similar to the national averages, except with respect to “Craft and Related Trades Workers” where Sialkot exceeds all other Districts and at 33.9% is more than double the national average of 14.8%. This clearly reflects Sialkot’s unique and historical industrial activity; and
- With respect to the sub-sector of “Precision, handicraft, printing and related trades workers” Sialkot excels with 20.2%, almost 4 times the national average of 5.5%, again reflecting Sialkot’s unique industries.

ii. Education

291. Sialkot has a fairly well-developed educational infrastructure that comprises a sub-campus of the Fatima Jinnah Women University, a sub-campus of the Virtual University of Pakistan,

8 Degree Colleges for Women, 5 Degree Colleges for Men, 2 Cadet Colleges, 6 Commerce Colleges, one Law College, one Medical College, one Homeopathic Medical College, one Nursing School, one Para- Medical School, one Poly-Technique Institute, with numerous Inter Colleges, Higher Secondary Schools and over 250 High Schools. The University of Engineering Sciences and Technology (UEST) was recently established in collaboration with the Royal Institute of Technology, Sweden on the Sialkot-Lahore Motorway and will also incorporate the development of a Technology Park.

iii. Health

292. This District like others in Pakistan has faced and will continue to face water-borne diseases such as cholera and diarrhea, Respiratory Tract Infections (RTIs), dengue virus, malaria, hepatitis B & C and skin diseases. The District Health Department has prepared a disaster management plan to deal with disastrous situation in the District through its own resources by integrating with other District departments.

293. There are four District Hospitals, at Sialkot, Daska, Sambrial and Pasrur, and over 20 other hospitals or specialized care facilities. In addition, there are 27 Basic Health Units in the Sialkot Tehsil alone, with considerably more scattered throughout the other three Tehsils comprising Sialkot District.

iv. Cultural Heritage

294. The old city of Sialkot is a great center of Punjabi culture with many important historical and religious sites and buildings amongst the fascinating labyrinth of narrow streets and crowded bazaars.

295. The centuries-old historical Sialkot fort has been badly affected through a lack of maintenance and investment, and by illegally encroachments surrounding the fort, badly damaging the natural beauty of this fort.

V. ASSESSMENT OF ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

296. This Section identifies and describes the potential impacts, both positive and negative, on the environment and public health of the construction and operation stages of the proposed projects.

297. In assessing the impacts of project proposals, it should be noted that the overall environmental impacts of the subprojects are deemed to be strongly positive since the objectives of the projects are to:

- provide continuous safe water to the residents;
- improve the management and disposal of sewage to reduce the exposure of pollutants to local residents; and
- improve roads and landscaping of the city.

298. Overall these projects are designed to prevent or alleviate the effects of pollutants on the human and natural environments.

A. Assessment of Risk – Environmental Aspects

299. The impact significance is categorized by considering the severity of the risk on the environment and human health and the probability of occurrence.

300. To assess the threat posed by a hazard (*i.e.* risk), the principal factors to be considered are:

a) the likelihood that the threat may be realised; and

b) in the event of realisation of the threat, the nature and extent of the consequences.

301. A qualitative risk assessment methodology has been adopted for this project, comprising the Likelihood and Consequence values detailed in Table 5.1 and Table 5.2.

Table 5.1: Qualitative Likelihood Values

Likelihood Indicator	Likelihood Description	
A	Almost Certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur at some time
D	Unlikely	Could occur at some time
E	Rare	May only occur in exceptional circumstances

Table 5.2: Qualitative Consequence Values

Consequence Indicator	Consequence Description	
1	Insignificant	Negligible, reversible, requires very minor or no remediation / minor injury with slight negative health impact
2	Minor	Reversible, requires minor remediation / major, non-fatal health impact to one or more individuals
3	Moderate	Reversible, short-term effect, requires moderate remediation / severe, non-fatal health impact to one or more individuals
4	Major	Serious impact, medium term effect, requires significant remediation / single fatality or severe irreversible disability or impairment
5	Catastrophic	Disastrous impact, long term effect, requires major remediation / multiple fatalities, major permanent health impacts on a large number of individuals

302. On the basis of a likelihood and consequence matrix (Table 5.3), each hazard may be categorised into broad 'risk categories' and the required management approach for each risk category can be defined.

Table 5.3: Risk Matrix – Risk Categories and Management Response

		Consequence				
		1	**2**	**3**	**4**	**5**
Likelihood	**A**	M	M	H	H	H
	B	L	M	H	H	H
	C	L	L	M	H	H
	D	L	L	L	M	H
	E	L	L	L	M	M

H = High Risk – Proposed works methods not acceptable and must be altered.
M = Moderate Risk – Detailed management action plan to be prepared, including monitoring program.
L = Low Risk – Routine management procedures to be defined and monitoring requirements to be specified.

B. Anticipated Environmental Impacts

i. Anticipated Environmental Impacts due to Project Location

303. The environmental impacts related to the location of the projects are mostly in the areas of physical setting, socioeconomic setting, ecological setting and special areas (archaeological sites etc.).

304. The proposed project components are described in Section III. Field inspections and consideration of the project locations indicate that the adverse impacts of the projects due to their locations are mostly in the category of 'insignificant', given that:

- none of the subprojects involve the development of greenfield sites;
- all of the water supply, sewerage and drainage, green spaces development and transport routes improvement projects will be implemented within the already heavily urbanized, and hence degraded, developed areas of the city of Sialkot; and
- there is no permanent displacement or impact on any inhabitants and local communities in the vicinity of the project proposals.

ii. Anticipated Environmental Aspects and Potential Hazards – Construction Phase

305. The potential hazards posed by construction activities are presented by environmental aspect in Table 5.4 to Table 5.10 inclusive.

306. Appropriate management actions for all of the potential environmental hazards shall be developed during project implementation on the basis of the level of risk assessed for each hazard identified. The potential hazards and assessment of risks are identified for following elements:

- Soil;
- Air quality;
- Noise;
- Traffic;
- Solid waste;
- Sanitary wastewater; and
- Health & Safety.

Table 5.4: Subproject Activities, Potential Hazards and Assessment of Risk – Soil

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Rehabilitation of existing OHRs (replacement of doors/windows, plastering, minor structural repair, cleaning, valves and pipeline connection)	Temporary and localized soil contamination for short period of time at specific place due to spillage of solvent/paint/chemicals on soil during repair and maintenance activities	B1 – Low
Replacement of rusted/damaged pipelines	Temporary and localized soil pollution for short period of time due to spillage of fuel/lubricant from construction camps, maintenance of vehicles and machines and excavation and construction activities	C2 – Low
Replacement of asbestos pipelines	Temporary and localized soil pollution for moderate period of time due to spillage of fuel/lubricant from construction camps and maintenance of vehicles and machines Deposition of asbestos to soil if degraded pipes or broken pipes exposed.	B2 – Moderate

Subprojects/Activities	Potential Hazard	Assessment of Risk
Sewerage		
Sewerage pipes replacement	Temporary and localized soil pollution for short period of time due to spillage of fuel/lubricant from construction camps, maintenance of vehicles and machines and excavation and construction activities	C2 – Low
Transport		
Improvement/upgradation of bus stand	Temporary and localized soil pollution for short period of time due to spillage of fuel/lubricant from construction camps, maintenance of vehicles and machines and excavation and construction activities	B2 – Moderate
Green Spaces		
Improvement/upgradation of public spaces and parks	Temporary and localized soil pollution for short period of time due to spillage of fuel/lubricant from construction camps, maintenance of vehicles and machines and excavation and construction activities	C2 – Low

Table 5.5: Subproject Activities, Potential Hazards and Assessment of Risk – Air Quality

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Development of DNI zones (Installation of water meters at houses, replacement of pipelines, disposal of old pipes)	Temporary and localized dust emissions due to excavation and refilling activities for laying the pipelines for short periods of time	B1 – Low
Rehabilitation of existing OHRs (replacement of doors/windows, plastering, minor structural repair, cleaning, valves and pipeline connection)	Temporary and localized dust emissions due to repair and maintenance work for short period of time	B1 – Low
Replacement of rusted/damaged pipelines	Temporary and localized dust emission due to excavation and refilling activities for laying pipelines and movement of construction vehicles for moderate periods of time	B2 – Moderate
	Release of mal-odors from exposure and removal of pipes for moderate periods of time	B2 – Moderate
	Localized and low intensity vehicular emissions due to transportation of pipes and accessories to the sites	B1 – Low
Replacement of asbestos cement pipelines	Temporary and localized dust emission due to excavation and refilling activities for laying new pipelines and movement of construction vehicles for moderate period of time	B2 – Moderate

Subprojects/Activities	Potential Hazard	Assessment of Risk
	Release of mal-odors from exposure of pipes for moderate periods of time	B2 – Moderate
	Localized and low intensity vehicular emissions due to transportation of pipes and accessories to the sites	B1 – Low
Replacement of inappropriate sized pipelines, Realignment of inappropriately laid pipelines at Fateh Garh Distribution System	Temporary and localized dust emission due to excavation and refilling activities for laying pipelines and movement of construction vehicles for moderate period of time	B2 – Moderate
	Release of mal-odors from exposure and removal of pipes for moderate periods of time	B2 – Moderate
	Localized and low intensity vehicular emissions due to transportation of pipes and accessories to the sites	B1 – Low
Sewerage		
Sewerage pipes replacement	Temporary and localized dust emission due to excavation and refilling activities for laying pipelines and movement of construction vehicles for moderate period of time	B2 – Moderate
	Release of mal-odors from exposure and removal of pipes for moderate periods of time	B2 – Moderate
	Localized and low intensity vehicular emissions due to transportation of pipes and accessories to the sites	B1 – Low
Transport		
Improvement of section of Kashmir Road	Temporary and localized dust emission due to construction activities for short period of time	B1 – Low
Improvement/up-gradation of bus stand	Temporary and localized dust emission due to construction activities (demolition of structures, mixing of material, movement of machines and vehicles)	B2 – Moderate
	Localized and low intensity vehicular emissions due to transportation of construction material and disposal of construction debris	B1 – Low
	Localized and low intensity generator emissions	B1 – Low
Green Spaces		
Improvement/upgradation of public spaces and parks	Temporary and localized dust emission due to construction activities	B1 – Low
	Localized and low intensity vehicular emissions due to transportation of construction material and disposal of construction debris	B1 – Low

Table 5.6: Subproject Activities, Potential Hazards and Assessment of Risk – Noise

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Replacement of pumps and motors	Low intensity localized noise generation due to dismantling and placement of pumps and motors activities under enclosed structures for short period of time	B1 – Low
Provision of switchgear and electrical installation	Low intensity localized noise generation due to installation of electrical appliances activities at tube wells under enclosed structures for short period of time	B1 – Low
Improving efficiency of tube wells (repair and maintenance of pumps and motors)	Low intensity localized noise generation due to repair and maintenance activities under enclosed strictures for short period of time	B1 – Low
Development of DNI zones (Installation of water meters at houses, replacement of pipelines, disposal of old pipes)	Low intensity localized vehicular noise due to movement of pipes and accessories carrying vehicles and construction machineries for short period of time	A1 – Moderate
Rehabilitation of existing OHRs (replacement of doors/windows, plastering, minor structural repair, cleaning, valves and pipeline connection)	Low intensity localized noise generation due to repair and maintenance work for short period of time	B1 – Low
Replacement of rusted/damaged pipelines	Low intensity localized noise generation due to pipe laying activities and movement of vehicles and machineries for moderate period of time	A2 – Moderate
Replacement of asbestos cement pipelines	Low intensity localized noise generation due to pipe laying activities and movement of vehicles and machineries for moderate period of time	A2 – Moderate
Replacement of inappropriate sized pipelines, realignment of inappropriately laid pipelines at Fateh Garh Distribution System	Low intensity localized noise generation due to pipe laying activities and movement of vehicles and machineries for moderate period of time	A2 – Moderate
Sewerage		
Sewerage pipes replacement	Low intensity localized noise generation due to pipe laying activities and movement of vehicles and machineries	A2 – Moderate
Rehabilitation of disposal stations (Replacement of pump and motor, improvement of electrical panels, repair and maintenance of pumps and motors and civil work)	Low intensity localized noise generation due to repair and maintenance work at disposal station (enclosed structures) for short period of time	B1 – Low
Transport		
Improvement of section of Kashmir Road	Low intensity localized noise generation due to construction activities	A1 – Moderate

Subprojects/Activities	Potential Hazard	Assessment of Risk
Improvement/upgradation of bus stand	Low intensity localized noise generation due to construction activities (demolition of structures, mixing of material, movement of machines and vehicles) for moderate period of time	A2 – Moderate
	Low intensity localized noise from generator for short period of time	B1– Low
Green Spaces		
Development of green space along drain side	Low intensity localized noise generation due to movement of machines for short period of time	B1 – Low
Rehabilitation of Gulshan-e-Iqbal and Qila parks	Low intensity localized noise generation due to movement of machines for short period of time	B1 – Low

Table 5.7: Subproject Activities, Potential Hazards and Assessment of Risk – Traffic

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Replacement of pumps and motors	Low traffic volume increase by the vehicles carrying pumps, motors and accessories	B1 – Low
Provision of switchgear and electrical installation	Low traffic volume increase by the vehicles carrying electrical appliances	B1 – Low
Improving efficiency of tube wells (repair and maintenance of pumps and motors)	Low traffic volume increase by the vehicles carrying pumps, motors and accessories	B1 – Low
Development of DNI zones (Installation of water meters at houses, replacement of pipelines, disposal of old pipes)	Low traffic volume increase by the vehicles carrying pipes and accessories Temporary blocking of access	B1 – Low
Rehabilitation of existing OHRs (replacement of doors/windows, plastering, minor structural repair, cleaning, valves and pipeline connection)	Low traffic volume increase by the vehicles carrying construction material and accessories Temporary blocking of access	B1 – Low
Replacement of rusted/damaged pipelines	Low traffic volume increase due to transportation of construction material and accessories	B1 – Low
	Localized traffic congestion at pipe laying area for short period of time Temporary blocking of access	B2 – Moderate
Replacement of asbestos cement pipelines	Low traffic volume increase due to transportation of construction material and accessories	B1– Low
	Localized traffic congestion at pipe laying area for short period of time Temporary blocking of access	B2 – Moderate

Subprojects/Activities	Potential Hazard	Assessment of Risk
Replacement of inappropriate sized pipelines, realignment of inappropriately laid pipelines at Fateh Garh Distribution System	Low traffic volume increase due to transportation of pipes and accessories	B1 – Low
	Localized traffic congestion at pipe laying area for short period of time Temporary blocking of access	B2 – Moderate
Sewerage		
Sewerage pipes replacement	Low traffic volume increase due to transportation of pipes, construction material and accessories	B1 – Low
	Localized traffic congestion at pipe laying area for moderate period of time Temporary blocking of access	B2 – Moderate
Transport		
Improvement of section of Kashmir Road	Localized traffic congestion due to construction and maintenance activities for short period of time Temporary blocking of access	B1 – Low
Improvement/up-gradation of bus stand	Low traffic volume increase due to transportation of construction material and accessories and disposal of debris	B2 – Moderate
	Localized traffic congestion for moderate period of time Temporary blocking of access	B2 – Moderate
Green Spaces		
Development of green space along drain side	Low traffic volume increase due to transportation of construction material and accessories and disposal of debris	B2 – Moderate
Rehabilitation of Gulshan-e-Iqbal and Qila parks	Localized traffic congestion for moderate period of time	B2 – Moderate

Table 5.8: Subproject Activities, Potential Hazards and Assessment of Risk – Solid Waste

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Replacement of rusted/damaged pipelines	Low volume localized generation of domestic solid waste from construction camps for moderate period of time	B1 – Low
Replacement of asbestos pipelines	Low volume localized generation of domestic solid waste from construction camps for moderate period of time	B1 – Low
Replacement of inappropriate sized pipelines at Fateh Garh Distribution System	Low volume localized generation of domestic solid waste from construction camps for short period of time	B1 – Low

Subprojects/Activities	Potential Hazard	Assessment of Risk
Sewerage		
Sewerage pipes replacement	Low volume localized generation of domestic solid waste from construction camps for moderate period of time	B1 – Low
Transport		
Improvement/up-gradation of bus stand	Low volume localized generation of domestic solid waste from construction camps for moderate period of time	B1 – Low
	Low volume generation of construction waste for moderate period of time	B1 – Low
Green Spaces		
Development of green space along drain side	Low volume localized generation of domestic solid waste from construction camps for moderate period of time	B1 – Low
Rehabilitation of Gulshan-e-Iqbal and Qila parks	Low volume generation of construction waste for moderate period of time	B1 – Low

Table 5.9: Subproject Activities, Potential Hazards and Assessment of Risk – Sanitary Wastewater

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Development of DNI zones (Installation of water meters at houses, replacement of pipelines, disposal of old pipes)	Low volume localized generation of sanitary wastewater from construction camps for short period of time	B1 – Low
Replacement of rusted/damaged pipelines	Low volume localized generation of sanitary wastewater from construction camps for moderate period of time	B2 – Moderate
Replacement of asbestos pipelines	Low volume localized generation of sanitary wastewater from construction camps for moderate period of time	B2 – Moderate
Replacement of inappropriate sized pipelines, realignment of inappropriately laid pipelines at Fateh Garh Distribution System	Low volume localized generation of sanitary wastewater from construction camps for short period of time	B1 – Low
Sewerage		
Sewerage pipes replacement	Low volume localized generation of sanitary wastewater from worker camps	B2 – Moderate
Transport		
Improvement/upgradation of bus stand and Kashmir Road	Low volume localized generation of sanitary wastewater from construction camps for moderate period of time	B2 – Moderate
Green Spaces		
Development of green space along drain side	Low volume localized generation of sanitary wastewater from construction camps for moderate period of time	B1 – Low

Subprojects/Activities	Potential Hazard	Assessment of Risk
Rehabilitation of Gulshan-e-Iqbal and Qila parks	Low volume localized generation of sanitary wastewater from construction camps for moderate period of time	B1 – Low

Table 5.10: Subproject Activities, Potential Hazards and Assessment of Risk – Health & Safety

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Rehabilitation of existing OHRs (replacement of doors/windows, plastering, minor structural repair, cleaning, valves and pipeline connection)	Minor nature health and safety concerns for the construction workers for short period of time Temporary disruption of water supply	B1 – Low
Replacement of rusted/damaged pipelines	Minor nature health and safety concerns for the construction workers for moderate period of time Temporary disruption of water supply	B2 – Moderate
Replacement of asbestos cement pipelines	Minor nature health and safety concerns for the construction workers for moderate period of time. Low risk if pipes remain buried and are not exposed, otherwise high risk	B2 – Moderate
Replacement of inappropriate sized pipelines, realignment of inappropriately laid pipelines at Fateh Garh Distribution System	Minor nature health and safety concerns for the construction workers for short period of time Temporary disruption of water supply	B1 – Low
Sewerage		
Sewerage pipes replacement	Minor nature health and safety concerns for the construction workers for moderate period of time	B2 – Moderate
Transport		
Improvement/upgradation of bus stand	Minor nature health and safety concerns for the construction workers for moderate period of time	B2 – Moderate
Green Spaces		
Development of green space along drain side	Minor nature health and safety concerns for the construction workers for moderate period of time	B2 – Moderate
Rehabilitation of Gulshan-e-Iqbal and Qila parks	Minor nature health and safety concerns for the construction workers for moderate period of time	B2 – Moderate

307. All of the subprojects and related project activities will generate environmental impacts during the construction phase. However, in all cases, the construction phase impacts are assessed to be in the category of low to moderate risk and are reversible in nature and of generally short-term duration, only occurring during periods of active construction.

308. No construction phase impact is assessed to be high risk, assuming that all ACP are left buried *in situ* or, if removed, are done so under strict procedures and protocols in accordance with an Asbestos Management Framework (refer to Annexure 2).

iii. Construction Phase Impacts and Mitigation Measures

309. It is an established fact that almost all construction projects will give rise to a number of impacts on environmental resources. These impacts, which cannot be avoided, may create significant temporary (short-term) hazards to the environmental resources of the project area during the project construction phase.

310. For the sub-projects under Phase 1 of PICIIP the assessed moderate construction phase impacts, as itemized on Tables 5.4 to 5.10, are as follows:

- Generation of dust due to excavation activities (for example, trenches for new pipes), transportation of construction material, mixing of building materials and dumping of excavated construction waste;
- Noise, vibration and air pollution due to excavation works, the removal of old pipe work, and the construction and erection of electrical and mechanical equipment;
- Increased traffic volume in the area due to haulage of building material, equipment, construction machinery and transportation of workers at site;
- Potential localized soil pollution due to spillage and leakage of fuel and lubricants during cooking, fueling and maintenance activities;
- Sanitary wastewater and solid waste generation from residences of construction crew; and
- Communicable disease hazard to workers from lack of sanitation facilities.

311. Construction activities affect the quality of the local environment. In particular, noise, odor and fugitive dust emissions due to construction and transportation, traffic congestion, and improper management of solid waste are the primary sources of nuisance for the local community.

312. The main construction phase potential impacts are assessed to be in the range of low to moderate risk. Most construction activities impacts can be mitigated by adopting appropriate mitigation measures during the construction phase as discussed below and in further detail in Section VII.

313. The main responsibilities for mitigation measures during the construction phase of the projects rest with the contractors appointed to carry out the individual project contracts. The SMC Engineers will, however, have the responsibility for monitoring the implementation of mitigation actions by the contractors and will need to implement their own system of internal checks to ensure that mitigation actions are carried out satisfactorily. In exceptional circumstances, the SMC may need to use its authority to call a halt to construction activity, if the contractors refuse to adhere to the requirements of the mitigation plan contained in the contract documents.

314. In order to avoid creation of misunderstandings regarding who is responsible for particular mitigation activities recommended for the construction phase, the Construction Phase Environmental Mitigation Plan (CPEMP) should be appended to tender documents. This will ensure that contractors include the cost of mitigation actions in their bids and will provide a reliable mechanism for enforcement. In fact, most of the recommended actions involve no or very little capital investment, but it depends on the contractor's management to adopt a responsible attitude to environmental protection, ensuring that construction

activity is properly planned and mitigation actions are correctly implemented. The mitigation actions recommended during the construction phase have the following principal objectives:

Dust Suppression

315. Excavation of ground for laying pipelines will generate dust. Regular water sprinkling is recommended at the dust generation points during the construction activities.

316. Construction activities should be suspended in periods of high wind to avoid the escape of fugitive dust.

317. Materials in transit and stockpiles of construction materials should be covered.

318. Appropriate personal protective equipment (PPE) such as dust masks, goggles, hats, gloves and safety shoes should also be made available to the construction workers at the site to avoid potential health hazards and accidents.

Management of Construction Waste

319. At bus terminal revamping activities, and for the upgrading of OHRs and disposal stations, construction debris will be generated because of the demolition of existing structures or the replacement of existing materials. Similarly, for the replacement of water supply and sewerage pipes, new trenches will be excavated, potentially generating excess spoil materials.

320. In all cases, debris produced during construction should preferably be screened and as much as possible of the material re-used for alternative activities, such as land reclamation. Materials suitable for recycling should be recovered and presented for recycling.

321. No construction debris should be dumped unattended, nor should any leftover material be dumped into any of the storm water drains or water courses, because such practices can clog these drainage systems and cause many other problems for the local residents. Unwanted materials should be disposed only to an approved landfill site.

Noise

322. Construction activities, movement of construction vehicles and machines, and demolishing of structures will generate noise and affect nearby communities and construction workers.

323. High noise levels may result in various health impacts, such as nuisance, hearing loss and number of physiological and other effects.

324. To attenuate noise impacts on workers and nearby community, the following measures should be taken:

- Carry out regular inspection and maintenance of the construction vehicles and equipment;
- Timely replacement of worn and noise producing parts of the construction machinery;
- In case of severe noise, use of sound barriers to avoid dispersion of sound waves into the nearby community; and use of noise protection equipment by the workers, working in noisy area; and

- Scheduling the timing of noisy activities to have the least impact on adjacent communities.

Traffic Management

325. Construction activities for laying pipelines, street improvement works on Kashmir Road, revamping of the bus terminal and upgrading public green spaces will cause traffic issues. Traffic management measures should be implemented as a means of reducing road congestion, maintaining traffic flows, maintaining access for the local communities, improving the residential living environment, and reducing the chance of collisions between vehicles, pedestrians and cyclists and traffic congestion.

326. Vehicles transporting construction materials shall be instructed to have operate at a maximum speed of about 20 km per hour in residential areas, with covering of the material from the top to avoid dispersion of fugitive dust to the surroundings. In case of large number of vehicles arriving at the site, it should be planned in such a way that these vehicles arrive at the site at different timings of the day to avoid traffic congestion and nuisance for the nearby community. As a measure to streamline heavy traffic in the area, proper road marking and signboard posting for safety and speed limit should also be undertaken, particularly at nearby residential and commercial areas.

327. For excavation activities within the road corridor, the proper cordon off the digging site and traffic planning for moving traffic to alternate routes will be part of traffic management.

328. Vehicle drivers should be apprised of the local customs and values, and be advised to remain courteous to the local population. The construction material transport activities scheduling should be such that most of the tasks are executed and scheduled in a manner so as to minimize traffic congestion in the area.

Disposal of Domestic Wastewater

329. During major periods of construction activity (for example, bus terminal revamping and pipe laying activities) it is considered probable that the construction crew will stay at a construction campsite. These workers shall generate sanitary wastewater. Generally in Pakistan, during the construction phase, proper disposal of sanitary wastewater is not practiced. Sanitary wastewater should be disposed of into the nearby drain or sewers after passing through a temporary septic tank.

330. Typical characteristics of untreated domestic wastewater are set out on Table 5.11.

Table 5.11: Typical Characteristics of Untreated Domestic Wastewater

#	Contaminants	Concentration (Medium Strength)
1	Total Dissolved Solids (TDS) - mg/L	500
2	Total Suspended Solids (TSS) - mg/L	210
3	Biochemical Oxygen Demand (BOD_5) - mg/L	190
4	Chemical Oxygen Demand (COD) - mg/L	430
5	Chlorides – mg/L	50
6	Sulfate - mg/L	30
7	Oil & Grease - mg/L	90
8	Total Coliform - No./100 mL	10^7-10^9
9	pH	7

Source: Wastewater Engineering - Treatment and Reuse by Metcalf & Eddy, 2003

331. The potential impacts of the discharge of untreated domestic wastewater are summarized on Table 5.12.

Table 5.12: Potential Environmental Impacts of Wastewater

Parameter	Impacts
pH	Growth inhibition of bacterial species (responsible for removing organic pollution) under highly acidic or alkaline conditions
	Corrosion of water carrying system and structures with acidic wastewaters having low pH
	Malfunctioning and impairment of certain physico-chemical treatment processes under highly acidic or alkaline conditions
Organic Pollutants	Depletion of dissolved oxygen (DO) levels, of the receiving water body, below limits necessary to maintain aquatic life (4-5 mg/l)
Suspended Solids	Sedimentation in the bottom of water bodies leaving adverse impact on flora and fauna
	Localized depletion of dissolved oxygen in the bottom layers of water bodies
	Reduced light penetration in natural waters and consequent reduction in photosynthesis
	Aesthetic nuisance
Oil and Grease	Reduced re-aeration in the natural surface bodies, because of floating oil and grease film and consequent depletion in dissolved oxygen levels
	Reduced light penetration in natural waters and consequent reduction in photosynthesis
	Aesthetic nuisance

332. Notwithstanding that these impacts are potentially significant, in the context of Sialkot these are already being experienced in the absence of an existing wastewater treatment facility and the routine disposal of untreated wastewater to land. The presence of a temporary campsite may serve only to introduce some short-term pollutant loading to an area not currently experiencing such discharges.

Domestic Solid Waste Management

333. Any construction campsite will also generate domestic solid waste. Such waste should be segregated and any recyclable materials sold on.

334. Residual waste should be packed and disposed of at the designated municipal solid waste disposal facility.

Occupational Health and Safety

335. The contractor should be responsible for the provision of safe drinking water, maintenance of occupational health and safety equipment, maintenance of hygienic sanitation conditions, together with supplying nutritious and hygienic food for the construction team at the site.

336. The major beneficial impact of the construction phase of the project is employment for local people during construction.

Air Pollution

337. The sources of air pollution at the construction sites are excavation activities, mal-odors and gasses released from buried pipework and the construction vehicles and generators.

338. Diesel oil is used as fuel in the generators used for standby electricity generation. Diesel-based generators generally emit pollutants such as CO, NO_x, SO_2 and particulate matter. Excavation activities and vehicle movements will generate fugitive dust and vehicular emissions. The major pollutants present in emissions include oxides of nitrogen and carbon, particulate matter and un-burnt hydrocarbons. For well-maintained vehicles, air emissions will remain within the PEQS.

339. The potential impacts of air emission on environment (E) and human health (HL) are summarized on Table 5.13.

Table 5.13: Impacts of Air Pollutants on Environment, Human Health and Life

Carbon Monoxide	HL	Heart attack, by reducing the oxygen carrying capacity of blood
		Birth defects including mental retardation and impairment of fetus growth
		Dizziness, headache, and nausea
		Increase in reaction time of the drivers, a threat to the road safety
Oxides of Nitrogen	E	Formation of photochemical oxidants
		Damage to materials and property, by acid rains, resulting from oxidation of oxides of nitrogen to nitric acid, after reacting with water vapors
		Retardation of growth in plants
	HL	Reduction in oxygen carrying capacity of blood
		Impairment of olfactory sense and night vision
		Dryness and roughness of the throat
Particulate Matter	HL	Respiratory diseases
	E	Choking of plant leaves restricting photosynthesis process
		Global cooling of earth by reflecting back the solar radiations
		Impairment of atmospheric visibility affecting the transportation safety
		Deterioration of aesthetic quality of atmosphere, land and water
Oxides of Sulfur	HL	Respiratory diseases, eye and throat irritation
	E	Precursor for acid rain, damage of property, plant and soil
Carbon Dioxide	E	One of the major greenhouse gases, contributing to global warming

Soil Pollution

340. Soil pollution can take place during cooking, fueling, lubrication and maintenance of vehicles and machines. It can also occur from the exposure of asbestos cement pipes and the discharge of contaminated wastewater directly to ground/

341. The following mitigation measures are recommended for soil pollution control:

- Placement of secondary containment under fuel/lubricant containers and generator fuel oil tank to collect spillage and leakage;
- Placement of fuel/lubricant container on paved floor at enclosed place;
- Properly collect and dispose waste lube oil/oily rags after maintenance;
- Avoid spill and leaks of oil, lubricants on floor during maintenance activities;
- Immediate cleaning the spillage and leakage from the ground with saw dust/cloth and dispose of as solid waste; and
- Avoid exposure of asbestos cement pipe work; and
- Drain all pipes by vacuum pump prior to extraction of old pipes from the ground.

iv. Anticipated Environmental Aspects and Potential Hazards – Operational Phase

342. The potential hazards posed by operational activities are restricted to noise and health and safety issues, as presented by environmental aspect in Table 5.14 and Table 5.15. Operational phase impacts are related primarily to the handling and storage of liquid chlorine solution (Sodium Hypochlorite) at tube wells and OHR facilities and algal growth in the OHRs.

Table 5.14: Subproject Activities, Potential Hazards and Assessment of Risk – Noise

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Operation of tube wells	Low intensity localized noise generation due to operation of tube wells within enclosed structures	B1 – Low
Operation of OHRs (operation of tube wells)	Low intensity localized noise generation due to operation of tube wells within enclosed structures	B1 – Low
Sewerage		
Operation of disposal stations	Low intensity localized noise generation due to operation of disposal pumps within enclosed structures	B1 – Low

Table 5.15: Subproject Activities, Potential Hazards and Assessment of Risk – Health & Safety

Subprojects/Activities	Potential Hazard	Assessment of Risk
Water Supply		
Operation of chlorine facilities for disinfection at tube wells and OHRs	Medium level localized health and safety concerns associated with chlorine storage and handling facilities	B2 – Moderate
Algal growth in OHRs	Moderate impact on community health due to growth of algal in OHRs and contamination of water	B2 – Moderate

343. Appropriate management actions for all of the potential environmental hazards shall be developed on the basis of the level of risk assessed to exist for each hazard identified.

344. Potential noise impacts are considered not to be significant since these will occur only at the immediate site of each facility within enclosed structures.

345. Mishandling of liquid chlorine (Sodium hypochlorite) and its exposure to the tube well operators may cause burns to the mouth and throat, gastrointestinal irritation, nausea, vomiting and diarrhea. Inhalation and ocular exposure to chlorine gas, produced when sodium hypochlorite is mixed with acidic or alkaline solutions, results in burning of throat and lungs, eye and nose irritation, chest tightness, coughing and sore throat. Exposure to higher concentrations of chlorine may lead to tachypnoea, cyanosis, swelling of the airway and, in severe cases, pulmonary oedema and respiratory failure. Sodium hypochlorite is corrosive and may irritate the skin or cause burning pain, inflammation and blisters.

346. Procedures for the safe handling and storage of liquid chlorine, as for any other hazardous material or substance, must be implemented, to include:

- Transportation: Sealed containers of chlorine will be transported at site;
- Storage: Closed and locked storage of chlorine containers, placement of labels, precautions/instructions at storage place in Urdu language, secondary containment for chlorine container, use of spill kit and proper ventilation at storage place; and
- Handling: Only authorized person for the dispensing of chlorine through pump under secondary containment, use of face mask, gloves and apron during chlorine handling activities. Strict monitoring is required from SMC for ensuring that the safe handling and storage practices are adopted at water supply sites.

347. Algal growth takes place in the water reservoir over time which may lead to contamination and cause the water to change its taste. It is proposed the reservoirs shall be cleaned and disinfected on a yearly basis.

v. Cumulative and Induced Impacts

348. Cumulative impacts are deemed to occur when the effects of project components, other projects, and/or other land use activities overlap with each other by affecting the same Valued Environmental and Social Component (VESCs). That is, cumulative impacts are the incremental impact of the project when combined with the cumulative effects of other past, present and reasonably foreseeable future projects.

349. Cumulative impacts can also be due to the induced actions of projects and activities that may occur if the action under assessment is implemented, such as growth inducing impacts and other effects related to induced changes to the pattern of future land use or additional road network, population density or growth rate. Induced impacts are those that arise indirectly as a consequential effect of the project. They usually have no direct relationship with the action under assessment and represent the growth-inducing potential of an action. For example, new roads leading from those constructed for a project, increased recreational activities, and construction of new service facilities are examples of induced actions.

350. For the project components under consideration in this IEE, the following considerations are pertinent:

- There are no greenfield sites to be acquired for any sub-project component. All upgrades to existing infrastructure are proposed within existing landholdings, existing structures or existing rights of way. There are accordingly no cumulative

impacts on physical, ecological or social resources in any of the areas subject to development or redevelopment, since all of these areas have been intensively developed in the past and are highly urbanized in the main;

- None of the water supply or sanitation components are designed to cater for an increase in served population or an extension to an existing service area. Rather, the project components are designed to improve the existing service provisions, be it in terms of availability of service or quality of service. In itself, improvements in service provision are not expected to lead to any growth-induced impacts. Similarly, improvements in service provision are not considered likely to result in any significant increase in net inward migration to the City;
- Wastewater discharges to land and surface watercourses will continue unabated, as at present, since no treatment facility is being proposed in Sialkot as part of Phase 1 of PICIIP. Therefore, there will be no change to environmental conditions in the receiving environments other than the continued accumulation of pollutants. This scenario will occur whether or not project proposals are implemented;
- Road improvements are designed to reduce traffic congestion and to manage urban road spaces more effectively and with less potential conflict between different modes of road users, notwithstanding that such improvements may increase overall traffic flows;
- Bus terminal upgrades are designed to improve facilities for passengers and commercial vendors at the bus terminal. Although improved facilities may result in a slight increase in the throughput of vehicles, this will be minor and is not the driving force for the project proposals; and
- Implementation of the projects will result in a short-term increase in employment opportunities for construction-related activities. However, none of the sub-projects will lead to a permanent increase in employment; hence, the projects are not considered likely to result in any significant increase in net inward migration to the City

351. The following cumulative and induced impacts may occur as a result of project implementation:

- Continued depletion of the groundwater table resulting from increased groundwater abstraction, as a consequence of improving the service provision (objective of 24/7 service supply). As noted in Section 4 above, the groundwater table has been experiencing a decline of 0.30 m per year, although the precise cause of this has not been established. It may be a consequence of over exploitation or a reduction in recharge or a combination of the two. The significance of further depletion by enhanced abstraction is assessed to be low in the short-term, providing opportunities are explored for securing alternative potable water supplies in the long-term, as discussed in Section 7;
- Increased water supply is likely to lead to an increase in sewage flow and sullage (wastewater from cooking and washing). This will need to be accommodated by the construction of sewage treatment facilities, understood to be planned for implementation in Phase 2 of PICIIP;
- Improvements to the bus terminal will increase the opportunities for commercial activities therein. In the context of Sialkot, however, the increase in commercial activities is deemed to be insignificant; and
- Enhanced traffic flows as a consequence of road improvements may result in increases in vehicle emissions to air, potentially resulting in a deterioration to urban air quality along main transport routes. This impact is, however, assessed to be

insignificant given that it is offset by reductions in vehicle emissions consequent upon a reduction in traffic congestion.

vi. Positive Impacts of Project Proposals

352. As noted above the majority of construction projects will give rise to a number of impacts on environmental resources. Subprojects under Phase 1 of PICIIP are no exception; however, all of the impacts are assessed to be temporary (short-term) and reversible, resulting in no discernible impact in the longer-term if the subprojects are implemented in accordance with an agreed and approved Environmental Management Plan (refer to Section VII).

353. By comparison, there are a number of positive impacts arising from project proposals that are deemed to have a significant long-term benefit to the local community with access to the improved urban services. These positive impacts include:

- Enhanced and continuous supply of potable water;
- Improved quality of potable water, including increased provision of disinfection;
- Reduction in the occurrence of water borne diseases through a reduction in the potential for contamination of water supply lines, increased disinfection and removal of potential breeding areas for insects (areas of stagnant water) by redevelopment of public open spaces;
- Conveyance of wastewater to areas beyond the city limits (urbanized area) through rehabilitation of the sewer lines and reduction in seepage to ground within urbanized areas;
- Reduction in traffic congestion, traffic conflicts and vehicle emissions to air;
- Improved public amenity in the main bus terminal; and
- Provision of recreational facilities in the City and overall enhancement of the aesthetics of public open spaces.

VI. PROJECT ALTERNATIVES

A. Water Supply

354. The water supply strategy for Sialkot City was evaluated during the PFS. The overall strategy adopted had the twin goals of delivering safe and healthy water 24 hours per day, 7 days per week, in accordance with the National Drinking Water Policy, 2009.

355. The current water supply system is locally-based, comprising a series of tube wells abstracting water from the available groundwater resource and feeding into a pressurized water distribution network, rather than relying on one large water treatment facility and major trunk main distribution.

356. The locally based system lends itself well to a more sustainable, resilient and affordable water supply that has the flexibility to expand or be rehabilitated without worry about a single main supply facility.

357. Notwithstanding that groundwater will remain the principal water source for the foreseeable future, alternative sources of potable water may need to be considered in the longer term given the reported lowering of the water table in the vicinity of Sialkot City, the potential impact of climate change on recharge and the continued high cost of pumping.

358. The risk to water supplies from the reduced recharge of the aquifer can be addressed partially through demand-side management (for example, reduction in water abstraction from water loss reduction programs), in addition to consideration of alternative water sources, such as rainwater harvesting, artificial recharge and surface water development, as discussed below.

i. Rainwater Harvesting and Artificial Recharge

359. Rainwater harvesting can play a significant role in ground water recharge, as groundwater levels in Sialkot are reported to be dropping potentially as a result of over exploitation and/or a reduction in natural groundwater recharge.

360. The rate of recharge can be increased through one or more of the following:

- Creation of storm water holding areas in areas of open space, which can recharge groundwater aquifers through percolation;
- Recharge tube wells or groundwater injection wells drilled specifically for the purpose of recharging deep aquifers;
- Recharge through abandoned dug wells and recharge trenches constructed where permeable strata is available at shallow depths.

361. There is limited open space available throughout Sialkot City and, thus, storm water holding ponds would appear to be potentially viable on a large scale only outside the city limits, where such use would compete with productive agricultural development. Standing bodies of water would also be associated with potential health risks from increased vector-borne disease (for example, malaria and dengue).

362. Recharging of the groundwater aquifer via wells and trenches requires a suitable source of water in the first instance, and this is not readily available other than via tapping a surface water source.

ii. Surface Water Development

363. The Upper Chenab Canal passes by Sambrial Tehsil of Sialkot District, whilst the Chenab River crosses Wazirabad District approximately 45 km to the north-west of Sialkot. These waterways are primary sources of water for irrigation.

364. In the longer term, the available surface water resources need to be explored for enhancing and securing the domestic water supply for Sialkot, as well as adjacent cities. Water filtration plants may be designed and constructed for treatment of this water.

365. Sialkot has an opportunity to start looking at alternative, longer-term water sources. The traditional Himalayan glacier sources are melting, as a result of climate change, and more intense storms and increased rainfall are forecast. The development of a series of upstream watershed storm water catchment/harvesting facilities should be considered to serve as future water supply and to help control urban flooding. Storm water retention ponds can also be introduced throughout the city, if and where space is available, as a smaller-scale version of the same control mechanisms, with water used for urban agriculture and other non-potable applications.

iii. Water Quality

366. Water quality issues have been cited as a major concern given indications of potential contamination of the water supply by sewerage from adjacent leaking sewer pipes, possibly laid in a common trench, as well as the poor condition of the existing pipe network. Whilst provision exists already for the application of chlorine treatment at tube wells, it is not known if such treatment is being applied routinely and/or at the correct dosage.

367. The disinfection of potable water provides a degree of protection from contact with pathogenic organisms including those causing cholera, polio, typhoid, hepatitis and a number of other bacterial, viral and parasitic diseases. Disinfection is a process where a significant percentage of pathogenic organisms are killed or controlled.

368. Disinfection is usually the final stage in the water treatment process in order to limit the effects of organic material, suspended solids and other contaminants. The primary methods used for the disinfection of water in very small (25-500 people) and small (501-3,300 people) treatment systems are ozone, ultraviolet irradiation (UV) and chlorine. There are numerous alternative disinfection processes that have been less widely used in small and very small water treatment systems, including chlorine dioxide, potassium permanganate, chloramines and peroxone (ozone/hydrogen peroxide).

369. The simplest and most widely used disinfectant in Pakistan is liquid chlorine. It is usually employed at water supply facilities without considering any other alternative.

370. The application of liquid chlorine at each tube well, as well as in the OHRs, should maintain a potable water supply that adheres to national standards. In addition:

- the replacement of the older, corroded pipes in the network; and
- providing appropriate separation of the water supply and sewerage pipes; and
- providing a 24 hour supply; and
- ensuring the water mains is pressurized to prevent contaminated water from entering the water mains,

should reduce the water quality problems reported currently.

iv. No Project

371. As noted above, the design production capacity exceeds demand both currently and into the foreseeable future. The key issues identified currently, therefore, centre not on long-term water supply, although this is important, but on the following short-term issues:

- maintaining or re-instating the design water production capacity;
- the absence of continuous service provision 24/7 (intermittent supply only given the poor state of the pipe network and the absence of system storage);
- the overall availability of water due to significant losses in the pipe network as a result of inadequate maintenance and rehabilitation of the distribution system. This is reflected in the high levels of NRW which is indicative of low operational efficiency; and
- maintaining clean and safe water by mitigating the potential for contamination of water in the pipe network due to groundwater and sewage incursions.

372. The above issues are the focus of the sub-project proposals and need to be addressed irrespective of the development of alternative water supplies.

373. In the absence of the proposed sub-projects, the following scenario will apply:

- the tube well production capacity will continue to deteriorate, reducing available water supplies and the ability to continue to provide an adequate supply in response to temporary local system breakdowns and failures;
- the piped network will continue to degrade, resulting in increased water losses throughout the network, and the likely deterioration in water quality from the increasing ingress of contaminated water and sewage and the absence of effective disinfection facilities;
- water quality will continue to fail to meet National Standards for Drinking Water Quality (NSDWQ, Pakistan EPA, 2010); and
- in addition, as the pipe network degrades over time, the potential exists for increasing exposure of asbestos materials from the decay of ACP, posing a significant long-term health risk to the water supply and also during any excavation exposing such pipes.

B. Sewerage

374. At present there is little or no functioning sewage treatment with effluent being discharged directly into nullahs, with all the associated negative environmental and health impacts.

375. Industrial effluent is a particularly serious problem with Sialkot's tannery industries and is currently either mixed with domestic waste or discharged directly into drains and water bodies. This is unacceptable and unsustainable, and fully recognized as such by the residents and leaders of the city.

376. The serious pollution of the nullahs resulting from disposal of untreated domestic and industrial wastewater is the most serious issue in the water and wastewater sector in Sialkot. Provision of wastewater treatment facilities is, therefore, a critical priority for the city.

377. The following project proposals have been advocated to address the wastewater issues:

- Rehabilitation of sewerage and drainage network and disposal stations;
- Construction of trunk sewers and sewerage system extensions; and
- Construction of sewage treatment plants.

378. The first element, rehabilitation of sewerage and drainage network and disposal stations, is addressed by project proposals in Phase 1 of PICIIP.

379. The second and third elements are proposed to be addressed in Phase 2 of PICIIP. Preliminary proposals for the treatment of sewage involves conveying it by means of trunk mains to two treatment plants located outside the current TMA boundaries. Possible locations have been identified in the northwest and southwest of the city.

380. There is no alternative to the provision of sewage treatment facilities, although there are alternative design approaches for providing the requisite treatment capacity. Since the design of the plants is yet to be addressed, and is not part of the present project proposals, this is not considered further in this IEE.

i. No Project

381. There is no alternative to the rehabilitation of the existing sewer lines and disposal stations, other than do nothing.

382. In the event of no project the following scenario will apply:

- Both wastewater and storm water drainage will continue to be collected by a combination of sewers and open drains which eventually discharge into nullahs. Water from all nullahs flows through the city and eventually drains into the Chenab River;
- The nullahs will continue to receive a mix of domestic wastewater and highly polluting industrial wastewater;
- The capacity of the sewer system will gradually decrease over time, as more of the existing system becomes choked or is subject to collapse;
- There will be increased flood potential in the City from contaminated wastewater as a consequence of the reduced carrying capacity. Increasing overflows from the sewers will occur during periods of peak stormwater drainage; and
- The risk of contamination to the potable water supply will increase as further leakage from the sewers occurs. The incidence of water-borne disease is likely to increase significantly.

C. Urban Public Spaces

383. Project proposals call for the rehabilitation and upgrading of existing infrastructure with regard to:

- Main transport routes;
- Main bus terminal; and
- Green spaces.

384. The design proposals set out in Section III are essentially pilot projects that are intended to be replicated at other locations throughout the City and to demonstrate the significant improvements that can be achieved with appropriate planning and management of urban public spaces. The primary aim of the proposals is to:

- Increase public amenity and recreational facilities;
- Reduce traffic congestion and pollution from vehicle emissions; and
- Enhance the liveability of the urban centre.

385. The primary constraints on the proposed improvements arise from:

- The lack of alternative greenfield sites and spaces within the City limits, thereby dictating that improvements must be in the form of re-development of existing urban public space rather than the creation and development of new areas; and
- The desire of the parties affected by any redevelopment (such as commercial entities along main transport routes and shop owners in the bus terminal) to be limited to cosmetic changes to existing structures as far as possible, so as not to impact their livelihood.

i. No Project

386. In light of the above, there are no project alternatives to the current design approaches.

387. In the event of no project the following scenarios will apply:

- The road network will continue to be poorly managed, resulting in severe congestion, with inefficient management and utilization of existing transport corridors. As the City continues to grow traffic congestion will become worse, with significant economic impacts;
- Air pollution from vehicle emissions along the main transport routes will increase, resulting in significant impacts on local communities. Enhanced rates of respiratory disease (RTI) are anticipated;
- Passengers and shop owners at the existing main bus terminal will continue to suffer poor and inadequate facilities; and
- Green spaces will not be used or improved, detracting from the aesthetics of the City and potentially impinging on public health and public amenity.

VII. ENVIRONMENTAL MANAGEMENT PLAN

388. The main purpose of the Environmental Management Plan (EMP) is to provide a strategy for environmental protection. According to this plan, all subproject implementation activities are controlled and monitored from the design phase, through construction, commissioning and operations. Problems that occur during the project's development are to be identified and rectified so as to prevent damage to the environment.

389. The EMP addresses specific potential impacts identified in this IEE. If some issues have been overlooked, or new issues arise during project implementation, then the EMP should be amended, in consultation with the regulatory authorities, so as to ensure effective mitigation is achieved at all stages in the project. The EMP aims to ensure that:

- Project activities are managed so as to avoid or reduce any negative environmental and social impacts and enhance positive impacts;
- Surrounding communities are better off after the project is implemented, on social and environmental indicators;
- Precautions are taken against damage, and claims arising from damage are handled in a timely manner;
- Information flow between the client, consultants, contractors and affected parties, if any, is optimized to ensure that all stakeholders are aware of their particular responsibilities;
- Any affected structures, infrastructure and natural features are protected during construction and then rehabilitated according to the guidelines in the EMP;
- Local labor and entrepreneurs from the affected communities are used throughout the project and for project related activities, wherever possible;
- Accurate records of the progress of the project (including objections) are maintained so that the concerned can be traced out in the event of claims against the client;
- Monitoring reports are produced for regulatory bodies. Their frequency and content are agreed upon prior to start of the construction phase; and
- Mechanisms are in place for reviewing the efficacy of the management plan and any improvements made in the course of the projects, so that other similar projects may benefit from the experience gained.

390. The EMP contains the following information to be used for its effective implementation:

- Responsibilities of individuals, groups, government agencies and Non-Government Organizations (NGOs) for carrying out mitigation actions identified in the IEE;
- Guidelines for communication between all stakeholders with responsibilities for implementing the management plan;
- Costs of implementing the proposed mitigation measures;
- Institutional and training requirements for implementing the mitigation measures;
- A monitoring program to track project related events and progress in implementing the mitigation measures;
- Community liaison procedures; and
- Mechanisms for improving the management plan.

A. Environmental Management Plan (EMP)

391. The EMP for those subproject activities which have environmental impacts of medium risk is provided in Table 7.1 for the construction phase and Table 7.2 for the operational phase (see below). The EMPs provide an overview of planned mitigation measures and identifies who is responsible for these. In addition, monitoring aspects have been included in the plan, comprising an overview of the frequency of monitoring, monitoring requirements and monitoring responsibilities.

392. One key issue identified during the preparation of the IEE pertains to the management of ACP.

393. Subprojects in both the water supply and sanitation sectors in PICIIP include replacement of water distribution mains (WDM) and sewer pipes. ACPs are known to have been used to construct significant portions of the existing WDM and may also have been used to construct some sections of the sewers.

394. Asbestos is recognized internationally as a hazardous material because it can present a risk to human health. In many jurisdictions asbestos is classified as hazardous and is a controlled chemical waste or a hazardous waste because, if it is mishandled, it can release airborne fibres that are known to cause asbestosis and may also be associated with other lung diseases and cancer. All forms of the asbestos mineral will release asbestos fibres if broken up and all types of asbestos containing materials (ACM) will release asbestos fibres, to some degree, if damaged, abraded, weathered or decomposed

395. It is standard practice for non-friable intact ACP to be left buried *in situ* when no longer required. This is an acceptable practice since it avoids exposure of the ACP and eliminates the potential for asbestos fibres to be released to the atmosphere.

396. For friable ACM (typically, materials that have begun to degrade and decompose) it is normal to remove such materials in accordance with specified procedures and protocols, as set out in an Asbestos Management Framework (AMF) and Asbestos Management Plan (AMP). Such a procedure is routinely adopted where:

    - specialist expertise exists within the contracting community experienced in handling asbestos materials; and
    - secure facilities are available for the safe disposal of asbestos wastes, normally to an engineered landfill.

397. Neither of these conditions is satisfied in Sialkot or indeed elsewhere in Punjab.

398. Given that there may be significant risks involved in removing any friable ACP, and given the location of such pipes within high density residential areas, it is concluded that it would be unsafe and a risk to public health to extract friable ACP in the current project. The intention, therefore, will be to avoid disturbing existing ACP by laying the new PVC pipes alongside or above the old ACP. This also has the advantage of not having to interrupt the existing water supply while construction takes place.

399. It is proposed to manage any friable ACM, wherever possible, by leaving it *in situ* and ensuring that it remains buried to eliminate any potential exposure, until such time as the two conditions above are satisfied and it is deemed feasible to extract and dispose of it in a safe and secure manner.

400. In the longer-term there is still the risk that other construction activities, outside the project, may disturb the old ACP. In order to provide some warning to possible future works it is

proposed to lay hazard marking tape in the ground above the existing pipe. This will provide an in-ground warning to any future excavations. In addition, the co-ordinates of such materials should be recorded in order to ensure that any subsequent construction works in the area do not inadvertently expose the ACMs.

401. This approach will negate the need to remove the majority of the ACP but there are likely to be occasions when small amounts of pipe will need to be removed and disposed of correctly. Should it prove unavoidable to remove friable ACMs during the current project, then the contractor will be required to follow the procedures and protocols set out in Annexure 2 which provides guidance on how to manage the excavation, handling, transport, storage and disposal of ACM.

402. Long term temporary storage of ACM until suitable disposal options are developed is an alternative option to the above approach but presents its own set of risks, such as poor security and maintenance of the facility, joint use of storage space, damage to packaging, etc. In addition, as noted above, there are no contractors in Pakistan that specialize in asbestos removal, meaning that there is no available in-country technical experience currently.

B. Institutional Arrangements

i. Local Government and Community Development Department (LG&CDD)

403. The Local Government and Community Development Department (LG&CDD) of Punjab will be the executing agency (EA) of the project. Under the guidance of the Project Steering Committee, LG&CDD will be responsible for the overall execution of the project.

404. A Project Management Unit (PMU) has been established within LG&CDD to support LG&CDD.

ii. Sialkot Municipal Corporation (SMC)

405. The city government of Sialkot (municipal corporation) will be the implementing agency and will be responsible for day to day project implementation of the water supply, sewerage, transport routes and green spaces development projects in Salkot.

406. The Mayor of Sialkot is the executive head of the Municipal Corporation. The Deputy Mayor performs the functions of the Mayor if the Mayor is unable to perform functions on account of absence or for any other reason. The Mayor heads the Municipal Corporation. He is assisted by the Chief Officer (CO).

407. The CO co-ordinates and facilitates the performance of functions assigned to the Municipal Corporation under the supervision of the Mayor. The CO is the focal person in the Municipal Corporation. He acts as the coordinating and administrative officer in-charge of the offices and units of the Corporation.

408. There are five Municipal offices of the Corporation including:

i) Planning and Coordination;
ii) Municipal Regulations;
iii) Infrastructure;
iv) Services; and
v) Finance.

Table 7.1: Construction Phase Environmental Management and Monitoring Plan

Subproject Component	Mitigation Measure (By Contractor)	Monitoring:		
		Type	Frequency	Responsible
- Water supply pipe replacement and rehabilitation works - Sewer replacement works - Urban public spaces (road improvements, Bus stand upgrade and green space redevelopment)	**Soil Pollution Control** - Placement of secondary containment under fuel/lubricant containers and generator fuel oil tank to collect spillage and leakage - Placement of fuel/lubricant container on paved floor at enclosed place - Properly collection and disposal of waste lube oil/oily rags after maintenance - Avoid spill and leaks of oil, lubricants on floor during maintenance activities - Immediate cleaning the spillage and leakage from the ground with approved spill kit, sawdust/cloth - Proper disposal of contaminated materials - Pump out contaminated water from pipe work prior to extraction or disconnection - Dispose of residual solids to approved site	Strict monitoring of best practices during fueling, oiling and maintenance activities to avoid soil contamination Visual check of pipe content prior to disconnection	Daily	Contractor
			Weekly and random inspections	Oversight by CIU/SMC
- Water supply pipe replacement - Sewer replacement	**Odour Control** - Pump out contaminated water from pipe work prior to extraction or disconnection - Adequate venting/pump out of pipe work prior to disconnection - Removal and disposal of residual solids to approved site - Use of odour suppressants	Visual check of pipe content prior to disconnection Monitoring of gasses such as H_2S, CO_2, CO and O2.	Daily	Contractor
			Weekly and random inspections	Oversight by CIU/SMC
- DNI zones - Water supply pipe replacement - Fateh Garh - Sewerage pipe replacement	**Dust Suppression** - Regular water sprinkling at dust producing areas during construction activities to suppress dust (Construction Phase Environmental Mitigation Plan-CPEMP, would be appended with the contractor bidding document)	Visual inspection of water sprinkling practices at construction site Visual inspection of stockpiles	Daily	Contractor

Subproject Component	Mitigation Measure (By Contractor)	Monitoring:		
		Type	**Frequency**	**Responsible**
- Urban public spaces (road improvements, Bus stand upgrade and green space redevelopment)	**Dust Suppression (continued)** - Covering of stockpiles of materials - Covering of spoil and construction materials in transit - Avoid excavation work and material movement and placement in periods of high wind	Visual inspection of trucks transporting construction materials and spoil materials	Weekly and random inspections	Oversight by CIU/SMC
- Water supply pipe replacement - OHR rehabilitation - Fateh Garh - Sewerage pipe replacement and disposal station rehabilitation - Urban public spaces (road improvements, Bus stand upgrade and green space redevelopment)	**Noise Control** - Operate well maintained vehicles and construction machines to avoid noise at the construction site - Regular preventative maintenance of vehicles and construction machinery (Proper lubrication, oiling and greasing of the moving parts of the machines) - Use of mufflers and silencers where noise levels exceed 85dBA - Use of noise barriers adjacent to high noise producing machines - Vehicle/machines movement permitted only during day time - No construction activity or movement of vehicles at night time	Review of maintenance record of vehicles and machines Noise monitoring of vehicles, machines and surrounding areas of the construction sites Noise monitoring at sensitive receivers	Daily noise monitoring at site of activity Monthly noise monitoring at sensitive receivers Submission of maintenance records monthly	Contractor
			Weekly and random inspections Review record for every new piece of equipment	Oversight by CIU/SMC
- Water supply pipe replacement - OHR rehabilitation - Fateh Garh - Sewerage pipe replacement and disposal station rehabilitation	**Traffic Management** - Vehicles speed limit of 20 km per hour at the residential areas to avoid accident - Construction material carrying vehicles will be covered from the top to avoid dispersion of dust in the surrounding areas	Strict monitoring of speed limits and frequency of arrival at the site Monitoring of road marking and signboard placing at the road side	Daily	Contractor

Subproject Component	Mitigation Measure (By Contractor)	Monitoring:		
		Type	Frequency	Responsible
- Urban public spaces (road improvements, Bus stand upgrade and green space redevelopment)	**Traffic Management (continued)** - Scheduling of vehicles arriving at the site to avoid congestion and nuisance for adjacent communities - Proper road marking and sign board posting at residential and commercial areas - Cordon off the construction work areas and diversion of traffic to other sides as per traffic plans - Prior communication of alternative routes to the public to avoid traffic congestion at construction site - Maintain access of local community	Alternative route plans and communication to public for the affected roads Access maintenance	Weekly and random inspections	Oversight by CIU/SMC
- Water supply pipe replacement - OHR rehabilitation - Fateh Garh - Sewerage pipe replacement and disposal station rehabilitation - Urban public spaces (road improvements, Bus stand upgrade and green space redevelopment)	**Construction Waste Disposal** - Controlled disposal of construction waste to approved facilities and locations - Prohibit dumping at residential areas - Prohibit dumping in the water bodies - Waste segregation - Maximize recovery of recyclable materials - Maximize re-use of spoil materials	Monitoring of construction waste dumping practices Records of disposal locations, quantities and types of waste Records of materials recovered and re-used	Daily inspections Weekly and monthly reports	Contractor
			Weekly reviews and random inspections	Oversight by CIU/SMC

Subproject Component	Mitigation Measure (By Contractor)	Monitoring:		
		Type	Frequency	Responsible
- All subproject components	**Domestic Solid Waste Disposal** - Provision of facilities for collection of solid waste - Waste segregation at source - Maximize recovery of recyclable materials - Ensure disposal at designated disposal site	Visual inspection of facilities for waste collection, segregation and storage	Daily, weekly and monthly	Contractor and oversight by CIU/SMC
- All subproject components	**Sanitary Wastewater Disposal** - Provision of septic tanks and collection facilities - Disposal to sewer after primary settlement - Disposal of sludge to approved location	Visual inspection of facilities for waste collection Monitoring of wastewater parameters (pH, BOD5, COD, TSS, TDS) prior to discharge	Daily Weekly monitoring of discharges	Contractor Oversight by CIU/SMC
- All subproject components	**Health and Safety of Workers** - Develop and implement Construction Safety Plan (CSP) - Provision of Personal Protective Equipment (PPE) - Undertake tool box talks - Provide training in site safety - Nominate site safety officer - Provide first aide medical facility at sites	Implementation of CSP Use of PPE Accident and down-time statistics	Daily visual inspections Weekly and monthly reports Weekly reviews and random inspections	Contractor Oversight by CIU/SMC

Table 7.2: Operational Phase Environmental Management and Monitoring Plan

Subproject Component	Mitigation Measure (By Operator)	Monitoring:		
		Type	Frequency	Responsible
Chlorination facility at tube wells and OHRs	<u>Transportation:</u> Sealed containers of chlorine will be transported at site <u>Storage:</u> - Closed and locked storage of chlorine containers - Labelling, precautions/instructions at storage place in Urdu language - Secondary containment for chlorine container - Use of spill kit - Proper ventilation at storage place <u>Handling:</u> - Only authorized person for the dispensing of chlorine through pump under secondary containment - Use of face mask, gloves and apron during chlorine handling activities	Regular monitoring of safe handling and storage practices	Daily visual inspection Monthly reporting of all related activities	SUSC
Algal growth in OHRs	Cleaning and disinfection of OHRs	Visual inspection Records of work undertaken	Annually	SUSC

409. A Municipal Officer (MO) heads each corporation office. These offices work under the CO. The MO Infrastructure and MO Services are responsible for water supply, sewage and sewage treatment and disposal, storm water drainage, sanitation and solid waste, roads and streets, traffic planning, street lighting, firefighting, parks and slaughter houses in the Municipal Corporation. In addition, this office provides all engineering related support to other offices of the corporation (and where requested to the Union Administration).

410. Overall, the SMC will be responsible for the implementation of all the projects proposed under Phase 1 of PICIIP. The water supply, sewerage and drainage and urban public spaces improvement projects will be executed directly by the SMC through contractors. Consultants will be engaged to assist with project implementation, audit monitoring, and institutional strengthening. A City Implementation Unit (CIU) has been established to support the SMC.

411. A new urban services company in Sialkot will operate and maintain the urban services.

iii. The Urban Unit

412. The Urban Unit was established in 2006, as a Project Management Unit (PMU) of the Planning and Development Department under the Government of Punjab. In 2012, it underwent significant transformation and converted into an independent private limited company, registered with the Securities and Exchange Commission of Pakistan. The objective of The Urban Unit is to provide guidance and support to Government departments in developing urban sector reforms and to coordinate the implementation of the reform program.

413. Thematic areas of coverage include GIS, urban planning and design, solid waste management, water and sanitation, urban transport, municipal finance and urban economics, information and communication technology, management information system, capacity development and social and environment safeguards, and monitoring and evaluation (M&E). It is an important partner and interlocutor for PICIIP preparation activities in Sialkot.

iii. CIU and Environmental Safeguard Specialist

414. The CIU will facilitate SMC in managing environmental concerns of the proposed projects and implementing environmental safeguard. Environmental safeguard specialist consultants will be hired for providing resources for environmental safeguard management as appropriate and required. The CIU, with the assistance of environmental safeguard specialist consultants, will be responsible for:

- Monitoring the implementation of environmental management and mitigation measures required for each subproject;
- Preparing environmental screening checklists and classifying subprojects that have not been yet classified;
- Based on the checklist and as per the requirements of ADB SPS (2009), PEPA1997and relevant provincial Environmental Protection Acts, preparing IEEs and EMPs;
- Submitting the checklists and IEE reports to ADB as part of the approval of subproject;
- Ensuring that EMPs are included in tender documents;
- Ensuring that all regulatory clearances are obtained before starting civil works for the subproject;

- Ensuring that the EMPs, including all proposed mitigation measures and monitoring programs, are properly implemented;
- Drafting and implementing an Asbestos Management Framework (AMF) and Asbestos Management Plan (AMP) should the need arise;
- Undertaking monitoring of subprojects and preparing environmental monitoring reports for submission to ADB.
- In the case of unpredicted environmental impacts occurring during project implementation, preparing and implementing a Corrective Action Plan (CAP);
- In the case that a Category B subproject needs to have its siting or alignment changed, or its environmental classification reconfirmed, reviewing it to determine whether a supplementary study is required. If so, carryout the study and implement any amendments to the original EMP;
- Preparing a project specific EMP for the operations that includes a Site Specific EMP for each of the work areas;
- Providing awareness training in environmental management for all employees working on the subproject;
- Ensuring that meaningful public consultations (including both men and women) are undertaken with affected groups and local NGOs. The list of people attending the consultation, time and locations, subjects discussed during consultation will be recorded in a systematic manner; and
- Sharing information and disclosure of environmental safeguard documents (including any CAP prepared in cases of change to original project design) as required.

iv. ADB

415. ADB will undertake the following responsibilities:

- Review project IEEs as a basis for the approval of subprojects;
- Publicly disclose the final IEE before project appraisal, and afterward updated IEE and any CAPs prepared during project implementation, as well as environmental monitoring reports on the ADB website;
- Monitor the implementation of the EMP and due diligence as part of overall project review mission; and
- Provide assistance to the TMA, if required, in carrying out its responsibilities and safeguard capacity building.

v. Civil Contractor

416. Civil contractors will be hired directly by SMC to undertake the bulk of the project work. The responsibilities of the civil contractor will comprise:

- Ensure compliance with the CPEMP, CAP, CSP and AMF and AMP, as applicable, throughout the construction activities;
- Ensure efficient site management for the storage of equipment and materials etc.;
- Ensure construction plan devised and agreed with the SMC;
- Ensure compliance with the agreed construction plan;
- Ensure quality of the work as per the construction contract specifications;

- Recruit labor from local communities first;
- For the construction camp on the site, ensure appropriate sanitary arrangements, accommodation and drinking water availability;
- Liaise with the local communities regarding services and goods supply at the site;
- Liaise with the local communities regarding construction activity, time span, likely nuisances such as noise, dust and disturbance;
- Ensure provision of appropriate night lights (if required) and standby power sources; and
- Plan working hours to provide minimum disturbance to the community.

vi. District Environment Officer (DEO)

417. The District's environment department is the sub department of Works and Services Department of District Government Sialkot and is headed by the District Environment Officer (DEO). The major functions of the department include:

- To assist Provincial Environment Protection Agency (EPA) in the discharge of its functions under the Pakistan Environment Protection Act,1997;
- Regulate motor vehicles subject to the provision of the Pakistan Environment Protection Act,1997 and the rules and regulations made there under;
- To ensure, guide and assist the proponents of new projects in submission of IEE/EIA to the DG Punjab EPA for approval, as applicable; and
- Identify the needs for legislation in various sector of the environment.

418. The DEO of Sialkot under the Environmental Protection Department (EPD), Punjab will have overall responsibility for the enforcement of PEQS through his inspectors. He will be responsible for the compliance with the following:

- Municipal and liquid industrial effluent parameters (32) for discharge to inland waters, sewage treatment facilities, and the sea;
- Industrial gaseous emissions (16) into the atmosphere;
- Motor and vehicle exhaust and noise (3);
- Ambient air quality (9);
- Drinking water quality (33); and
- Noise for residential, commercial, industrial and silence zones

C. Local Regulations for Acquiring Environmental Approval

419. The water supply, sewerage and urban public spaces development projects do not require any No Objection Certificate (NOC) from the Environmental Protection Department of Punjab as per prevailing EIA/IEE regulations.

D. Environmental Training Needs Assessment

420. SMC does currently have the capacity for ensuring environmental compliance of project proposals. For this purpose, SMC will need the support of the CIU, assisted by environmental consultants for monitoring the environmental performance of the projects and preparing performance reports for ADB. The consultants will be responsible for the preparation of monitoring and performance reports and submitting it

to ADB, training of CIU and SMC staff on ADB's environmental safeguards during construction and operational phases, translation of EMP actions into on ground implementation etc.

421. Frequent training on environmental compliance will be required by those within the SMC (Infrastructure and Services officials, as well as CIU). Most of this training will be conducted on-the-job and in workshops.

E. Grievance Redress System

422. A Grievance Redress System (GRS) will be established by the SMC to facilitate resolution of community complaints and grievances about the subproject environmental performance, in line with the requirements of ADB's SPS 2009. Under this mechanism, a Grievance Redress Cell (GRC) will be established.

423. The civil contractors will maintain a Community Complaints Management Register (CCMR) at site for logging complaints and grievances. This register will be filled and maintained with the assistance of SMC. All written and oral grievances will be recorded in the Register. The information recorded will include the date of the complaint and particulars of the complainant; a description of the grievance; the follow-up action required; the person responsible for implementing the action; and a target date for its completion. Each contractor will primarily be responsible for redressing the grievances within its jurisdiction under overall supervision of SMC. Construction-based grievances will mainly be dealt with by the SMC. The CCMR will be checked frequently by the SMC and necessary actions will be taken in case the contractor is not following up.

424. A Grievance Committee will be established as soon as subproject implementation in each site commences. However, with careful observance of the provisions of the EMP by all stakeholders involved, grievances can be avoided.

425. If necessary, the aggrieved person will first address the CIU Safeguards Cell, whose officers will strive for an informal settlement within 10 days of lodging of the complaint. If the complaint cannot be settled, the grievance will be referred to the Grievance Committee.

426. Within 30 days the committee will discuss the matter and refer grievances to the CIU Safeguards Cell, and obtain a resolution. If the complaint still remains unresolved, it can be re-lodged by the aggrieved person within one month of the Safeguards Cell decision with the Grievance Committee, which refers it to the PMU, LG&CDD.

427. The PMU will rule on the issue(s) within 21 days of its re-lodging with the Grievance Committee. The PMU decision must be in compliance with the provisions of the IEE. If the grievance redress mechanism fails to satisfy the aggrieved person, he/she can approach the Punjab Environmental Protection Agency.

428. Affected communities and their representatives will be identified during the project preparation stage. The SMC will work towards resolving the grievances recorded in the CCMR in conjunction with the contractors within seven calendar days.

F. Environmental and Social Complaint Register

429. SMC project management team will maintain an environment and social complaints register at site offices to document all complaints received from the local communities. The register will also record the measures taken to mitigate these concerns. The final

report will be communicated to the ADB. The SMC monitoring team will monitor the implementation of social and environmental mitigation measures as per the ADB Safeguard Policy Statement.

G. Environmental Management Cost

430. The total cost of environmental management includes human resources, mitigation measures during the construction and operational phases, and laboratory testing charges. The estimated cost of EMP implementation is given in Table 7.3.

Table 7.3: Cost Estimate for Environmental Management

Particulars	Detail	Unit Rate (Rs)	No. of Units	Total Amount (Rs)
Environmental Safeguard Specialist	One person for 6 months responsible for compliance of ADB requirements and training of SMC staff	150,000/month	6	900,000
Construction Phase Compliance of CPEMP	Contractors will be responsible for implementing Construction Phase Environmental Mitigation Plan (as appended with the bidding and contract documents). These costs will be included in their bids and will be part of their overall construction cost	-	-	-
Laboratory Testing Charges Construction Phase (6 months)	i) PM monitoring ii) Stack flue gas analysis for generators and vehicles iii) Wastewater analysis iv) Water quality analysis v) noise	i) 3,000 ii) 3,000 iii) 6,000 iv) 6,000 v) 200	i) 15 ii) 75 iii) 15 iv) 15 v) 300	510,000
Personal Protective Equipment (6 months)	i) Dust masks ii) Face masks iii) Ear plugs iv) Ear muffs v) Safety helmet vi) Safety shoes vii) Safety gloves viii) First aid boxes ix) Firefighting equipment	Contractor		
Environmental Training of the SMC Staff	i) General environmental awareness ii) ADB safeguard requirements iii) GoPb environmental legislation and compliance requirements iv) Monitoring requirement v) Health and safety vi) Firefighting	Lump Sum		300,000
Total				**1,710,000**

VIII. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

431. Public consultations have been carried out at three stages:

- during the initial formulation of project proposals in the Pre-Feasibility Study;
- during the development of project proposals in the Feasibility Study, as part of the preparation of the IEE. Concerns expressed by stakeholders at this stage have been incorporated into final project design; and
- a public consultation workshop at the completion of the draft IEE.

432. Stakeholders consulted have included the local communities directly or indirectly affected either positively or negatively by the project components, NGOs, government departments, and private sector bodies.

433. At the feasibility study stage the consultations have been carried out during preparation of the Gender Analysis and Gender Action Plan, the Poverty Analysis and Social Development Plan, and the Land Acquisition and Resettlement Action Plans.

434. Upon completion of the draft IEE, a further one day workshop has been held in order to inform stakeholders of the project components, the anticipated environmental impacts, proposed measures to mitigate these impacts and the scope and content of the preliminary EMP.

435. At present, there are no public consultations for planning and development of projects in TMA Sialkot. The consultations undertaken and reported in this IEE are a requirement of ADB.

436. The objective of the Public Consultation process was to involve stakeholders from the earliest stages. The viewpoints of the stakeholders have been taken into account and their concerns and suggestions for possible improvements have been included where appropriate.

437. Much of the consultation process to date has resulted in positive feedback from the stakeholders. Stakeholder have appreciated the project components which would improve their lives.

438. There is also a requirement for ongoing consultation for preparation of Land Acquisition and Resettlement Plan (LARP), as this relates to the proposed upgrading of the Main Bus Terminal, and which is documented separately.

439. It is expected that this process will continue throughout all stages of the subproject in order to accommodate stakeholders' aspirations and to orient the stakeholders positively towards the project implementation and where possible to harness cooperation over access issues in order to facilitate timely completion.

A. Pre-Feasibility Stage Public Consultation

440. In the social surveys undertaken under the PFS, water supply emerged as the main issue for people living in poor areas. Whilst detailed records of the individual

consultations held are not available, the following key points are highlighted in the PFS report:

- The local community were not satisfied with the available water quality, such that in some areas they have disconnected the supply due to poor quality and odors that appear as a result of the mixing of water and sewerage systems;
- People were concerned that the poor quality of the water causes diseases such as hepatitis, diarrhea, worm infections, and malaria. Regarding costs, they are paying on average Rs. 626 on quarterly basis;
- The general public is very happy with the proposed underpass project. They held the view that excess traffic failure is a problem, having adverse effects on local schools, especially Allama Iqbal Degree College for Girls. The underpass will result in the smooth flow of traffic in the area;
- There is a Nullah (drain) located close to the project area, and during construction of the underpass, the entire residential area will be cut off from the drainage system, so there will need to be alternative drainage options identified prior to the commencement of construction;
- Traffic will likely be affected during the project construction stage, so an alternate route must be given to avoid larger traffic failure;
- People were worried that their commercial structures will be affected during the project execution stage. In case their structures are damaged, they will need to be compensated;
- Encroachment by other businesses and mobile vendors will affect livelihoods during the construction stage;
- Some people have doubts that the project will not be completed on time and will create problems for them;
- The project may lead to the loss of business, negatively affecting livelihoods;
- The movements of local residents, especially female students, will be hindered severely, so they should be provided with an alternate route; and
- Any displaced persons should be provided with an alternate source of income prior to commencement of civil work to account for the expected loss of income.

B. Feasibility Stage Public Consultation

441. Focus Group Discussions (FGD) in Sialkot were held in the period 4th November 2017 to 8th November 2016. A list of participants is provided in Annexure 3.

442. A summary of the key points arising from these public consultations is as follows:

- Women participants of the Focus Group Discussions (FGDs) reported that health related expenditures form a significant portion of their total monthly expenditures. There is anecdotal evidence that a large majority of the population relies on private sector health facilities;
- Women and men in all FGDs have noted that there is a high prevalence of hepatitis which they attribute to contaminated water and inadequate solid waste disposal;
- According to primary data from the FGDs, there is no development activity, donor assisted projects or initiatives. The civil society representatives provided a

different perspective but it can be stated that, with the exception of some philanthropic activity for installation of water filters, none of the sample areas are being targeted under any urban services improvement programs currently;

- Women residents talked at length on the poor or non-existent services available to them in terms of the quality and quantity of water, sanitation, health and education;
- Poor communities do not have access to gas and there are no proper arrangements for water supply, sewage or solid waste management;
- At an institutional level, it was observed that there were no specific gender mainstreaming strategies or mechanisms at the level of the TMAs and it would not be an exaggeration to state that the public services institutions are gender-blind. No-one from the TMAs mentioned having any policies and resources to this effect and indeed the facilities and working environment is very unfriendly towards women, despite the fact that women are employed in the workers' category;
- Overall, issues related to water access and water quality are very common. These include poor water quality, erratic supply and infiltration of water supply pipelines with sewage;
- Government water supply follows fixed timings and is mostly available three times a day for an hour each time. Water quality has been reported to be poor to very poor and unsafe for drinking, in all cases. Some residents, for example in Union Council (UC) Mianapura, Sialkot noted that water quality is so bad that it is unfit even for bathing;
- For drinking purposes, almost all households resort to either boiling water or collecting it from the various public and private water filtration plants installed in different areas. While a small number of people reported that they are making do with collecting water from filters, most of the women and men stated that filter plants are either far away or are dysfunctional;
- Due to the unavailability of municipal water supply, the majority depend on motor-operated pumps and pay a heavy electricity bills (ranging between Rs. 3,000 - 4,000 per month);
- The FGD in UC New Mianapura East revealed that even the pumped water they get within their houses is not good and they have to go to the nearest filter plant which is half an hour away on foot to get water;
- With regard to the sewage system the consultations indicated that the public system is a badly planned, haphazard, outdated, inefficient and faulty collection of old rusty pipes and open and semi-covered and covered drains;
- Local communities indicated that there was a perpetual problem of clogged and overflowing drains, flooding of streets and lanes with filth and sewage with ad hoc arrangements being made in emergency situations that only provide temporary relief. The severity of the situation varies but is particularly alarming in middle- or low-income areas;
- Women respondents in all FGDs mentioned the great difficulty faced by them due to this problem and the health, hygiene and mobility constraints they face because of this situation;
- Rain water gathers and remains standing for days and many areas reportedly remain inundated for days on end due to a lack of adequate drainage;

- The functioning of the TMA is considered to be highly unsatisfactory and people have mentioned that there are severe staff shortages. According to city residents, the cleaning and operation of the sewerage system is a combination of luck, chance or circumstance where an active UC chairman or councillor will take action to mobilize resources;
- In UC Model town, Sialkot, residents reported the presence of households who have kept livestock (cows and buffaloes) within their homes. Animal dung and other waste is being collected and disposed of directly at street level. Residents have unsuccessfully lodged complaints and tried to take action on this matter but to no effect;
- The FGD respondents mentioned that solid waste collection staff are limited, that containers are not placed evenly across the city, that neighborhood and lane level disposal is not thought out, that the dumpers are often faulty and that timing schedules are not adhered to;
- Moreover, it was noted that SWMC sanitary workers often refused to work on the pretext that they are on strike. TMA has alleged that the separation of solid waste sanitary staff has created a difficult situation whereby they sweep garbage directly into open lines and let the TMA staff attend to it;
- Residents of New Mianapura East, Sialkot also mentioned that SWMC only collect from major market roads and there is unattended industrial waste as well in their area. The landfill site had not been finalized at the time of fieldwork and according to the SWMC all suitable options had been exhausted to no avail;
- The only mode of transportation for a large majority of the population are qingchis and auto rickshaws and these are reportedly unaffordable. Most of the women noted that they travel on qingchis at a flat rate for Rs 20 within the city but more for travel to far off places and this places a huge financial burden especially for those who have to go out every day for education or employment purposes; and
- Women in the FGD (UC Kareempura, Sialkot) noted difficulties in having to sit next to male passengers and said they would very much like a metro bus system which they can avail for Rs 10 as in bigger cities.

443. It is evident that the city residents (men and women) in Sialkot feel that there are no adequate, safe, reliable, consistent or regular services vis-à-vis water supply, sewage, solid waste management or transportation.

444. It is also evident that women, due to their multiple productive and reproductive roles, are inconvenienced and burdened due to limitations in service provision. Men and children are also involved in terms of both time and labor (water carrying/collecting, garbage collection). The proposed projects, therefore, stand to benefit everyone and do not have any adverse impacts.

445. The field findings from the FGDs indicate community prioritisation of needs as follows:

- Better sewage and sanitation;
- Improved water supply (availability and quality);
- Solid waste management;
- Health facilities/improvements;
- Community spaces/centers; and
- Transportation services.

446. Another equally important and oft-mentioned concern by almost all women is their aspiration for a women-friendly public space that is open to all and where they can come together for various purposes. “A centre run for women and by women” is how many different women expressed it – a space where they can congregate for various purposes in a safe and unhindered manner.

447. The Civil Society Organizations emphasized clean water supply, functioning sewage system, health and education, as well awareness raising and sensitization of civic and legal rights and obligations, implementation of existing laws and labor standards relating to women, jobs and skills training for skilled and unskilled labor.

448. Willingness to pay for the amenities was explored under all sectors and in all data collection instruments for primary data collection. By and large, all respondents, with the exception of women respondents in UC Waterworks, reported that they are not able to pay any additional charges for water supply or solid waste because they are already barely able to make ends meet. “The Rs 626 is already too high and we sometimes have to pay this amount in installments” is how the women in UC Kareempura, Sialkot put it.

449. The respondents in the more affluent UC Waterworks reported, however, that their willingness to pay depends on the suitability of proposed arrangements and they indicated that perhaps 50 percent of the households are in a position to pay an extra Rs 100-200 for improved (efficient and regular) water supply and solid waste management.

450. Households are already paying fees for privately acquired services, such as electricity bills for water or rickshaw fares. These fees are usually higher than municipal service charges, and this, therefore, suggests an ability to pay, if not a willingness to pay.

C. Public Consultation on Main Bus Terminal Upgrading

451. A consultation meeting at the Main Bus Terminal was held on 22nd February, 2017 at 12.00 hours. Information about meeting date and time was provided by Sialkot Cantonment Board (SCB) to all shopkeepers in the bus terminal by SCB staff and the census survey team preparing the Land Acquisition and Resettlement Plan (LARP) for the proposed bus terminal upgrade.

452. The consultation meeting was convened in order to explain the proposed project, to document and address the concerns of any Affected Persons (AP) (primarily shopkeepers) that might be impacted by the proposed upgrade, and to solicit the suggestions of APs to be incorporated into the final design.

453. There is no association of shopkeepers at the bus terminal. All shopkeepers were invited to attend the meeting.

454. The meeting was attended by 21 shopkeepers and one driver. The Secretary of the SCB participated in consultation meeting. The Deputy Team Leader of the PPTA consultant and LARP consultant conducted the consultations. LARP team participated in the meeting. The Due Diligence Consultant of ADB also attended the consultation meeting. The meeting lasted for nearly two hours. A list of participants with their signatures is included in Annexure 3.

455. At the beginning of the meeting participants were informed about the PICIIP and its subprojects for improvement of water supply, sanitation, solid waste management, improvement of public parks and urban transport that included upgrade of the bus terminal.

456. They were informed that engineering design for upgrade of bus terminal is under preparation. Consultations on the final design will be held with SCB. The final design will be presented to all stakeholders to document and consider their concerns and suggestions.

457. They were also informed that the SCB will not evict any shopkeeper and will not increase the monthly shop rent after completion of bus terminal upgrade. The construction plan will be prepared to minimise any disruption in business activities on the bus terminal.

458. Participants articulated the following principal concerns:

- The most important concern was about eviction of shopkeeper for infrastructure development if the upgrade plan required dismantling of shops in some parts of the bus terminal. In this case some persons may be displaced and their livelihoods destroyed. They were informed that no one will be displaced as a result of bus terminal upgrade. If any shop is demolished, the shopkeeper will be provided with a replacement shop before its acquisition;
- Concern was also expressed about size and location of replacement shops. APs informed that shops at some distance from bus departure bays have little business. They asked for provision of shops close to the departure bays and accessible to passengers. This concern was noted and they were informed that replacement shop will be accessible to passengers;
- Another concern was about the size of any replacement shop. They wanted the same size replacement shops. They were ensured that replacement shop will be of the same size or larger than the acquired shops.
- Another concern was about increase in rent of shop after completion of bus terminal upgrade. They were informed that the terms and conditions of their tenancy contract, which include 30% increase in rent of shop after three years, will remain unchanged.

459. The following nine suggestions were given by participants for the improvement of bus terminal:

- Provision of waiting passenger's rooms;
- Provision of toilets;
- Provision of clean drinking water;
- Provision of adequate lights;
- Provision of storm water drainage;
- Pavement of all bus stand;
- Provision of parking space for vehicles;
- Provision of sheds at bus departure areas; and
- Provision of space for parking of buses.

460. Participants were informed that their concerns and suggestions have been documented and will be considered in the preparation and finalization of design for bus terminal upgrade.

461. Another consultation meeting will be held after completion of the detailed engineering design to ensure that their concerns are addressed and suggestions are incorporated.

D. Public Consultation Workshop

462. A Public Consultation workshop was held on July 18, 2017 at Municipal Corporation office Sialkot. The purpose of the public consultation was to brief the participants and to seek their views, comments and concerns about the subprojects proposed Phase 1 of PICIIP and their anticipated environmental impacts.

463. The meeting was attended by the Deputy Mayor and other governmental officials, public organizations, industry representatives and consultants. Attendance sheet and participants pictures are reproduced in Annexure 3.

464. Mr. Shafqat Ullah, Environmental Safeguard Consultant, started the proceeding, thanked the Deputy Mayor and Municipal Corporation of Sialkot for arranging the public consultation meeting and welcomed the participants for their participation. He briefly explained the participants about the PICIIP and the development projects proposed for Sialkot city under Phase 1 of PICIIP.

465. After explaining the proposed projects, Mr. Ullah informed the participants that ADB required environmental assessment of the proposed projects before implementation so that the identified impacts could be managed during construction, as well as during the operational phases.

466. The environmental impacts would be managed by implementing an Environmental Management Plan (EMP). During environmental assessment, public consultation was required to obtain public's views from those directly or indirectly affected by these projects, both positively or negatively.

467. He then presented the potential environmental impacts of the proposed projects during both the construction and operational phases. He emphasized that the identified impacts were mostly under LOW risk category. For LOW category there was no need for any action. Very few were potential environmental impacts were categorized under the MEDIUM risk category and these could be controlled by taking simple management actions during construction and operational phases.

468. Overall, the participants appreciated all the proposed projects and hoped that these projects would be beneficial for them in future. However, participants also raised their concerns, which primarily related to implementation arrangements and commercial concerns rather than direct environmental or social impacts:

- SMC and the Cantonment Board should have a joint venture agreement for the proportionate distribution of profits from the rehabilitation of the general bus stand;
- Participants were quite concerned about the start of these projects because they had already been delayed;

- There should be project implementation and management plan which should be shared with the Municipal Corporation to understand that it would not create problems during laying down pipelines and digging of roads. They had the experience that when pipelines were laid down, the existing water connections were disconnected and people were in real trouble at that time. The management plans should address these issues;
- It was not clear whether the disturbed roads and other structures would be rehabilitated after laying down the pipelines or left unaddressed;
- It was not clear that whether budget would be allocated for the maintenance of these infrastructure or not and, if available, then for how long. It was suggested that the ADB should also give maintenance budget to the Municipal Corporation for the maintenance of the projects.
- What kind of taxes would be imposed on public for the maintenance of the proposed projects;
- There should also be sewage treatment plant and solid waste management projects in the city; and
- Participants pointed that the infrastructure development projects should be implemented in phases to minimize the disturbance to the residents of the city. For example, they proposed that the work on city roads should not start simultaneously rather roads should be improved in sequence.

469. The above concerns were addressed and answered during the workshop.

IX. FINDINGS AND RECOMMENDATIONS

470. This IEE was carried out at the Feasibility Study stage of the PICIIP. Primary and secondary data were used to assess environmental impacts. The report has provided a picture of all potential environmental impacts associated with the project, and recommended suitable mitigation measures.

471. Most of the water supply, sewerage and urban public space development improvement projects have minor adverse transient environmental impacts during the construction phase only. These are manageable through implementation of the CPEMP with overall supervision by the SMC. However, the staff of the SMC will require training on EMP implementation during the construction phases.

472. The water supply, sewerage and urban public space projects (transport route, bus terminal and green spaces upgrading) do not require No Objection Certificates from the government. The information provided in this report can form the basis of any further submission to ADB as required.

473. Construction phase environmental management plan (CPEMP) and construction safety plans are also required to be prepared before awarding the construction contract to the contractors. These plans will be part of the bidding documents.

474. These projects will not pose any negative social impact. However, if land acquisition is required, compensation to the APs and concerned parties will be provided. Gender Analysis and Gender Action Plan, Poverty Analysis and Social Development Plan, and, Land Acquisition and Resettlement Plan have been completed in tandem with this IEE. These studies have:

    - Examined and assessed the overall social and poverty profile of the project area on the basis of the primary and secondary data sources and prepared socio-economic profiles of the project areas;
    - Prepared a social and poverty analysis, taking into account socio-economic and poverty status of the project area of influence, including the nature, extent and determinants of poverty. In addition, estimation of the likely socioeconomic and poverty reduction impacts of the project were included;
    - Held consultations with relevant officials from the government, including consultation with affected communities to assess responses to the project and ascertain the nature and scope of local participation in project planning and implementation; and
    - Identified, analyzed and, where appropriate, quantified the potential resettlement Impacts (minimal) of the proposed project on the area and the population.

475. Baseline monitoring activities have not been carried out in the FS. The requirement for baseline monitoring, prior to the commencement of construction and operation activities, shall be integrated into contract documents in order to establish performance thresholds, pollution limits and contingency plans for the contractor's performance.

476. During the operational phase, the monitoring of environmental parameters should ensure that statutory requirements have been achieved. Monitoring activities will focus on periodic recording of environmental performance and proposing remedial actions to address any unexpected impacts.

X. CONCLUSIONS

477. The water supply, sewerage and urban development projects under PICIIP are feasible and sustainable from engineering, environmental, and socio-economic points of view.

478. Implementation of the EMP is required to and the potential environmental impacts associated with subproject implementation need to be mitigated properly.

479. The positive environmental and social benefits of the projects far outweigh the temporary negative potential impacts arising from construction activities.

480. Existing institutional arrangements are available for the implementation of the EMP. Additional human and financial resources will be required by SMC to comply with environmental safeguard requirements. The proposed mitigation and management plans are practicable but require additional resources.

481. This IEE, including the EMP, should be used as a basis for an environmental compliance program and as guidelines for the preparation of construction related EMP document which should be included as an Appendix to the contract document.

482. The EMP shall be reviewed at different stages of the project and be updated as per requirement.

483. In addition, should any subsequent conditions be issued by EPA Punjab as part of the environmental clearance, these should also be included in the environmental compliance program. Therefore, continued monitoring of the implementation of mitigation measures and implementation of the environmental conditions for work should be properly carried out and reported at least twice a year as part of the project performance report.

ANNEXURE 1: REA CHECKLISTS

Rapid Environmental Assessment (REA) Checklist

SEWAGE TREATMENT

Instructions:

- ❑ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional Sustainable Development Department.
- ❑ This checklist is to be completed with the assistance of an Environmental Specialist in a Regional Department.
- ❑ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on i) involuntary resettlement, ii) indigenous peoples planning iii) poverty reduction, iv) participation, and v) gender and development.
- ❑ Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: PAKISTAN/Punjab Intermediate Cities Improvement Investment Project (PICIIP)

Sector Division: Water and other urban infrastructure and services

SCREENING QUESTIONS	Yes	No	REMARKS
A. Project Siting Is the project area			
➢ Densely populated?	☐	■	
➢ Heavy with development activities?	☐	■	
▪ Adjacent to or within any environmentally sensitive areas?			
➢ Cultural heritage site	☐	■	
➢ Protected area	☐	■	
➢ Wetlands	☐	■	
➢ Mangrove	☐	■	
➢ Estuarine	☐	■	
➢ Buffer zone of protected area	☐	■	
➢ Special area for protecting biodiversity	☐	■	
➢ Bay	☐	■	
B. Potential Environmental Impacts			

SCREENING QUESTIONS	Yes	No	REMARKS
Will the Project cause			
▪ Impairment of historical/cultural monuments/areas and loss/damage to these sites?	☐	■	
▪ Interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.??	■	☐	Transient impacts possible during replacement of sewer lines. Mitigation measures proposed as part of the EMP
▪ Dislocation or involuntary resettlement of people?	☐	■	
▪ Impairment of downstream water quality due to inadequate sewage treatment or release of untreated sewage?	☐	■	Situation is unchanged from current scenario in the absence of treatment plant facilities.
▪ Overflows and flooding of neighboring properties with raw sewage?	☐	■	Situation is unchanged from current scenario in the absence of treatment plant facilities.
▪ Environmental pollution due to inadequate sludge disposal or industrial waste discharge illegally disposed in sewer?	☐	■	Situation is unchanged from current scenario in the absence of treatment plant facilities.
▪ Noise and vibration due to blasting and other civil works?	■	☐	Transient impacts during construction. Mitigation measures proposed as part of the EMP.
▪ Discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?	☐	■	Situation is unchanged from current scenario in the absence of treatment plant facilities.
▪ Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?	☐	■	No treatment plants
▪ Social conflicts between construction workers from other areas and community workers?	☐	■	
▪ Road blocking and temporary flooding due to land excavation during rainy season?	■	☐	Transient impacts during construction. Mitigation measures proposed as part of the EMP. Scheduling of works to avoid the rainy season
▪ Noise and dust from construction activities?	■	☐	Transient impacts during construction. Mitigation measures proposed as part of the EMP.

SCREENING QUESTIONS	Yes	No	REMARKS
▪ Traffic disturbances due to construction material transport and wastes?	■	□	Transient impacts during construction. Traffic management measures proposed as part of the EMP.
▪ Temporary silt runoff due to construction?	■	□	Transient impacts during construction. Mitigation measures proposed as part of the EMP.
▪ Hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?	□	■	Situation is unchanged from current scenario in the absence of treatment plant facilities.
▪ Deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?	□	■	Situation is unchanged from current scenario in the absence of treatment plant facilities.
▪ Contamination of surface and ground waters due to sludge disposal on land?	□	■	Situation is unchanged from current scenario in the absence of treatment plant facilities.
▪ Health and safety hazards to workers from toxic gases and hazardous materials which may be contained in sewage flow and exposure to pathogens in sewage and sludge?	□	■	Situation is unchanged from current scenario

Rapid Environmental Assessment (REA) Checklist

URBAN DEVELOPMENT

Instructions:

- ❑ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional Sustainable Development Department.
- ❑ This checklist is to be completed with the assistance of an Environmental Specialist in a Regional Department.
- ❑ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on i) involuntary resettlement, ii) indigenous peoples planning iii) poverty reduction, iv) participation, and v) gender and development.
- ❑ Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: PAKISTAN/Punjab Intermediate Cities Improvement Investment Project (PICIIP)

Sector Division: Water and other urban infrastructure and services

SCREENING QUESTIONS	Yes	No	REMARKS
C. Project Siting Is the project area			
➢ Densely populated?	☐	■	
➢ Heavy with development activities?	☐	■	
▪ Adjacent to or within any environmentally sensitive areas?			
➢ Cultural heritage site	☐	■	
➢ Protected area	☐	■	
➢ Wetlands	☐	■	
➢ Mangrove	☐	■	
➢ Estuarine	☐	■	
➢ Buffer zone of protected area	☐	■	
➢ Special area for protecting biodiversity	☐	■	
➢ Bay	☐	■	
D. Potential Environmental Impacts Will the Project cause			

SCREENING QUESTIONS	Yes	No	REMARKS
▪ Impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services?	☐	■	
▪ Deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?	☐	■	
▪ Degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests?	☐	■	
▪ Dislocation or involuntary resettlement of people?	■	☐	Social safeguard report under preparation for parties affected by plans to redevelop the bus terminal
▪ Degradation of cultural property, and loss of cultural heritage and tourism revenues?	☐	■	
▪ Occupation of low lying lands, floodplains and steep hillsides by squatters and low income groups, and their exposure to increased health hazards and risks due to polluted industries?	☐	■	
▪ Water resource problems (e.g. depletion/degradation of available water supply, deterioration of surface and ground water quality, and pollution of receiving waters?	☐	■	
▪ Air pollution due to urban emissions?	☐	■	
▪ Social conflicts between construction workers from other areas and local workers?	☐	■	
▪ Road blocking and temporary flooding due to land excavation during rainy season?	■	☐	Traffic management measures required as part of the EMP. Scheduling of construction work to avoid rainy season
▪ Noise and dust from construction activities?	■	☐	Transient impacts from construction activities. Mitigation measures proposed

SCREENING QUESTIONS	Yes	No	REMARKS
			as part of the EMP
▪ Traffic disturbances due to construction material transport and wastes?	■	□	Traffic management measures required as part of the EMP. Transient impacts
▪ Temporary silt runoff due to construction?	■	□	Construction activities to be confined to dry season/dry weather. Scheduling to be stipulated in the EMP
▪ Hazards to public health due to ambient, household and occupation pollution, thermal inversion, and smog formation?	□	■	
▪ Water depletion and/or degradation?	□	■	
▪ Overpaying of groundwater, leading to land subsidence, lowered groundwater table, and salinity?	□	■	
▪ Contamination of surface and ground waters due to improper waste disposal	□	■	
▪ Pollution of receiving waters resulting in amenity losses, fisheries and marine resources depletion, and health problems?	□	■	

Rapid Environmental Assessment (REA) Checklist

WATER SUPPLY

Instructions:

- ❑ This checklist is to be prepared to support the environmental classification of a project. It is to be attached to the environmental categorization form that is to be prepared and submitted to the Chief Compliance Officer of the Regional Sustainable Development Department.
- ❑ This checklist is to be completed with the assistance of an Environmental Specialist in a Regional Department.
- ❑ This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB checklists and handbooks on i) involuntary resettlement, ii) indigenous peoples planning iii) poverty reduction, iv) participation, and v) gender and development.
- ❑ Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: PAKISTAN/Punjab Intermediate Cities Improvement Investment Project (PICIIP)

Sector Division: Water and other urban infrastructure and services

SCREENING QUESTIONS	Yes	No	REMARKS
E. Project Siting Is the project area			
➢ Densely populated?	☐	■	
➢ Heavy with development activities?	☐	■	
▪ Adjacent to or within any environmentally sensitive areas?			
➢ Cultural heritage site	☐	■	
➢ Protected area	☐	■	
➢ Wetlands	☐	■	
➢ Mangrove	☐	■	
➢ Estuarine	☐	■	
➢ Buffer zone of protected area	☐	■	
➢ Special area for protecting biodiversity	☐	■	
➢ Bay	☐	■	
F. Potential Environmental Impacts			

SCREENING QUESTIONS	Yes	No	REMARKS
Will the Project cause			
▪ Pollution of raw water supply from upstream wastewater discharge from communities, industries, agriculture, and soil erosion runoff?	☐	■	
▪ Impairment of historical/cultural monuments/areas and loss/damage to these sites?	☐	■	
▪ Hazard of land subsidence caused by excessive groundwater pumping?	☐	■	
▪ Social conflicts arising from displacement of communities?	☐	■	
▪ Conflicts in abstraction of raw water for water supply with other beneficial water uses for surface and ground waters?	☐	■	
▪ Unsatisfactory raw water supply (e.g. excessive pathogens or mineral constituents)?	☐	■	
▪ Delivery of unsafe water to distribution system?	■	☐	Disinfection system proposed at production and storage facilities
▪ Inadequate protection of intake works or wells, leading to pollution of water supply?	☐	■	
▪ Over pumping of groundwater, leading to salinity and ground subsidence?	☐	■	
▪ Excessive algal growth in storage reservoir?	■	☐	Preventative maintenance required for all production and storage facilities
▪ Increase in production of sewage beyond capabilities of community facilities?	■	☐	Improvements to sewerage system proposed in parallel with this project
▪ Inadequate disposal of sludge from water treatment plants?	☐	■	
▪ Inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances and protect facilities?	☐	■	
▪ Impairments associated with transmission lines and access roads?	☐	■	
▪ Health hazards arising from inadequate design of facilities for receiving, storing, and handling of chlorine and other hazardous	■	☐	Handling and storage procedures built into the EMP

SCREENING QUESTIONS	Yes	No	REMARKS
chemicals?			
▪ Health and safety hazards to workers from the management of chlorine used for disinfection and other containments?	■	□	Handling and storage procedures built into the EMP
▪ Dislocation or involuntary resettlement of people	□	■	
▪ Social conflicts between construction workers from other areas and community workers?	□	■	
▪ Noise and dust from construction activities?	■	□	Noise and dust control measures to be specified in the EMP. Impacts are transient.
▪ Increased road traffic due to interference of construction activities?	■	□	Traffic management plan to be specified in the EMP. Impacts are minor and transient.
▪ Continuing soil erosion/silt runoff from construction operations?	□	■	
▪ Delivery of unsafe water due to poor O&M treatment processes (especially mud accumulation in filters) and inadequate chlorination due to lack of adequate monitoring of chlorine residuals in distribution systems?	■	□	Preventative maintenance required for all production and storage facilities. Monitoring requirements to be specified in the Monitoring Plan
▪ Delivery of water to distribution system, which is corrosive due to inadequate attention to feeding of corrective chemicals?	■	□	Preventative maintenance required for all production and storage facilities. Monitoring requirements to be specified in the Monitoring Plan
▪ Accidental leakage of chlorine gas?	□	■	
▪ Excessive abstraction of water affecting downstream water users?	□	■	
▪ Competing uses of water?	□	■	
▪ Increased sewage flow to increased water supply	□	■	
▪ Increased volume of sullage (wastewater from cooking and washing) and sludge from wastewater treatment plant	■	□	Improvements to sewerage system proposed in parallel with this project

ANNEXURE 2: ASBESTOS MANAGEMENT FRAMEWORK

1. This Asbestos Management Framework (AMF) was prepared for all subprojects funded under the Punjab Intermediate Cities Improvement Investment Project (PICIIP). The Asbestos Management Framework focuses specifically on environmental liabilities with respect to asbestos.

2. Nothing in this AMF shall be construed as modifying or releasing the Implementing Agency (IA) from any other obligations for environmental assessment of subprojects as required under the Project Administration Manual (PAM) with regards to the policy, procedures and institutional requirements for preparing subsequent sub-projects under the loan.

A. Development Activities Requiring Asbestos Management

3. Subprojects in both the water supply and sanitation sectors in PICIIP will include replacement of water distribution mains (WDM) and sewer pipes. Asbestos cement pipes (ACP) are known to have been used to construct significant portions of the existing WDM and may also have been used to construct some sections of the sewers.

4. The objective of this AMF is to reduce the risk of exposure of workers that have to handle asbestos, reduce the environmental liabilities associated with asbestos and also build capacity in the PMU of the IA, the CIU of Sialkot City and the Sialkot Urban Services Company, to manage asbestos related issues.

5. ADB's Safeguard Policy Statement (SPS) (2009) embraces environmentally responsible procurement (ERP) which is a fundamental principle for robust environmental management of subprojects. Asbestos is on the Prohibited List in ADB's guidelines for Environmentally Responsible Procurement (2007)[2].

6. Asbestos is recognized internationally as a hazardous material because it can present a risk to human health. In many jurisdictions asbestos is classified as hazardous and is a controlled chemical waste or a hazardous waste because, if it is mishandled, it can release airborne fibres that are known to cause asbestosis and may also be associated with other lung diseases and cancer.

7. All forms of the asbestos mineral will release asbestos fibres if broken up and all types of asbestos containing materials (ACM) will release asbestos fibres, to some degree, if damaged, abraded, weathered or decomposed.

8. Asbestos has been used widely in numerous types of materials – for example, in numerous types of cement materials, pipe insulation plaster and in refractory brick work Asbestos is often used because of its good qualities as a thermal insulation material and also because it is useful as a binder to form complicated cement shapes and durable pipes. The amounts of asbestos used varies from product to product but certain types of asbestos cement can contain more than 50% asbestos.

9. Asbestos containing materials are typically classified into two main groups based upon the physical characteristics of the material and the potential this offers for the airborne release of asbestos fibres, namely friable and non-friable materials.

[2] Environmentally Responsible Procurement – A guide to better practice. ADB, Manila (2007)

10. Friable materials are those which can be readily crushed or can disintegrate under pressure, either because of their inherent characteristics or due to longer-term deterioration or damage post installation. Non-friable materials are those which retain their physical integrity and in which the asbestos fibres are readily bound into the matrix of the material.

11. Asbestos cement pipes are regarded as non-friable materials, unless these have become damaged or weathered due to exposure.

12. When bound in the cement matrix of a pipe the asbestos is generally considered safe. However, over time, the cement surface of a pipe can become corroded or abraded and gradually become more friable leading to the release of asbestos fibres.

13. For buried or submerged AC pipe, the chemical conditions in the surrounding soil or water will also affect the rate of deterioration of the pipes as they gradually wear out or become more fragile.

14. The removal and replacement of AC pipes will give rise to some release of asbestos fibres as it is almost impossible to remove more fragile old ACPs without breaking them. Therefore, in addition to giving rise to a controlled waste, the removal of the ACP can also easily lead to the release of asbestos fibres if the removal is not conducted under controlled conditions.

15. This AMF has been prepared because ACPs will most likely be disturbed in the process of rehabilitating and/or replacing existing water supply pipework and sewers. Given the concerns expressed over the extensive leaking and dilapidated state of the WDM and sewers, it is likely that a significant part of the ACP are severely degraded, broken or cracked underground and will, inevitably, have to be physically removed and replaced.

16. The Asbestos Specialist in the PMU, CIU and/or Sialkot Urban Services Company will be responsible ensuring that the AMF is implemented, that necessary asbestos assessments are prepared and that asbestos issues, as applicable, are considered early in the implementation at the detailed design stage.

17. The procedures to be adopted are outlined in this framework by reference to known asbestos in ACP but this AMF should be applied to all subprojects where any ACM is identified, anticipated or suspected. In these circumstances, a preliminary review of asbestos issues should be undertaken to identify any known uses of ACM or asbestos containing products that have been procured. In the case of subprojects involving WDM and sewer subprojects replacement or rehabilitation, either all cement pipes can be assumed to be ACP or sampling of the pipes can be undertaken by the Environmental Specialist early in the detailed design phase, The ACP samples shall be referred to a suitably qualified laboratory for analysis (refer to Appendix 3 to this AMF).

18. Asbestos investigations should be prepared for each subproject to check if there is any likelihood of ACM being encountered. If ACM is present Asbestos Management Plans (AMP) should be prepared and disclosed to ADB for review and approval prior to including the AMP in the contracts before commencement of work.

B. Requirement for Asbestos Management

19. Strict procedures are to be prescribed and adopted for handling, removing, transporting and disposal of ACM, where these are removed from their *in-situ* location. These procedures require the use of specially trained and equipped contractors working under

approved operational health and safety guidelines and approved waste management plans (refer to Appendix 2 to this AMF).

20. These procedures are mandatory for all materials classified as friable and are also to be applied where non-friable materials need to be cut, broken down or otherwise reduced in size (for example, cutting ACP into sections or removing pipe thrust blocks) as part of the protocol for their removal from the installed location.

21. For non-friable materials in ACP it is common practice, where such pipes are to be replaced, to leave the pipes *in-situ*, buried in their installed position, providing the ACPs are not disturbed and are assessed to be in good condition.

22. Best practice asbestos management usually entails several stages:

    I. Survey and investigation are the first steps in which the Asbestos Specialist will check all structural elements, fixtures and fittings for fibrous materials that are potentially asbestos;

    II. Samples are taken under controlled conditions and an accredited laboratory analyses the samples using polarized light microscopy;

    III. The Asbestos Specialist will then assess the type, location and condition of asbestos and make a hazard assessment;

    IV. If asbestos needs to be removed, an Asbestos Abatement Plan (AAP) is usually prepared to cover removal with detailed work specifications for specialist contractors; and

    V. In all cases the asbestos should be labelled and safety procedures instigated to prevent disturbance, until such time as it can be removed safely, if required.

23. There are as yet no statutory controls on hazardous waste in Pakistan. The Hazardous Substances Rules (HSR) were drafted in 2003 but were never brought into force. Asbestos wastes are listed in the draft HSR. If enacted the HSR would require an entity licensed under the Environmental Protection Act (1997, amended 2012) to have a waste management plan for any listed hazardous substance. This AMF is in line with the spirit of Pakistan's draft legislation.

24. The lack of a functioning Hazardous Waste Management (HWM) system is of grave concern, since many hazardous wastes are being co-mixed with municipal solid waste and disposed of to uncontrolled open dumps. This would presumably be the fate of any asbestos waste from the sub-projects under PICIIP if disposal of ACM is not controlled.

25. ADB standards are guided by World Bank Environment, Health and Safety (EHS) Guidelines that requires asbestos disposal should be carried out in line with host country regulations or following best international practice.

26. As there are, as yet, no local standards for asbestos control in Pakistan, any known asbestos waste requiring removal should be disposed of following best international practice.

27. In line with best international practice, the requirement for a dedicated Asbestos Management Plan (AMP) has been included in the EMP for relevant PICIIP subprojects.

C. Responsibilities / Authorities of Various Agencies

28. Potential environmental liabilities with respect to asbestos associated with subprojects will be minimized by implementing the requirements of the AMF and by prescribing the selection of alternative non-asbestos materials (Section D and Appendix 2).

29. All measures shall be in line with ADB's Safeguard Policy Statement (2009), any applicable National and Provincial Government regulations and guidelines, and ADB's guidance document on Environmentally Responsible Procurement (2007).

30. Subprojects shall only involve asbestos-related activities that follow the AMF.

31. The IA will be solely responsible for the implementation of all of the asbestos assessment and review procedures required in the AMF for all affected subprojects. This will include, but not be limited to, ensuring that the asbestos control procedures are strictly adhered to, that preparation of Asbestos Investigation Reports (AIR) and Asbestos Management Plans (AMP) are carried out in a timely and efficient manner and included in the construction contracts.

32. Sialkot Urban Services Company (SUSC) will submit the asbestos checklist (Table 1), an AIR, an AMP and monitoring reports to ADB for review.

Table 1: Proposed preliminary checklist for AMF Implementation on PICIIP Subprojects

	Task/Progress	Yes/No (comment)	Date
1	Strengthen Safeguard Cell (SC) to manage asbestos		
2	Prepare asbestos screening checklist. A preliminary review of asbestos issues by SC. Are ACMs/ACPs known to have been used in the system ?		
3	Have potential locations for ACMs/ACPs been identified, surveyed, sampled and investigated by the Asbestos Specialist /qualified/registered asbestos consultant as per best practice ?		
4	Have the potential ACM/ACP bulk samples been analyzed by an accredited laboratory as per best practice (Appendix 4) ?		
5	Has the SC Specialist prepared an AIR, including the survey, sampling locations and confirmed or refuted the presence and types of asbestos as per best practice ?		
6	Has the SC Specialist prepared an AMP, including AAP, including results of the asbestos investigation, ACM locations and types of asbestos as per AMF procedures and best practice ?		
7	Are the requirements for AMP, including AAP, included in the contracts ?		
8	Have SUSC provided the necessary buffer storage space or landfill disposal location for the asbestos ?		
9	Do contractors have, or can obtain, the necessary skills, capability and equipment to carry out asbestos management as per the AMF ?		
10	If no to any of the above, provide remedial action and detail on separate sheets		

33. The Asbestos Specialist of the SUSC Safeguard Cell shall:

I. Assist SUSC to identify a suitable secure buffer store for waste asbestos;

II. Prepare an AIR and checklist to identify any asbestos issues in any subproject;

III. Ensure that adequate sampling and analysis of the existing facilities has been carried out to ensure all environmental liabilities with respect to asbestos have been identified, review the asbestos assessments AIR and AAP and submit the AIR and AAP to ADB; and

IV. Prepare the asbestos surveys and investigations, and prepare asbestos assessments, AIR and AAP reports, including an AMP, for inclusion in the construction contracts.

34. Prior to the commencement of civil works for subprojects the SUSC shall:

I. Set up the buffer store facility and ensure that all contractors have been briefed as to the presence of ACM in the subproject works and the nature of the hazards posed by the type of asbestos present;

II. Ensure that the contracts have specified the asbestos management procedures to be used in the construction of the subproject to control environmental liabilities to acceptable levels;

III. Ensure that the required mitigation measures during construction and the AMF are included in the bidding document of the subproject and that the all bidding contractors have access to the IEEs and EMP;

IV. Ensure that SUSC have identified a suitable secure buffer store for the waste ACM in lieu of landfill disposal being available and that the contractors know the location of the buffer store in the bidding documents; and

V. Ensure the selected contractor has made adequate provisions (including human resources, materials methods and training) to carry out works in line with the AMF as a payment milestone.

35. During the implementation of civil works for subprojects the Asbestos Specialist shall:

I. Ensure that the asbestos abatement procedures, including all proposed mitigation measures and monitoring in Appendix 2 are properly implemented;

II. Monitor the implementation of AMPs and present its monitoring report;

III. Ensure that ADB be given access to undertake environmental due diligence for all subprojects. It should be noted that SUSC shall have the main responsibility for undertaking environmental due diligence and monitoring of all the subprojects. The due diligence report, as well as monitoring reports on EMP implementation, shall be prepared systematically and include asbestos abatement issues.

36. ADB shall be responsible for regular review and timely approval of subproject AMF checklists (Table 1). Technical guidance shall be provided by ADB to the SUSC as needed. ADB shall also be responsible for reviewing regular monitoring reports and officially disclosing any aspects relating to the management of asbestos on the ADB website if required.

37. During the PICIIP ADB shall:

I. Review submitted AIRs and AMPs as a basis for subproject approvals;

II. Monitor the AMF and AMP implementation and due diligence as part of Project reviews; and

III. Provide assistance to SUSC, if required, in carrying out its responsibilities and for building capacity for compliance with the AMF.

D. Asbestos Control Procedures

1. Minimizing Asbestos Liabilities

38. Potential environmental liabilities with respect to asbestos associated with subprojects will be minimized by taking the following measures:

I. Implementing the requirements of the AMF and by prescribing the selection of alternative non-asbestos materials;

II. Where ACM must be disturbed in a subproject the ACM shall only be removed under controlled conditions for disposal in line with the provisions of the AMF or any rules subsequently promulgated by the Federal EPA or Punjab EPA;

III. Construction of the subprojects will not take place until the contractor has agreed to carry out the asbestos abatement procedures in line with the procedures included in the AMF;

IV. Conducting sampling of potential ACMs and compiling an AIR with adequate implementation;

V. For low risk ACP (non-friable materials) prepare an asbestos management plan based upon in-situ burial of undisturbed pipework;

VI. For high risk ACP and other high risk friable materials, if they are identified, prepare alternative asbestos abatement plans (AAP), with adequate implementation and monitoring budget, based on best international practice;

VII. All measures shall be in line with ADB's Safeguard Policy Statement (2009), any applicable National and Provincial Government regulations and guidelines, and ADB's guidance document on Environmentally Responsible Procurement (2007); and

VIII. The subprojects shall only involve asbestos activities that follow the AMF.

2. Preparation of Detailed Design

39. Detailed design work for each additional subproject will include and follow the recommendations of the AMF.

40. The SUSC will include the requirements of the EMP and IEE/EIAs (including the AMF) in subproject bid documents and ensure the detailed designs include such requirements.

41. Before contracts are finalized certification shall be provided by SUSC to ADB that the detailed designs comply with the EMPs recommendations in subproject IEE/EIAs (including any AMP). This certification shall be required before contracts can be signed and made effective.

42. The SUSC shall also allocate sufficient resources to recruit and support an Asbestos Specialist in the SUSC to monitor the progress of the asbestos management process for all subprojects under PICIIP.

3. Preparation of Construction Contracts

43. Early in the implementation period, model construction contracts shall be prepared incorporating general environmental safeguards and asbestos management practices based on Appendix 2 and Appendix 3 to this AMF.

44. Specific, individual contracts shall be based on the model contracts, but shall also be checked by the SUSC to ensure that all special or specific safeguard requirements and mitigation measures, recommended in the AMP, for that subproject are incorporated fully within the individual contract.

45. The SUSC shall also allocate sufficient resources to the Asbestos Specialist to monitor that the asbestos abatement mitigation measures specified in the AMP are included in all construction contracts under PICIIP.

4. Monitoring During the Construction Period

46. Monitoring during construction shall be the responsibility of the Asbestos Specialist. Monitoring will relate to compliance with the requirements for asbestos management and abatement included in the construction contracts.

47. The Asbestos Specialist shall inspect the ongoing works regularly and systematically, checking that the asbestos abatement mitigation measures specified in the AMP have been implemented effectively during the design and construction stages of the project and ensuring the implementation and effectiveness of mitigation measures. Reporting shall be to the SUSC on a regular basis (at least quarterly) and to ADB semi-annually.

48. The removal of any ACMs, if required, will occur only during the construction stage. No monitoring shall be required in the operational stage.

5. Institutional Arrangements

49. The IA at subproject level for the AMF shall be SUSC. An Environment Manager within the SUSC shall lead the implementation of the AMF throughout the duration of the loan and shall report directly to the head of the SUSC, who shall be accountable and responsible for implementation of the AMF at subproject level.

50. The dedicated Asbestos Specialist shall coordinate consistently the implementation of the AMF in all subprojects where asbestos has been identified as an issue.

51. The Asbestos Specialist shall also be responsible for coordinating and supervising monitoring of asbestos abatement, quality control, and writing the periodic progress reports on implementation of the AMF.

52. The implementation of the AMF shall commence immediately upon commencement of the detailed designs for the subprojects. The Asbestos Specialist shall, therefore, be designated at least one month before and released for duty before the loan becomes effective. SUSC will further ensure the release of resources for asbestos management and that monitoring budgets are made available for timely AMP implementation.

6. Monitoring and Evaluation

53. The AMF shall have both internal and external monitoring.

54. The Asbestos Specialist at the local level shall be responsible for internal monitoring of the AMF implementation, and shall forward quarterly progress reports to SUSC. The reports will contain progress made in AMF implementation with particular attention to compliance with the principles set out in the AMF. The SUSC will submit a brief, semi-annual, monitoring report to ADB.

APPENDIX 1

DRAFT TERMS OF REFERENCE FOR SAFEGUARD CELL

ASBESTOS SPECIALIST

1. Qualifications

1. The Asbestos Specialist shall be a registered asbestos consultant or member of a recognized waste management association in an ADB member country and/or have extensive work experience and familiarity with all aspects of asbestos management and/or have attended a recognized full-time training course on all aspects of asbestos management. Candidates with broad experience in the field of asbestos management or hazardous waste management will be preferred.

2. The Asbestos Specialist shall at least be a graduate in environmental science, environmental engineering or a related discipline with significant experience in asbestos management or hazardous waste management. In addition, the candidate should have significant experience of the monitoring of projects and the implementation of mitigation measures and engineering controls to minimize risks associated with control of asbestos or hazardous wastes in the environment.

3. The general scope of work will be:

    a) Plan asbestos investigations and arrange for bulk sampling of potential asbestos containing materials (ACM);

    b) Compile and report results of bulk sampling and monitoring and verify results through random checking at the field level to assess whether AMF objectives have been met;

    c) Prepare asbestos investigation reports (AIR) for all subprojects to confirm the extent, or refute the presence, of ACM;

    d) Prior to controlled landfill disposal facilities being available, to assist Sialkot Urban Services Company (SUSC) to identify a suitable buffer store to stockpile ACM collected from subprojects;

    e) If ACM is confirmed, to prepare asbestos management plans (AMP) including asbestos abatement plan (AAP) for SUSC for all subprojects;

    f) If ACM is confirmed, prepare an AMP for the buffer store and future landfill;

    g) Monitor the management of stockpiled ACM in the buffer store and subsequently monitor the management of waste ACM in the controlled landfill disposal facilities;

    h) When controlled landfill disposal facilities are available, to assist SUSC to monitor the implementation of necessary controls on asbestos disposal and to monitor the controlled handling, transfer and disposal of the stockpiled ACM from the buffer store;

    i) Review and verify the progress in AMP implementation for each subproject and assess whether robust asbestos management practices have been achieved and/or improved continually on all subprojects;

    j) Assess efficiency and effectiveness of asbestos management practices and engineering control measures that have been implemented, their impacts

(positive as well negative) and sustainability, drawing both on policy and practice and to suggest any corrective measures, if necessary;

k) Review and verify the progress in AMF implementation of each subproject and every six months prepare reports for SUSC and ADB; and

l) Report directly to the Head of SUSC and the Project Management Unit (PMU) of the Implementing Agency if the progress with any aspect of the AMF is insufficient to support continued project financing from ADB.

4. The Asbestos Specialist shall be involved in ongoing monitoring of the AMF implementation for the SUSC.

5. This TOR to be modified depending on the management details.

6. The position may be combined with other consultant support arrangements through a firm.

APPENDIX 2

ASBESTOS ABATEMENT PROCEDURES

1. Removal of Asbestos Cement Pipes (ACP)

1. The principle will be that asbestos cement pipes (ACP) shall be excavated carefully, lifted on to plastic sheets for wrapping, wrapped in polythene and sealed with duct tape and then lifted and lowered on to the transport lorry for transport to the designated storage area or landfill.

2. The procedure shall follow the measures indicated below:

A. Preparation

3. The CONTRACTOR shall make available the materials in Appendix 3.

4. The CONTRACTOR shall be prepared and agree to remove and transport, on lorries covered with tarpaulins, all the wrapped ACP and fractured ACP that is in drums, from the site to the secure temporary buffer store designated by SUSC to await disposal.

5. The CONTRACTOR shall provide approved protective clothing to all workers. The CONTRACTOR shall also provide approved protective clothing to the SUSC Asbestos Specialist/Inspector as and when requested. Protective clothing shall consist of an approved disposable full body coverall, with head cover. Hard hats and boots shall also be made available to all workers by the CONTRACTOR.

6. Workers handling the ACP shall wear approved half face dust masks, protective coverall and goggles. The CONTRACTOR shall ensure all workers wear the protective clothing provided.

7. The SUSC Asbestos Specialist/inspector shall carry out a visual inspection to check that the preparation has been carried out satisfactorily and issue a written certification to the Contractor to proceed.

B. Abatement Method

8. The ground / pipe trench shall be excavated carefully to avoid the risk of contact with and damage to the ACP.

9. The last 5 cm of excavation to the pipe surface shall be undertaken using hand tools to expose the old ACP.

10. Any accidentally excavated loose pieces of asbestos cement shall be picked up and stored in plastic bags, sealed and then placed in drums or barrels.

11. The drums / barrels to contain the fractured pieces of ACP shall be made of plastic or metal. If made of some other material, the drums / barrels shall be lined with two layers of 0.15mm polythene sheeting. When the drums are full the plastic lining shall be folded over the pipe segments and secured in place with duct tape and the lid placed on the drum and secured in place with duct tape

12. The ACP shall be removed in sections carefully using manual labour and hand tools to expose the old ACP so that it can be lifted carefully to avoid cracking as far as

possible. Any accidentally fractured loose pieces of asbestos picked up and stored in plastic bags or barrels and sealed.

13. The surface of the asbestos shall be wet before commencing the process to remove ACP. Any dry areas of exposed existing asbestos cement pipes shall be sprayed with water containing a wetting agent to reduce fibre release. The wetting agent shall be of a correct mix and concentration in accordance with the manufacturer's instructions as specified under materials (refer to Appendix 3).

14. The wetting solution (amended water) shall be sprayed using equipment capable of providing a 'mist' application to reduce the release of fibres. The existing asbestos material shall be sufficiently saturated to wet it thoroughly. The existing asbestos material shall be sprayed repeatedly during the removal processes to maintain a wet condition and to minimize asbestos fibre dispersion.

15. Fixed ACP shall be separated carefully and prized off any supporting brackets and separated from any attached ACP or cement screed base and taken up in manageable sections taking care not to drop, crack, break or damage the ACP.

16. POWERED MECHANICAL EQUIPMENT (such as backhoe) SHALL NOT BE USED TO REMOVE THE ASBESTOS CEMENT PIPES because this will increase the risk of cracking and fibre release.

17. Once removed the ACP shall be wrapped immediately in two layers of polythene. Smaller pieces/sections can be double bagged and goose neck tied with duct tape and the polythene shall be wet wiped clean.

18. The bottom 10cm of soil below the old ACP shall be assumed to be contaminated with asbestos fragments or fibres and shall be loosened and shoveled or picked up and stored in plastic bags or barrels and sealed as ACM.

19. A further 5cm of soil below the old ACP, and any loose debris and rubble, will be removed to create a level floor to the trench and to designate the completion of the removal work.

20. The exposed surfaces of the partially wrapped pipes and the surface of the trench shall be sprayed with adhesives to be used as "lock down" on surfaces during the final clean-up of the area. This is to bind any traces of asbestos fibre which may remain on exposed surfaces.

21. The SUSC Asbestos Specialist/inspector shall carry out a visual inspection to certify that all visible ACP and fragments have been removed to a satisfactory standard prior to the installation of any new replacement pipework.

22. If the visual inspection indicates a satisfactory standard all the wrapped asbestos cement packs shall be counted and picked up and transferred to the lorries for transportation to the temporary buffer store to await disposal. All wrapped asbestos cement packs shall remain at the temporary buffer store and not be removed. An inventory of material taken to, and received at, the temporary buffer store shall be prepared and maintained.

23. The workers shall wet wipe down their overalls and mask and wash hands and face and any accidentally exposed areas of skin to decontaminate. Dust masks, overalls,

gloves, wet wipes and any other litter shall be double bagged and goose neck tied for disposal as asbestos waste.

24. The SUSC Asbestos Specialist/inspector shall then carry out a further visual inspection to certify that all remaining polythene packs and equipment and visible asbestos has been removed to a satisfactory standard and proper decontamination of tools and equipment has taken place. (xv)

25. The SUSC Asbestos Specialist/inspector shall check and record the number of packs of waste transferred to the lorries are the same as those that arrive at the temporary buffer or landfill using a trip ticket system. (xvi)

26. The SUSC Asbestos Specialist/inspector shall monitor and periodically audit the buffer store and landfill security to ensure no pilfering or theft of the stockpiled waste.

27. The Asbestos Specialist inspector shall report on the progress of all the asbestos abatement works under PICIIP twice per year to ADB.

APPENDIX 3

MATERIALS AND EQUIPMENT and ASBESTOS LABORATORIES

A. Containment Materials

1. At least two layers of transparent plastic (0.15mm thickness low density polythene (B.S.4932:1973) shall be used for wrapping the ACP in sizes which minimize the need for jointing.

2. Polythene transparent bags and containers used for packing of asbestos waste should be able to resist puncturing by the sharp edges of the asbestos cement.

3. The wrappings shall be joined carefully and sealed with wide duct tape or spray adhesive capable of sealing adjacent sheets of polythene and facilitating attachment of polythene to the asbestos cement. The adhesive agents should be capable of adhering and maintaining the wrapping in place under both wet and dry conditions.

4. Pipe sections and fragments of 2m or less shall be completely wrapped in polythene or collected in polythene bags.

5. Pipe sections and fragments of greater than 2m shall have each end (up to 1m) and any cracked or broken areas completely wrapped in polythene.

6. Intact pipe sections greater than 2m shall have the ends end up to 1m and any cracked or broken areas completely wrapped in polythene. (iv)

7. Access to the asbestos waste shall be guarded at all times by security personnel.

B. Wetting Agent and Lock Down

8. It is strongly recommended to apply amended water containing a wetting agent on the asbestos materials prior to removal so as to minimize the release of asbestos fibres during the removal process.

9. Electrical equipment is not likely to be present in the excavated trenches but if electrical cables are present these should be de-energized and isolated prior to the application of wetting agents.

10. The recommended wetting agent for the amended water to enhance penetration should be 50% polyoxyethylene ester and 50% polyoxyethylene ether or equivalent. The wetting agent shall be diluted in accordance with the manufacturers' instructions.

11. As a fall back option household, washing up detergent mixed at 10% can be substituted to prepare the wetting water.

12. Water based polyvinyl acetate adhesives (PVA) shall be used as "lock down" for spraying on to surfaces during the final clean-up of the area and shall be able to bind traces of asbestos fibre which may remain on exposed surfaces. The adhesive shall be dyed to indicate where it has been sprayed and to facilitate a check as to whether they have been applied or not and to facilitate crosschecking at a later stage.

C. Lifting Gear & Ladders

13. All lifting appliances, i.e. wire slings, ropes and chain blocks, must comply with the local construction sites safety regulations.

14. Valid test certificates must be kept on site for checking at all times.

15. Ladders shall be used in line with general safety procedures.

16. Joints and ends of ladders, scaffolds and parts of lifting gear where appropriate shall be sealed with tape to prevent the incursion of asbestos fibres and finished to create a smooth surface to facilitate cleaning.

*D. **Respirators*** (dust mask)

17. Respirators to be provided by the CONTRACTOR shall be of an approved type deemed appropriate for protection against the level of asbestos fibres reasonably expected in the particular stage and environment of work. In this case half face dust mask shall be required.

18. The CONTRACTOR shall provide disposable paper respirators to all workers with a protection factor of 4 (e.g. recommended 3M8812 or equivalent).

19. The CONTRACTOR shall also provide approved respirator(s) to the SUSC Asbestos Specialist /inspector as and when requested. (iii)

20. The respirators shall be removed when wet and be treated as contaminated waste. A new half face dust mask shall be provided to each worker prior to each shift, and the CONTRACTOR shall hold sufficient spare masks on site at all times for replacement purposes.

E. Protective Clothing

21. The CONTRACTOR shall provide approved protective clothing to all workers.

22. He shall also provide approved protective clothing to the SUSC Asbestos Specialist inspector as and when requested.

23. Protective clothing shall consist of an approved disposable full body coverall, with head cover. Hard hats and boots shall also be made available by the CONTRACTOR.

24. Coveralls will be of a disposable type:

    a) made from material which does not readily retain asbestos dust;

    b) prevents, so far as is reasonably practicable, dust penetration;

    c) is close fitting at the neck, wrists and ankles; and

    d) without external pockets or unnecessary pleating or accessories.

F. Preliminary List of Laboratories in Pakistan with the Capability to Identify Asbestos

25. There are a number of laboratories in Pakistan that are equipped to provide analyses and determination of the presence and content of asbestos in materials.

26. Details of four laboratories are provided below. Note that this list does not purport to be comprehensive or exhaustive; there may be other laboratories in Pakistan that have the facilities to identify and confirm the presence of asbestos.

    a) Pakistan Council of Scientific & Industrial Research PCSIR Labs Complex Off University Road Karachi. Tel#: +92-21-8141841, Fax#: +92-21-8141847;

    b) National Physical and Standards Laboratory (NPSL), Islamabad Plot No.16, Sector H-9 Islamabad. Tel#: +92-51-9257459, +92-51-9257462-7, Fax#: +92-51-9258162;

    c) Pakistan Council of Scientific & Industrial Research PCSIR Labs Complex Ferozepur Road Lahore. Tel#: +92-42-9230688-95, +92-42-9230704, Fax#: +92-42-9230705; and

    d) SGS Pakistan (Private) Limited, H-3/3, Sector 5, Korangi Industrial Area, Karachi, 74900. Tel#: +92-21-35121388-95, +92-21-11122274

ANNEXURE 3: RECORDS OF PUBLIC CONSULTATIONS

Name	Title/Designation and Organization	Date, Place
Sialkot		
Mohd Zafar Qureshi	Tehsil Municipal Officer	4th Nov
Mohd Shiraz	Managing Director, SWMC	4th Nov
Mustansar Khan	Chief Sanitary Inspector	5th Nov
Ashraf Bajwa	Assistant Tehsil Officer, Water Supply	5th Nov
Muzammil Yaar	District Officer, Social Welfare	5th Nov
Mohd Sharif Ghumman	Deputy District Officer, Social Welfare	5th Nov
Fakhira Yasmin Tazeem Akhtar	Superintendent Dar-ul-Falah, Mother and Child Home Deputy Teacher, Dar-ul-Falah, Mother and Child Home	7th Nov
Asma Ahmed Erum Shehzadi	Superintendent, Shelter home/dar-ul-aman Second In charge, Shelter home/dar-ul-aman	7th Nov
Hina Nasreen	President, Baidaari	7th Nov
Mohd Ijaz Noori	Chairman Pakistan Council for Social Welfare and Human Rights	7th Nov
Shakir Husain	Representative, Fair Trade Asia Pacific	7th Nov
Mohammad Ishfaq	President, Roz Human Rights	7th Nov
Shakila Ijaz	Lady Health Visitor, Union Council Waterworks	8th Nov

Sialkot

FGD 1: New Mianapura East

Participants: **1. Mouzma Anwar 2. Sehrish Anwar 3. Shumaila Ajmal 4. Saba Iqbal 5. Razia Iqbal 6. Razia Munir 7. Parveen Akhtar 8. Sidra Bilal 9. Shama Yasin 10. Shehnaz Asghar 11. Sheena Taha 12. Ms Nayyar**

FGD 2: Union Council Kareempura, Mohallah Raja Baazar (5th Nov)

Participants: **1. Riffat Sultana 2. Kaneez Fatima 3. Razia Begum 4. Roohi Bano 5. Mohammad Tasleem 6. Nasreen Tariq**

FGD 3: Old Model Town/Union Council Mubarikpura (now Mianapura) 7th Nov

Participants: **1. Sabiha Jalal 2. Shabana Zia 3. Rafia Abid 4. Ms Ejaz 5. Mian Aftab Jahangir 6. Sohail Mir**

FGD 4: Union Council Waterworks (8th Nov)

Participants: **1. Maqsooda Begum 2. Yasmin Razzak 3. Nazeera Begum 4. Shazia Nasir 5. Sadia Usman**

Participants of the Consultation Meeting at Sialkot General Bus Stand

No.	Name	Designation	Contact No.
1	Muhammad Yousuf	Shopkeeper	054261786
2	Muhammad Yaseen	Shopkeeper	03110307676
3	Zaman Shah	Shopkeeper	03026111599
4	Rana Khalid Mehmood	Shopkeeper	03007117946
5	Altaf Hussain	Shopkeeper	03006129305
6	Muhammad Siddique	Shopkeeper	03338646792
7	Muhammad Lateef	Driver	03354570990
8	Muhammad Khalid	Shopkeeper	03457191885
9	Hammad Ahmed	Shopkeeper	03026323980
10	Muahmmad Naseer	Shopkeeper	03404815241
11	Syed Yousuf Geelani	Shopkeeper	03334528303
12	Sarfraz Hussain	Shopkeeper	03016103590
13	Javed Akhtar	Shopkeeper	03455362171
14	Mubashir Hussain	Shopkeeper	03075119368
15	Qalb e Abbas	Shopkeeper	03216183806
16	Khalid Mahmood	Shopkeeper	03338639842
17	Muhammad Akram	Shopkeeper	03007158014
18	Ashiq Hussain	Shopkeeper	03025753184
19	Shabeer Ahmed	Shopkeeper	03006123108
20	Faizan	Shopkeeper	03024200006
21	Imran Gujjar	Shopkeeper	03476764409
22	Muhammad Basheer	Transport Manager	
Representative of Sialkot Cantonment Board			
1	Kamran Khan	Secretary SCB	
Consultant Team			
1	Saifur Rahman Sherani	LARP Consultant PPTA	
2	Azher Uddin Khan	Deputy Team Leader of PPTA	
3	Ayaz Asif	Due Diligence Consultant ADB	
4	Hafeez Buzdar	LARP Coordinator	
5	Muhammad Asher	LARP Assistant	

Signed list of participants given below

22-02-2017

جنرل بس سٹینڈ سیالکوٹ

نمبر شمار	نام	موبائل نمبر	دستخط
1	حاجی محمد یوسف دکان	0524261786	
2	محمد لیٰسین (دکان)	03110307676	
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4	رانا خالد محمود (دکان)	0300-7117946	
5	الطاف حسین (دکان)	0300-6129305	
6	محمد صدیق (دکان)	0333-8646792	
7	محمد لطیف (ڈرائیور)	0335-4570990	
8	محمد خالد - دوکان	0345-7191885	
9	عمار احمد دکان	03026323980	
10	محمد منیر دوکان	03404815241	
11	سید یوسف [illegible] دکان	0333 [illegible] 28303	
12	سرفراز حسین دکان	0301-6103590	
13	جاوید اختر / اختر (دکان)	0345-5362171	
14	مبشر حسین (دکان)	0307-5119368	

نمبر شمار	نام	موبائل نمبر	دستخط
15	خالد عباسی (دکان)	0321-6183806	خالد عباسی
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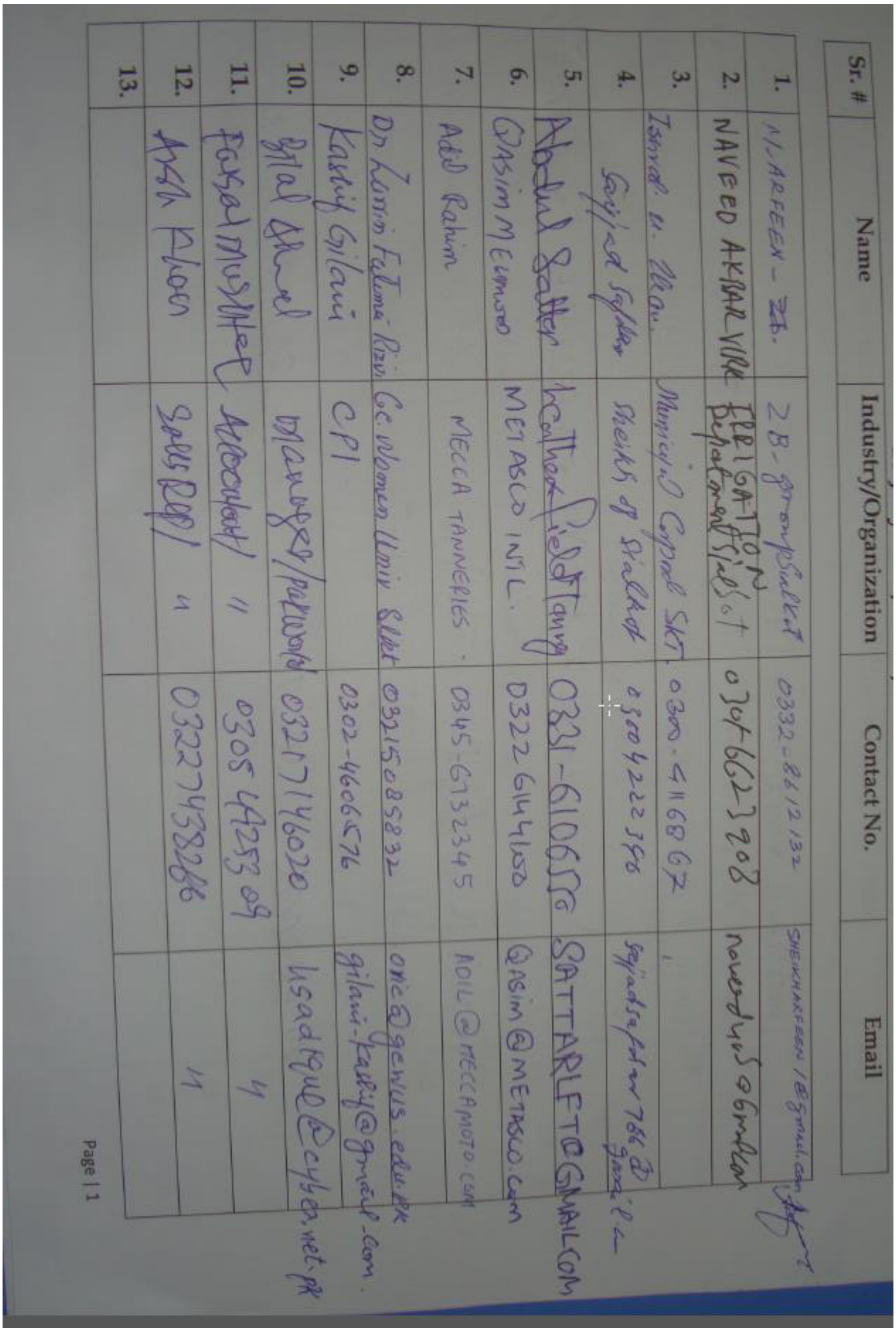
18	عاشق حسین گرم خاکہ	03025753184	عاشق حسین
19	سید احمد ربڑی ایروز	03006123108	Syed Ahmad
20	حنیف زیبری	03024200006	M. Hanif
21	عمران گجر (دکان)	0347-6764409	عمران
22	محمد بشیر	—	محمد بشیر
23			

Views of the Consultation Meeting at Sialkot bus terminal

Workshop (18/07/2017) Attendance Sheet p1



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Workshop (18/07/2017) Attendance Sheet p2

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17.	Naeem	Sheikh of Sialkot		
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22.	Omair Nisar	SCCI	0345-6725002	Omair.scci@gmail.com
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24.				
25.				
26.				

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