Initial Environmental Examination

Project Number: 40031
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India: Rajasthan Urban Sector Development Investment Program—Bundi Heritage Sites

Prepared by Local Self Government Department

For the Government of Rajasthan
Rajasthan Urban Infrastructure Development Project

ABBREVIATIONS

ADB	—	Asian Development Bank
BOQ	—	bill of quantity
CBO	—	community-based organization
CGWB	—	Central Ground Water Board
CLC	—	City Level Committees
CLIP	—	City Level Investment Plan
DSC	—	Design and Supervision Consultants
EAC	—	Expert Appraisal Committee
EARF	—	Environmental Assessment Resettlement Framework
EIA	—	Environmental Impact Assessment
EMP	—	Environmental Management Plan
EMS	—	Environmental Monitoring Specialist
EPA	—	Environmental Protection Agency
GRC	—	Grievance Redress Committee
H and S	—	health and safety
IEE	—	Initial Environmental Examination
IPIU	—	Investment Program Implementation Unit
IPMC	—	Investment Program Management Consultants
IPMU	—	Investment Program Project Management Unit
JNNURM	—	Jawaharlal Nehru National Urban Renewal Mission
LSGD	—	Local Self Government Department
MFF	—	multitranche financing facility
MLD	—	million liters per day
MOEF	—	National Ministry of Environment and Forests
NAAQS	—	National Ambient Air Quality Standards
NGO	—	nongovernmental organization
O and M	—	operation and maintenance
OHSA	—	Occupational Health and Safety Administration
OHSR	—	overhead storage reservoirs
PHED	—	Public Health Engineering Department
PIU	—	Project Implementation Unit
PMU	—	Project Management Unit
ROW	—	right of way
RPCB	—	Rajasthan State Pollution Control Board
RUIDP	—	Rajasthan Urban Infrastructure Development Project
RUSDIP	—	Rajasthan Urban Sector Development Investment Programme
SEIAA	—	State Environment Impact Assessment Authority
SPS	—	Safeguard Policy Statement
STP	—	sewage treatment plant
TDS	—	total dissolved solids
TOR	—	terms of reference
UIDSSMT	—	Urban Infrastructure Development Scheme for Small and Medium Towns
ULB	—	urban local body
USEPA	—	United States Environmental Protection Agency
WTP	—	water treatment plant

WEIGHTS AND MEASURES

lakh	–	100 thousand = 100,000
crore	–	100 lakhs = 10,000,000
$\mu g/m^3$	–	micrograms per cubic meter
km	–	kilometer
lpd	–	liters per day
m	–	meter
mg/l	–	milligrams per liter
mm	–	millimeter
ppm	–	parts per million

NOTE{S}

(i) In this report, "$" refers to US dollars.
(ii) “INR” and “Rs” refer to Indian rupees

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EXECUTIVE SUMMARY

1. Rajasthan Urban Sector Development Investment Program (RUSDIP) is intended to optimize social and economic development in 15 selected towns in the State, particularly district headquarters and towns with significant tourism potential. RUSDIP is being implemented over a seven year period beginning in 2008, and being funded by a Multitranche Financing Facility (MFF) loan from the Asian Development Bank (ADB). The Executing Agency is the Local Self-Government Department (LSGD) of the Government of Rajasthan; and the Implementing Agency is the Investment Project Management Unit (IPMU) of the Rajasthan Urban Infrastructure Development Project (RUIDP). ADB requires the consideration of environmental issues in all aspects of the Bank's operations, and the requirements for Environmental Assessment are described in ADB's SPS. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

2. This Initial Environmental Examination (IEE) has been prepared for the Bundi Heritage Sites Subproject as part of RUSDIP Tranche 3. The sub-project is in line with the Support Infrastructure Development Project[1] involving ASI's restoration of cultural heritages in Bundi.

3. The subproject site is located in Bundi town in Bundi District. The subproject covers restoration and preservation of the heritage structures including (i) 7 city gates; (ii) Chaurasi Khambon Ki Chhatri (84-pillar Cenotaph); (iii) Nagar Sagar Kund (step well); (iv) Naruki Baori; (v) Nahardhos Ki Baori (step well); (vi) Nahardhos ki Baori; and (vii) Naval Sagar Lake. Only the Chaurasi Khambon Ki Chhatri (84-pillar Cenotaph) is included in the list of Rajasthan's Department of Archaeology and Museum[2].

4. Works under this subproject will (i) be limited on vacant lots and spaces allocated for general public; (ii) not directly on nor encroach any of the monuments inside the structures; and (iii) be closely supervised and monitored by ULB and Department of Archaeology And Museum where ever necessary.

5. The subproject is needed to (i) support infrastructure development to enhance the Different locations of Bundi town; (ii) provide modern facilities to increasing number of tourists visiting the Bundi; and (iii) preserve and maintain orderliness and cleanliness in the immediate vicinities of important monuments/religious places in Bundi town.

6. Detailed design began in the year 2010 and completed middle of 2010. Construction of all elements will begin in year 2011, and work will be completed by 2012. ULB and Department of Archaeology and Museum, as part of the City Level Committee, has been actively participating in the design process.

7. The subproject site is not located in areas prone to water-logging, salinasation, and flash flood. There are no protected areas, wetlands, mangroves, or estuarines inside the monuments. Trees, vegetation (mostly shrubs and grasses), and animals are those commonly found in urban areas.

8. Potential negative impacts were identified in relation to construction and operation of the improved infrastructure. No impacts were identified as being due to the subproject

[1] Project supported by govt. of India for improvement of heritage site
[2] List can be accessed at http://museumsrajasthan.gov.in/mounment_1.htm

design or location. An Environmental Management Plan (EMP) is proposed as part of this IEE which includes (i) mitigation measures for significant environmental impacts during implementation, (ii) environmental monitoring program, and the responsible entities for mitigation, monitoring, and reporting; (iii) public consultation and information disclosure; and grievance redress mechanism. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. A number of impacts and their significance have already been reduced by amending the designs.

9. During the construction phase, impacts mainly arise from the need to excavate small areas which can result to disturbance to tourists, residents, businesses, traffic, and important buildings. These are common impacts of construction in built-up areas, and there are well developed methods for their mitigation.

10. One field in which impacts are much of interest in the subproject is archaeology, and series of specific measures have been developed to avoid damaging important remains during construction.

11. Special measures were also developed to protect workers and the public from exposure to carcinogenic asbestos fibres in the event that asbestos cement pipes used in the existing water supply system are uncovered accidentally during excavation work

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

13. Once the system is operating, most facilities will operate with routine maintenance, which should not affect the environment. The toilet facilities and water stations need regular maintenance but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. It will also be conducted in areas that have already been excavated, so there will be not much need to protect archaeological materials.

14. Mitigation will be assured by a program of environmental monitoring to be conducted during construction and operation stages. The environmental monitoring program will ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. The Investment Program Implementation Unit (IPIU) and Design and Supervision Consultants (DSC) will work closely with department of archaeology and museum in implementing the program. Any requirements for remedial action will be reported to the Investment Program Management Unit (IPMU).

15. The main impacts of the operating improved heritage sites facilities will be beneficial as visitors of Different locations of Bundi town will be provided with modern-day amenities, which will lead economic gains of Bundi.

16. The stakeholders were involved in developing the IEE through face-to-face discussions on site and a large public meeting held in the town, after which views expressed were incorporated into the IEE and the planning and development of the project. The IEE will be made available at public locations in the town and will be disclosed to a wider audience via the ADB website. The consultation process will be continued and expanded during project implementation, when a nationally-recognised NGO will be appointed to handle this key element to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.

17. The subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, the classification of the Project as Category “B” is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB SPS (2009) or GoI EIA Notification (2006).

I. INTRODUCTION

A. Purpose of the Report

1. Rajasthan Urban Sector Development Investment Program (RUSDIP) is intended to optimize social and economic development in fifteen selected towns in the State, particularly district headquarters and towns with significant tourism potential. This will be achieved through investments in urban infrastructure (water supply; sewerage and sanitation; solid waste management; urban drainage; urban transport and roads), urban community upgrading (community infrastructure; livelihood promotion) and civic infrastructure (art, culture, heritage and tourism; medical services and health; fire services; and other services). RUSDIP will also provide policy reforms to strengthen urban governance, management, and support for urban infrastructure and services. The assistance will be based on the State-level framework for urban reforms, and institutional and governance reforms recommended by the Government of India through the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT).

2. RUSDIP is being implemented over a seven year period beginning in 2008, and being funded by a loan via the Multitranche Financing Facility (MFF) of Asian Development Bank (ADB). The Executing Agency is the Local Self-Government Department (LSGD) of the Government of Rajasthan; and the Implementing Agency is the Project Management Unit (PMU) of the Rajasthan Urban Infrastructure Development Project (RUIDP).

3. This Initial Environmental Examination (IEE) has been prepared for the Bundi Heritage Sites Subproject as part of RUIDP Phase II Tranche 3. The subproject covers restoration and preservation of the heritage structures: the city gates (7nos), Nagar-Sagar Kund, Nawal Sagar lake with chattri and temple inside the lake, Nahar Dhos ki Baori, Naruki Baori and 84 Pillared Cenotaph, which includes a) Covering of the existing drains and nallah b) Construction of walkways c) Improvement of road surfaces by paving d) Construction of storm water drains e) Repair of damaged walls f) Up gradation of toilet facilities g) Construction/Up gradation of drinking water hut h) construction of platforms i) Creating open parking spaces j) Provision of benches, dustbins, lights, signages etc.

4. This IEE report covers the general environmental profile of Bundi and includes an overview of the potential environmental impacts and their magnitude on physical, ecological, economic, and social and cultural resources within the subproject's influence area during design, construction, and operation stages. An Environmental Management Plan (EMP) is also proposed as part of this report which includes mitigation measures for significant environmental impacts during implementation of the Project, environmental monitoring program, and the responsible entities for mitigation and monitoring.

B. Extent of the IEE Study

5. This IEE report was prepared on the basis of detailed screening and analysis of all environmental parameters, field investigations and stakeholder consultations to meet the requirements for environmental assessment process and documentation per ADB's Safeguard Policy Statement (SPS, 2009) and Government of India Environmental Impact Assessment (EIA) Notification of 2006.

1. ADB Policy

6. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for Environmental Assessment are described in ADB SPS 2009. This states that ADB requires environmental assessment of all project loans, program

loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

7. **Screening and Categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project, the sensitivity, scale, nature and magnitude of its potential impacts, and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impact are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
(ii) **Category B**. Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
(iii) **Category C**. Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
(iv) **Category FI**. Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all Projects will result in insignificant impacts.

8. **Environmental Management Plan.** An EMP which addresses the potential impacts and risks identified by the environmental assessment shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the Project's impact and risks.

9. **Public Disclosure.** ADB will post the following safeguard documents on its website so affected people, other stakeholders, and the general public can provide meaningful inputs into the project design and implementation:

(i) For environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) Final or updated EIA and/or IEE upon receipt; and
(iii) Environmental Monitoring Reports submitted by Investment Program Implementation Unit (IPIU) during project implementation upon receipt.

2. National Law

10. The Government of India EIA Notification of 2006 (replacing the EIA Notification of 1994), sets out the requirement for environmental assessment in India. This states that Environmental Clearance is required for specified activities/projects, and this must be obtained before any construction work or land preparation (except land acquisition) may commence. Projects are categorised as A or B depending on the scale of the project and the nature of its impacts.

11. Categories A projects require Environmental Clearance from the National Ministry of Environment and Forests (MOEF). The proponent is required to provide preliminary details of the project in the form of a Notification, after which an Expert Appraisal Committee (EAC) of the MOEF prepares comprehensive Terms of Reference (TOR) for the EIA study, which are finalized within 60 days. On completion of the study and review of the report by the EAC,

MOEF considers the recommendation of the EAC and provides the Environmental Clearance if appropriate.

12. Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA). The State level EAC categorises the project as either B1 (requiring EIA study) or B2 (no EIA study), and prepares TOR for B1 projects within 60 days. On completion of the study and review of the report by the EAC, the SEIAA issues the Environmental Clearance based on the EAC recommendation. The Notification also provides that any project or activity classified as category B will be treated as category A if it is located in whole or in part within 10 km from the boundary of protected areas, notified areas or inter-state or international boundaries.

13. The only type of infrastructure provided by the RUSDIP that is specified in the EIA Notification is solid waste management thus EC is not required for this subproject.

3. Others

14. Some part of this subproject (84 pillared Cenotaph) is listed as a protected monument of Rajasthan's Department of Archaeology and Museum, A "No Objection Certification is required to be obtained prior to start of any physical works. For other heritage sites, a "No Objection Certification must be obtained from the local government.

II. DESCRIPTION OF THE PROJECT

A. Type, Category and Need

15. **Type**. This is a renovation and simple construction subproject intended to improve the current situation in Bundi in terms of improved facilities and amenities. This is one of a series of subprojects designed by the RUSDIP that are intended to raise the standards of the municipal infrastructure and services of Bundi town and the other urban centres to those expected of modern Asian towns.

16. **Category**. Environmental examination indicates the proposed subproject falls within ADB's environmental Category B projects. The Project components will only have small-scale, localized impacts on the environment, and can be mitigated. Under ADB procedures such projects require an IEE to identify and mitigate the impacts, and to determine whether further study or a more detailed EIA may be required.

17. **Need**. The subproject is needed to (i) support infrastructure development to enhance the different locations of Bundi town; (ii) provide modern facilities to increasing number of tourists visiting the Bundi town; and (iii) Positioning and maintaining tourism development in the area as a state/national priority activity (iv) Creation of world-class infrastructure; (v) preserve and maintain orderliness and cleanliness in the immediate vicinities of important monuments inside the Bundi town.

B. Location and Implementation Schedule

18. The subproject site is located in different locations of Bundi town which includes the city gates (7nos), Nagar-Sagar Kund, Nawal Sagar lake with chattri and temple inside the lake, Nahar Dhos ki Baori, Naruki Baori and 84 Pillared Cenotaph Works. This subproject will (i) be limited on vacant lots and spaces allocated for general public; (ii) not directly on nor encroach any of the monuments inside the Bundi town; and (iii) be closely supervised and monitored by department of archaeology and museum and ULB.

19. Detailed design began in the year 2010 and completed middle of 2010. Construction of all elements will begin in end of 2011, and work will be completed in 2012.

C. Description of the Subproject

1. Existing Condition

20. Department of Archaeology and Museum and the local Departments have kept Different locations of Bundi town in a presentable condition. The Bundi town is very popular and attracts a large number of visitors every day. Increase in number of domestic as well as foreign visitors are expected in the coming years. The current challenges are: (i) lack of designated parking spaces; (iii) deteriorating conditions of city gates (iv) lack of basic amenities such as toilet facilities and drinking water stations; (v) unmaintained landscape since visitors have no available spaces; (vi) unmanaged garbage left by visitors; (vii) improper road surfaces and drainage conditions; and (viii) insufficient street furniture such as benches, lights, and signages.

2. Subproject Components

21. The subproject will involve:

(i) **Construction of parking facility** - Vehicular parking facility and separated animal stands are proposed with the use of local materials.
(ii) **Construction of water and sanitation facilities**- Drinking water and public toilet facilities will be provided.
(iii) **Repair and improvement of road surfaces** - Damaged road surfaces will be repaired, paved pathways for pedestrians will be constructed, and interface of existing roads will be improved.
(iv) **Provision of street furniture** – Informative signages, lighting, and dustbins will be provided.
(v) **Landscaping** - Areas inside and adjacent to proposed parking facilities will be landscaped with small planters, benches, resting shelters for commuters and visitors. Platforms around existing trees will be repaired or replaced if necessary.
(vi) **Improvement of storm water disposal** – Together with landscaping, slope gradient will be improvement.
(vii) **Improvement of water bodies (Baoris and lake)**- Dewatering of Baori, Garbage and sludge removal, Site clearance, Removal of vegetative growth, repair of Baori wall, steps and stone elements in traditional manner
(viii) **Improvement of other related structures** - Raking and filling of joints, re-routing of wirings, re-plastering and repainting, and reconstruction of broken walls, planters, chemical cleaning, etc.

22. **Table 1** summarizes the subproject components for each location covered by the subproject. The descriptions shown in the table are based on the present proposals, which are expected to be substantially correct, although certain details may change as development of the subproject progresses.

Table 1: Present Condition of the Subproject and Proposed Components

Sr. No.	Location	Description	Existing Condition	Proposed Improvement
1	City Gates (7 nos)	- Situated at the entrance of the Different locations of Bundi town	- open space near town gates being used as urinal point by public	(i) parking facility (ii) road surfaces improvements

Sr. No.	Location	Description	Existing Condition	Proposed Improvement
		and - Popular with tourists and locals for its breathtaking view of Bundi town - maintained by local government	- lacks good street furniture - no parking facility	(iii) street furniture (iv) landscaping (v) storm water disposal (vi) area improvement
2	84-Pillared Cenotaph	- The cenotaph is located in the southern part of the city - famous for Bundi Festival organised here - maintained by Rajasthan Department of Archaeology and Museum	- open space area near the palace is underdeveloped - improper parking facility - public toilet in poor condition - algae deposition causing the blackening	(i) parking facility (ii) road surfaces (iii) landscaping (iv) storm water disposal (v) chemical cleaning
3	Nagar Sagar Kund	- The kunds (pair of matching step wells) are located near to Indira Market and Azad Park - Nagar Sagar is an artificial lake which tends to dry up if the monsoon is poor. - in the center of the lake is a temple for the Aryan god of water. - maintained by local government	- commercial markets permanent and temporary have developed near the kunds - water is deteriorated due to silt deposition and garbage - lacks good street furniture	(i) dewatering (ii) garbage and sludge removal (iii) site clearance (iv) removal of vegetative growth (v) chemical cleaning of the structure (vi) street furniture
4	Naruki Baori	- The Baori is located in the heart of mohallas in ward no.36 in the northern part of the city and Shukl Baori gate is the closest heritage structure to the baori - maintained by local government	- used as garbage disposal by residents - no maintenance works by residents or by the local authorities has taken place in the recent past - stone elements like brackets, statues, panpatta pattern are missing at many instances	(i) dewatering (ii) garbage and sludge removal (iii) site clearance (iv) removal of vegetative growth (v) chemical cleaning of the structure (vi) street furniture (vii) landscaping (viii) repair and maintenance
5	Nahardhoski Baori	- located in the southern part of the town Khoja Gate is the closest heritage structure to the baori - maintained by local government	- used as garbage disposal by residents - no maintenance works by residents or by the local authorities has taken place in the recent past - stone elements like brackets, statues, panpatta pattern are missing at many instances	(i) dewatering (ii) garbage and sludge removal (iii) site clearance (iv) removal of vegetative growth (v) chemical cleaning of the structure (vi) street furniture (vii) landscaping (viii) repair and maintenance
6	Naval Sagar Lake	- The lake is located on the right side to the approach road of Taragarh Fort in the western part of the city	-There is a temple for Varun (rain god) and the other is a *chattri* (stone umbrellas with carved pillars)	(i) restoration of lake wall, temple and *chattri* situated inside the lake. (ii) repair of *ghats* (series of steps leading to the

Sr. No.	Location	Description	Existing Condition	Proposed Improvement
		- maintained by local government	-The lake structure wall is damaged at instance and the Ghats leading to the lake are also damaged with their treads and risers missing at instances - The authorities have developed a small landscaped garden which hasn't been maintained from a long time - The approach to the site through a broken road	lake) and ramp in existing pattern and technique. (iii) pathways around the lake (iv) landscaping of open spaces around the lake periphery. (v) street furniture (vi) resting shelters for the visitors of the lake

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Administrative Boundaries

23. Bundi district is located in the southeast region of Rajasthan and lies at a distance of 206 kilometer (km) from Jaipur. The river Chambal forms the southern and eastern boundaries separating the Bundi and Kota territories. The administrative headquarters is Bundi town..

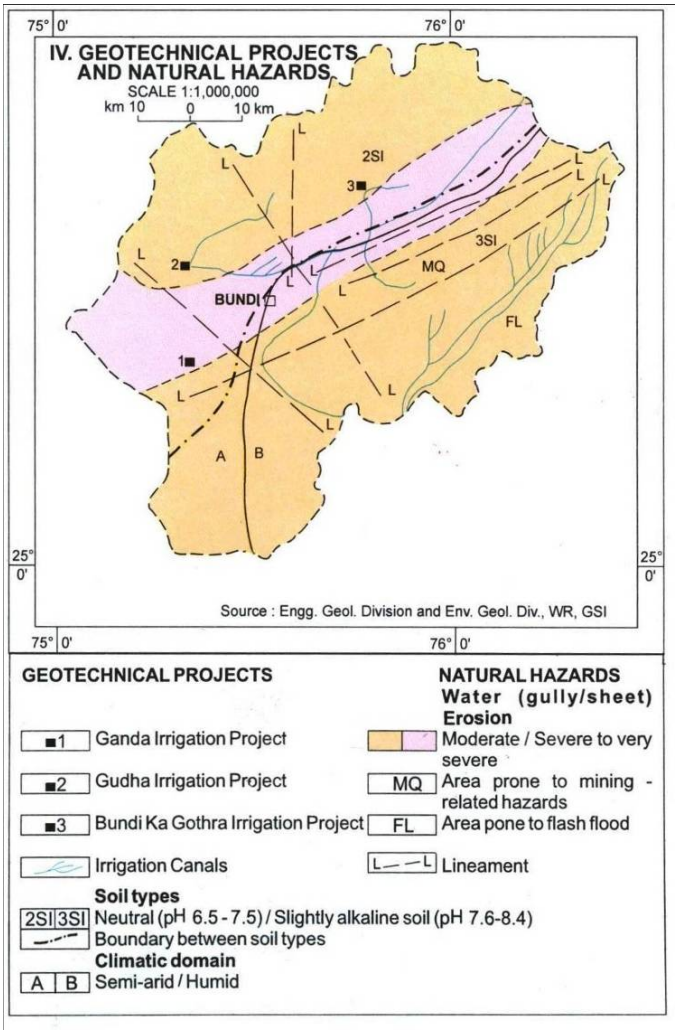
2. Topography, Drainage, and Natural Hazards

24. **Topography**. Bundi stands in the foothills of the Aravelli mountains therefore its topography ranges from flat to rugged terrains. The ground level varies from 600 m to 650 m above the mean sea level. The 12.8-ha landfill site is a flat area

25. **Drainage.** The peculiar topography of Bundi provides a natural drainage pattern. Overflows of two large water bodies (Jait Sagar in the northeast and Naval Sagar in the west) are channalized through the existing storm water drains in the town area and further flows beyond the town limits towards the southeast direction.

26. **Natural Hazards.** Based on the evaluation of the Earthquake Zones of Rajasthan, Bundi lies in a low damage risk zone and is less prone to earthquakes because it is located on relatively stable geological plains. The Natural Hazard Zone Map of Bundi district is shown in **Figure 1**. Evaluation of the map shows water (gully/sheet) erosion in the district ranges from low to very severe. Majority of the area is not prone flash-flood. The landfill site is located in an area with low damage risk zone, water (gully/sheet) erosion and not prone to flash floods.

Figure 1: Natural Hazard Map of Bundi



3. Geology, Geomorphology and Soils

27. **Geology.** The various rocks type exposed in the area belong to Bhilwara and Decan Traps Supergroups. A major part of the district is occupied by limestone, the most important mineral of the district, glass sand occurrences, and small occurrences of copper, marble, and iron

28. **Geomorphology.** The district is classified into structural plain, pediment, alluvial plain, and badland (ravines). The ground water potential range from 5 to 10 liters per second (lps).

29. **Mineral Resources.** Sizeable reserves of good quality clay, marble, limestone, zinc, lead, copper, iron, rock phosphates, and building stones are found in the district. The subproject site do not have mineral resources.

30. **Soils.** The nature of the soil is generally lothosolsat in the foothills while alluvial in the plains. Bundi soil is classified as saline and sodic. The nutrient status of the Bundi soil is graded as medium nitrogen, medium phosphorus, and high potassium levels.

4. Climate

31. The district is generally dry except during the monsoon or winter rains. Maximum temperature is 42.6 degrees Celsius. Minimum temperature is 29.7 degrees celsius. Normal annual rainfall in the district is 76.41 cm. The rainfall over Bundi is scanty and is concentrated over four month i.e. from June to September.

5. Air Quality

32. There are no data on ambient air quality of Bundi Town, which is not subject to monitoring by the RPCB as there are no major industries. The nearest station is located at Udaipur (121 km from Bundi). Traffic is the only significant pollutant in Bundi, so levels of oxides of sulphur and nitrogen are likely to be well within the National Ambient Air Quality Standards (NAAQS).

6. Surface Water

33. There are two large water bodies (Jait Sagar in the northeast and Naval Sagar) in Bundi but water quality monitoring has not been conducted. The landfill site is located very far from these two water bodies. Dried up channels (*nallahs*) where observed during site visits but these are only small shallow depressions where storm water flows during monsoon period.

7. Groundwater

34. The Central Ground Water Board monitors several national hydrographic monitoring stations in and around Bundi. Records of monitoring conducted from May 2005 to January 2006 shows ground water table ranged between 5 to 20 meters below ground level.

35. Records of groundwater quality monitoring from Public Health Engineering Department (PHED) show groundwater quality in Bundi town does not conform with the set norms of Government of Rajasthan. It has been noted that groundwater contains high level of total dissolved solids.

B. Biological Resources

36. There are no protected areas, wetlands, mangroves, or estuarines in or within the subproject site. There is a Ramgarh Vishdhari wildlife sanctuary located about 12 km from the boundaries of the Bundi town area. However, the subproject site is in the built-up area of the Bundi town and will not impact the Ramgarh Vishdhari wildlife sanctuary.

37. **Flora.** Flora is limited to planted trees and shrubs, and the Vegetation in the subproject site is sparse.

38. **Fauna.** No classified, endangered or extinct species is found in the locality of sub project site. Fauna comprises domesticated animals (cows, goats, pigs and chickens), plus other species able to live close to man (urban birds, rodents and some insects). Animals were not noted in the subproject site except some domesticated stray animals like cows, goats etc.

C. Economic Development

39. The participation ratio of workers is 27.1% (1991 data). The most important sector of employment in Bundi town is the service sector, employing about 37.4% of total workers.

Bundi also has a number of industrial units which are agro-based, stone polishing, metal works. Most of the developments have taken place in the south-west, west, and north-west portion of the town.

1. Land use

40. Bundi town encompasses 20.23 km^2 in which only one fifth is urbanized and the rest consists of hills, water bodies and agricultural land .Even within the contiguous urbanized area, only 65% is developed and the remaining comprises of water bodies agricultural lands, and pockets of vacant lands. The landfill site is classified “vacant land.

2. Commerce, Industry and Agriculture

41. **Commerce.** The main retail and wholesale business activities are still being carried out the old town main market street where retail and transport-oriented businesses are located.

42. **Industrials Development.** There are many small- to large-scale industries located in and around Bundi town. These are composed of general engineering, oil mills, oil refineries, paper, *poha* making, portland cement, rice milling, stone cutting, polishing and sugar. The main export items of Bundi are cement and rice.

43. **Agriculture.** About 80% of the lands in Bundi are used for agricultural purpose. Major crops include paddy (rice), wheat, cereals, pulses, food grains, and oil seeds.

3. Infrastructure

44. **Water supply**. 60% of the population is covered by piped water supply and while the remaining source their water from public stands and hand pumps. The present service level is less than 135 liters per capita per day (lpcd). The existing water supply system comprises mainly of asbestos cement (AC) pipes.

45. **Sewerage and Sanitation**. Bundi town does not have underground sewerage system. Only 50 to 60% of the households reportedly have septic tanks and soaks well as the system of sewerage disposal. The remaining accounted for cases of open defecation which is an unacceptable and unhygienic practice. The raw settled sewage from septic tank is periodically flushed out by sanitary workers of BMB and but are being indiscriminately discharged to open spaces and agricultural lands in an indiscriminate manner.

46. **Drainage**. Due to scanty rains in the region, natural drainage system has not been developed. In Bundi town itself, no natural drainage system exists to drain away the rainwater or wastewater from the town. Presently there exists a minimal network of storm water drains composed of (i) open *pucca* (115.2 km) (ii) closed drains (6.4 km), and (iii) open drain *kutchha* (6.96 km).

47. **Industrial Effluents.** Industries, managed by Rajasthan State Industrial Development and Investment Corporation Ltd. (RIICO), located outside the town area. The industries are required to treat their own effluents before disposal and are not allowed by the BMB to connect to the local sewer network.

48. **Solid Waste**. The total waste generation in the town is about 22 tons per day out of which 15 tons per day is collected by CMB. The garbage is collected and stored in a common point in every ward and the transportation is done by the tractor and wheel barrows. There are some open points within the town demarcated by CMC for garbage

disposal in the wards. It is common to see wastes being dumped in depressions, ditches, or by the roadsides because Bundi has no landfill as final disposal.

49. **Transportation.** Bundi is well connected with all the important towns of the state. It is situated on the National Highways No. 12. There is railway station in Bundi on the Kota Jaipur route. There is no airport in Bundi.

D. Social and Cultural Resources

50. **Demography**. The town has a population of 88,871 (2001 census) with an annual growth rate of 3.34% and population density of 3,905 persons per km^2.

51. **Health and Educational Facilities** There are good educational facilities in Bundi district, which serve both townspeople and inhabitants of surrounding villages and towns in the hinterland. There are 933 primary schools, 89 secondary and higher secondary schools, two general degree colleges, and three industrial training institutes (ITI).

52. There is one general hospital, one tuberculosis hospital, and one primary health center in Bundi town.

53. **History, Culture, and Tourism.** Bundi was founded in 13th century. Historical places include the Bundi palace, built of locally quarried stone, which presents one of the finest examples of Rajput architecture. Other historically- and culturally-significant places are the Diwan-I-Am, Hathi Pol, Naubat Khana, and the famous Chitra Shala (provides a colourful glimpse of history because the walls and ceiling of this palace are completely covered with paintings).

54. Bundi has other palaces and hunting lodges like the Phool Sagar Palace, Sukh Mahal and Shikar Burj. Phool Sagar houses a collection of murals done by the Italian prisoners of war. Sukh Mahal evokes memories of Rudyard Kipling, who not only stayed in BUndi, but is believed to have found inspiration for his famous work, Kim. Shikar Burj, though not a palace, is interesting for carvings on the 66 royal cenotaphs.

55. Bundi is also known for its *baories* or step-wells. Unique to Rajasthan and Gujarat, the step-wells served as water reservoirs during summer months when there was a scarcity of drinking water. At one time, there were over fifty *baories* in Bundi but most of them have suffered the ravages of time. One remaining baori, Raniji-ki, can still be found in the heart of the town.

IV. ANTICIPATED IMPACTS AND MITIGATION MEASURES

56. This section of the IEE reviews possible subproject-related impacts, in order to identify issues requiring further attention and screen out issues of no relevance. ADB SPS (2009) require that impacts and risks will be analyzed during pre-construction, construction, and operational stages in the context of the subproject's area of influence. As defined previously, the primary impact areas are (i) the construction sites; (ii) adjacent monuments, temples, and buildings; (iii) main routes/intersections which will be traversed by construction vehicles; and (iv) quarries and borrow pits as sources of construction materials. The secondary impact areas are: (i) entire Bundi area outside of the delineated primary impact area; and (ii) entire Bundi district in terms of over-all environmental and socio-economic improvement.

57. The ADB Rapid Environmental Assessment Checklist for Urban Development in http://www.adb.org/documents/guidelines/environmental_assessment/eaguidelines002.asp

was used to screen the subproject for environmental impacts and to determine the scope of the IEE investigation. The completed Checklist is found in **Appendix 1**. All the proposed subproject components will interact physically with the environment.

58. In the case of this subproject (i) most of the individual elements are relatively small and involve straightforward construction and operation, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and (iii) being located in the built-up area of Different locations of Bundi town, will not cause direct impact on biodiversity values. The subproject will be in properties held by the local government and access to the subproject area is thru public rights-of-way and existing roads hence, land acquisition and encroachment on private property will not occur.

A. Pre-construction – Location and Design

59. **Design of the proposed components.** The design of the subproject components for the 84-pillared Cenotaph will be presented to Rajasthan Department of Archaeology and Museum for review and approval. Designs of the other heritage sites will be reviewed and approved by local government.

60. **Utilities.** Telephone lines, electric poles and wires, water and sewer lines within the existing right-of-way (ROW) may be damaged. To mitigate the adverse impacts due to relocation of the utilities, DSC will (i) identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.

61. **Asbestos Cement (AC) Pipes.** An additional, particularly acute health risk presented by this subproject derives from the fact that, the existing water supply system comprises mainly AC pipes, so there is a risk of contact with carcinogenic material if these pipes are uncovered in the course of the work. However unlikely, the design consultant will develop a protocol to be applied in any instance that AC pipes are found, to ensure that appropriate action is taken. This will be based on the approach recommended by the United States Environmental Protection Agency (USEPA),[3] and amongst other things, will involve:

(i) Develop reporting procedures to inform management immediately if AC pipes are encountered; and
(ii) Require construction consultants to develop and apply an AC Management Plan, as part of the over-all health and safety (H and S) plan, to protect both workers and citizens in case accidental uncovering of AC pipes. This AC Management Plan should also contain national and international standards for safe removal and long-term disposal of all asbestos-containing material encountered.

62. **Social and Cultural Resources.** Rajasthan is an area of rich and varied cultural heritage which includes many forts and palaces from the Rajput and Mughal periods, and large numbers of temples and other religious sites, so there is a risk that any work involving ground disturbance can uncover and damage archaeological and historical remains. For this

[3] In the USA, standards and approaches for handling asbestos are prescribed by the Occupational Health and Safety Administration (OHSA) and the Environmental Protection Agency (EPA) and can be found at http://www.osha.gov/SLTC/asbestos

subproject, excavation will occur near the 84-pillared Cenotaph, so it could be that there is a very risk of such impacts. IPIU/DSC will:

(i) Consult ASI to obtain an expert assessment of the archaeological potential of the site;
(ii) Consider alternatives if the site is found to be of medium or high risk;
(iii) Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available; and
(iv) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.

63. **Site selection of construction work camps, stockpile areas, storage areas, and disposal areas.** Priority is to locate these in the existing dumpsite area. However, if it is deemed necessary to locate elsewhere, sites to be considered will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems. Residential areas will not be considered to protect the human environment (i.e., to curb accident risks, health risks due to air and water pollution and dust, and noise, and to prevent social conflicts, shortages of amenities, and crime). Extreme care will be taken to avoid disposals near the monuments, temples, buildings, or in areas which will inconvenience the community and visitors. All locations would be included in the design specifications and on plan drawings.

64. **Site selection of sources of materials.** Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution. To mitigate the potential environmental impacts, locations of quarry site/s and borrow pit/s (for loose material other than stones) would be included in the design specifications and on plan drawings. Priority would be sites already permitted by Mining Department. If other sites are necessary, these would to be located away from population centers, drinking water intakes and streams, cultivable lands, and natural drainage systems; and in structurally stable areas even if some distance from construction activities. It will be the construction contractor's responsibility to verify the suitability of all material sources and to obtain the approval of Bundi Municipal Board (CMB). If additional quarries will be required after construction is started, then the construction contractor shall use the mentioned criteria to select new quarry sites, with written approval of BMB.

B. Construction

1. Screening of No Significant Impacts

65. The construction work is expected not to cause major negative impacts, mainly because:

(i) Most of the activities will be on the built-up areas of the Different locations of Bundi town thus could be constructed without causing impacts to biodiversity;
(ii) The site is located on an government-owned land which is not occupied or used for any other purpose;
(iii) Overall construction program will be relatively short and is expected to be completed in 12 months with activities to conducted by small teams working on short lengths at a time so most impacts will be localized and short in duration; and

(iv) Most of the predicted impacts associated with the construction process are produced because the process is invasive, such as involving earth-moving and excavation. However the routine nature of the impacts means that most can be easily mitigated and the impacts are clearly a result of the construction process rather than the design or location, as impacts will not occur if excavation or other ground disturbance is not involved.

66. As a result, there are several aspects of the environment which are not expected to be affected by the construction process and these can be screened out of the assessment at this stage as required by ADB procedure. These are shown in **Table 2**. These environmental factors are screened out presently but will be assessed again before starting of the construction activities.

Table 2: Fields in which construction is not expected to have significant impacts

Field	Rationale
Topography, Drainage, and Natural Hazards	Activities are not large enough to affect these features.
Geology, Geomorphology, Mineral Resources, and Soils	Activities are not large enough to affect these features. No mineral resources in the subproject sites.
Climate	Activities are not large enough to affect this feature.
Air Quality	Short-term production of dust is the only effect on atmosphere
Geohydrology and Groundwater	Activities will not be large enough to affect these features
Protected Areas	Different locations of Bundi town itself Archaeological protected area (since work will be carried out outside core area of Bundi town no impact on Bundi town structure is anticipated)
Flora and Fauna	No rare or endangered species.
Land Use	No change in land use.
Socio-economic	Subproject site is located entirely on government-owned land so there is no need to acquire land from private owners.
Commerce, Industry, and Agriculture	Activities are not large enough to affect these features
Population	Activities are not large enough to affect this feature.

2. Construction method

67. Works will involve (i) common civil works like concreting of land for parking, pavement construction, boundary wall construction, and platform construction; and (ii) electric connection, water supply connection, slopping of land for proper drainage of water, and utility shifting (if any) (iii) chemical washing of stone structures

68. The cavity for the toilet septic tanks will be excavated by backhoe, with soil being loaded onto trucks for disposal. Aggregate and concrete will be tipped into each void to create the foundations and floor. After which the brick walls and roof materials will be added by hand. Surfaces will be smoothed and finished where necessary.

3. Anticipated Impacts and Mitigation Measures

69. Although construction of the subproject components involves quite simple techniques, the invasive nature of excavation, and in this case the relatively proximity to historically- and archaeologically-sensitive areas means that there will be quite a lot of disturbance where there are a variety of human activities.

70. Physical impacts will be reduced by the method of working, whereby the works will be (i) conducted by small teams working on short lengths at a time; and (ii) if trenching is to done on roads, repaired to pre-construction conditions.

71. **Sources of Materials.** Approximately 60 to 70 m^3 of materials (sand, soil, and gravel) is required for this subproject. The construction contractor will be required to:

(i) Use quarry sites and sources permitted by government;
(ii) Verify suitability of all material sources and obtain approval of IPIU;
(iii) If additional quarries will be required after construction has started, obtain written approval from IPMU; and
(iv) Submit to DSC on a monthly basis documentation of sources of materials.

72. **Air Quality.** Emissions from construction vehicles, equipment, and machinery used for excavation and construction will induce impacts on the air quality in the construction sites. Anticipated impacts include dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) but temporary and during construction activities only. To mitigate the impacts, construction contractors will be required to:

(i) Consult with IPIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
(ii) Excavate the bridge foundations at the same time as the access roads are built so that dug material is used immediately, avoiding the need to stockpile on site;
(iii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather; Use tarpaulins to cover sand and other loose material when transported by trucks; and
(iv) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.

73. **Surface Water Quality.** Construction activities will be conducted on flat areas flowing to *nallahs* which are dry during the summer period. Run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works can contaminate downstream surface water quality. These potential impacts are temporary and short-term duration only and to ensure these are mitigated, construction contractor will be required to:

(i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
(ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with IPIU/DSC on designated disposal areas;
(iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
(iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
(v) Dispose any silt, debris, and other materials collected from dewatering and cleaning activities;
(vi) Dispose any wastes generated by construction activities in designated sites; and
(vii) Dispose any spent chemicals (from the chemical washing) according to the chemical's Material Safety Data Sheet (MSDS) of the chemical;
(viii) Prevent at all times chemical contamination of surface water bodies and lakes;
(ix) Conduct surface quality inspection according to the Environmental Management Plan (EMP).

74. **Noise Levels.** Construction works will be on busy areas in the Bundi town area. The sensitive receptors are the general population and visitors in these areas. Increase in noise level may be caused by earth-moving and excavation equipment, and the transportation of equipment, materials, and people. Impact is negative, short-term, and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan activities in consultation with IPIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
(ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
(iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and
(iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.

75. **Existing Infrastructure and Facilities.** Excavation works can damage existing infrastructure located alongside roads. It is notably important to avoid damaging existing water pipes as these are mainly manufactured from Asbestos Cement (AC), which can be carcinogenic if inhaled, so there are serious health risks for both workers and the public. It is therefore important that construction contractors will be required to:

(i) Obtain from IPIU and/or DSC the list of affected utilities and operators;
(ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of services. and
(iii) Develop and implement an AC Pipes Management Plan

76. **Landscape and Aesthetics.** The construction works will produce less than 15 m^3 of excess excavated soils, excess construction materials, and solid waste such as removed concrete, wood, trees and plants, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. These impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Prepare and implement Waste Management Plan;
(ii) Avoid stockpiling of excess excavated soils;
(iii) Coordinate with BMB for beneficial uses of excess excavated soils or immediately dispose to designated areas;
(iv) Recover used oil and lubricants and reuse or remove from the sites;
(v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
(vi) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
(vii) Request IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

77. **Accessibility.** Hauling of construction materials and operation of equipment on-site can cause traffic problems and conflicts in ROW. Potential impact is negative but short term and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
(ii) Schedule transport and hauling activities during non-peak hours;
(iii) Locate entry and exit points in areas where there is low potential for traffic congestion;

(iv) Keep the site free from all unnecessary obstructions;
(v) Drive vehicles in a considerate manner;
(vi) Coordinate with Bundi Municipal Traffic Office for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
(vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

78. **Socio-Economic – Income.** The subproject components will be located on government lands and ROWs, so there will be no need to acquire land, and thus there will be no impacts on the asset or landowners or tenants. However construction works will impede the access of tourists to the temples, monuments and nearby shops. The potential impacts are negative and moderate but short-term and temporary. The construction contractor will be required to:

(i) Leave spaces for access between mounds of soil;
(ii) Provide walkways and metal sheets where required to maintain access across trenches for people and vehicles;
(iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
(iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
(v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

79. **Socio-Economic – Employment.** Manpower will be required during the 12 month construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term. The construction contractor will be required to:

(vi) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and
(vii) Secure construction materials from local market.

80. **Occupational Health and Safety.** Workers need to be mindful of the occupational hazards which can arise from working in construction. Potential impacts are negative and long-term but reversible by mitigation measures. The construction contractor will be required to:

(i) Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment; (c) H and S Training4 for all site personnel; (d) documented procedures to be

[4] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

followed for all site activities; and (e) documentation of work-related accidents;

(ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
(iii) Provide medical insurance coverage for workers;
(iv) Secure all installations from unauthorized intrusion and accident risks;
(v) Provide supplies of potable drinking water;
(vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;
(vii) Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, use personal protective equipments, and preventing injuring to fellow workers;
(viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
(x) Ensure moving equipment is outfitted with audible back-up alarms;
(xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate;
(xii) Use chemical during chemical wash as directed by the manufacturer in Material Safety Data Sheet (MSDS), use appropriate personal protective equipments such as suitable hand gloves, safety goggles, apron etc,
(xiii) Only trained and experienced worker should be deployed for chemical washing
(xiv) Use proper stairs, staging, platforms, barricades and Personal Protective Equipments (PPEs) such as safety belt, while working at height more that 1.5 meters.
(xv) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.

81. A particular acute health risk presented by this subproject the risk of contact with carcinogenic material if the AC pipes are uncovered in the course of work. Precautions have already been introduced into the design of the subproject to avoid uncovering of these AC pipes. However unlikely, the construction contractor will be required to:

(i) Train all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognise them in situ;
(ii) Report to management immediately if AC pipes are encountered;
(iii) Develop and apply AC Management Plan.

82. **Community Health and Safety.** Hazards posed to the public, specifically in high-pedestrian areas may include traffic accidents and vehicle collision with pedestrians. Potential impact is negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Plan routes to avoid times of peak-pedestrian activities.
(ii) Liaise with IPIU/DSC in identifying high-risk areas on route cards/maps.
(iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.

(iv) Provide road signs and flag persons to warn of dangerous conditions.

83. **Work Camps.** Operation of work camps can cause temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants. Potential impacts are negative but short-term and reversible by mitigation measures. The construction contractor will be required to:

(i) Consult with IPIU/DSC before locating project offices, sheds, and construction plants;
(ii) Minimize removal of vegetation and disallow cutting of trees;
(iii) Provide water and sanitation facilities for employees;
(iv) Prohibit employees from poaching wildlife and cutting of trees for firewood;
(v) Train employees in the storage and handling of materials which can potentially cause soil contamination;
(vi) Recover used oil and lubricants and reuse or remove from the site;
(vii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
(viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
(ix) Request IPIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

84. **Social and Cultural Resources.** For this subproject, excavation will occur near important historical and archaeological sites so that there is a risk of chance finds during excavation work. The construction contractor will be required to:

(i) Strictly follow the protocol for chance finds in any excavation work near Archaeological site;
(ii) Request IPIU/DSC or any authorized person with archaeological field training to observe excavation;
(iii) Stop work immediately to allow further investigation if any finds are suspected; and
(iv) Inform IPIU/DSC if a find is suspected, and take any action they require ensuring its removal or protection in situ.

C. Operation and Maintenance

1. Screening out areas of no significant impact

85. Infrastructure will be used with minor repair and routine maintenance; there are several environmental sectors which should be unaffected once the new system becomes operational. These are identified in **Table 3** below, with an explanation of the reasoning in each case. These factors are thus screened out of the impact assessment and will not be mentioned further.

Table 3: Fields in which Operation and Maintenance of the Completed Infrastructures are expected Not to have Significant Impacts

Field	Rationale
Atmosphere	Activities are not large enough to affect these features.
Wildlife, forests, rare species, protected areas	There is no wildlife or rare or endangered species nearby the subproject components.
Coastal resources	Bundi is not located in a coastal area

2. Operation and Maintenance of the new infrastructure

86. O and M of the infrastructures will be the responsibility of O and M contractor for 3 yrs and later by Archaeological Dept.

87. The infrastructures are designed such that they shall not require major repairs or refurbishments and should operate with little maintenance beyond routine actions required to keep the toilets, water stations, lampposts, and other minor components in working order. These will be monitored periodically to detect any problems and allow remedial action if required. Any repairs will be small-scale involving manual, temporary, and short-term works involving regular checking and recording of performance for signs of deterioration and servicing.

88. Regular collection of solid wastes, desludging of septic tanks of the toilets and regular monitoring of the drinking water stations will be coordinated with the BMB.

3. Anticipated Environmental Impacts and Mitigation Measures

89. **Physical Resources**. Physical impacts will be negligible and rather positive. Repair works will not be conducted during monsoon period so there will be no effect on drainage or other surface water body. Generated dust will be suppressed by water sprinkling.

90. **Ecological Resources.** There are no significant ecological resources in or around the town, so any repairs or maintenance work can be conducted without ecological impacts.

91. **Economic Development.** The provision of improved infrastructure in the Bundi town will definitely encourage tourism which will result in overall improved economic condition of the Bundi town.

92. **Social and Cultural Resources.** There is a low risk of chance finds during O and M since all work will be conducted in areas that have already been disturbed when the infrastructure was installed. However, repair works could cause some temporary disruption of activities so the same precautions as employed during the construction period should be adopted. O and M contractor will need to:

(i) Complete work in these areas quickly;
(ii) Provide access for pedestrians and metal sheets for vehicles where required; and; and
(iii) Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and address key issues, and avoid working at sensitive times, such as religious and cultural festivals.

V. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project Stakeholders

93. The primary stakeholders are:

(i) Residents, shopkeepers and businesspeople who live and work alongside the roads in which improvements will be provided and near sites where facilities will be built;
(ii) Custodians and users of socially and culturally important buildings in affected areas;

(iii) State and local authorities responsible for the protection and conservation of archaeological relics, historical sites and artefacts; and
(iv) State and local tourism authorities.

94. The secondary stakeholders are:

(i) LSGD as the Executing Agency;
(ii) Other government institutions whose remit includes areas or issues affected by the subproject (state and local planning authorities such as Public Health Engineering Department, Local Government Department, Ministry of Environment and Forests, Roads and Highways Division);
(iii) Non-government organizations (NGOs) and community-based organizations (CBOs) working in the affected communities;
(iv) Other community representatives (prominent citizens, religious leaders, elders, women's groups);
(v) The beneficiary community in general; and
(vi) ADB, GoI, and Ministry of Finance.

B. Consultations and Disclosures Conducted

95. Some informal discussion was held with the local people during site visit. Issues discussed are:

(i) Awareness and extent of the project and development components;
(ii) Benefits of Project for the economic and social upliftment of community;
(iii) Labour availability in the Project area or requirement of outside labour involvement;
(iv) Local disturbances due to Project Construction Work;
(v) Necessity of tree felling etc. at project sites;
(vi) Water logging and drainage problem if any;
(vii) Drinking water problem;
(viii) Forest and sensitive area nearby the project site; and
(ix) Movement of wild animals nearby the project site.

96. Public consultations and group discussion meetings were conducted by DSC on 13 October 2010. The objectives were to appraise the stakeholders about the program's environmental and social impacts and present safeguards to mitigate any potential significant impacts. Records of public consultations are attached as **Appendix 2**. The major issues raised are related to traffic interferences and possible dust and noise problems during construction phase. Other comments include construction vehicles creating some disturbances to the local people daily activities, necessity of proper safety arrangements. The issues and comments have been considered and incorporated in the design of the subproject and mitigation measures for the potential environmental impacts raised during the public consultations.

97. Informal discussions were held with the local people during site visits for the preparation of this IEE. Issues discussed were:

(i) Executive agency should give preference to engage reputed and specialised contractors as people do not faith about the local contractors in respect of quality of works as well as timely completion of work;

(ii) Livelihood affected households should be given assistance in the mode of cash compensation;
(iii) Local people should be employed by the contractor during construction work;
(iv) Adequate safety measures should be taken during construction work;
(v) Mobile kiosks/vendors/hawkers have shown willingness to shift in nearby places without taking any compensation and assistance from the Executing Agency; and
(vii) Local people have appreciated the water supply proposal of the government and they have ensured that they will cooperate with the Executing Agency during project implementation.

98. Hindi versions of the Environmental Framework were provided during workshops to ensure stakeholders understood the objectives, policy, principles, and procedures. Likewise, English and Hindi versions of the Environmental Framework have been placed in Urban Local Body (ULB) offices, Investment Program Project Management Unit (IPMU) and IPIU offices, and the town library.

C. Future Consultation and Disclosure

99. LSGD extended and expanded the consultation and disclosure process significantly during implementation of RUSDIP. They have appointed an experienced NGO to handle this key aspect of the programme. The NGO (Community Awareness Participation Program, [CAPP]) continuously (i) conducts a wide range of activities in relation to all subprojects in each town; and (ii) ensures the needs and concerns of stakeholders are registered and are addressed in subproject design.

100. For this subproject, CAPP will develop, in close coordination with IPIU and DSC, a public consultation and disclosure program which is likely to include the following:

(i) Consultation during detailed design:
  (a) Focus-group discussions with affected persons and other stakeholders (including women's groups, NGOs and CBOs) to hear their views and concerns, so that these can be addressed in subproject design where necessary; and
  (b) Structured consultation meetings with the institutional stakeholders (government bodies and NGOs) to discuss and approve key aspects of the project.
(ii) Consultation during construction:
  (a) Public meetings with affected communities to discuss and plan work programmes and allow issues to be raised and addressed once construction has started; and
  (b) Smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and provide a mechanism through which stakeholders can participate in subproject monitoring and evaluation;
(ii) Project disclosure:
  (a) Public information campaigns (via newspaper, TV and radio) to explain the project to the wider town population and prepare them for disruption they may experience once the construction programme is underway;
  (b) Public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in Hindi; and

(c) Formal disclosure of completed project reports by making copies available at convenient locations in the study towns, informing the public of their availability, and providing a mechanism through which comments can be made.

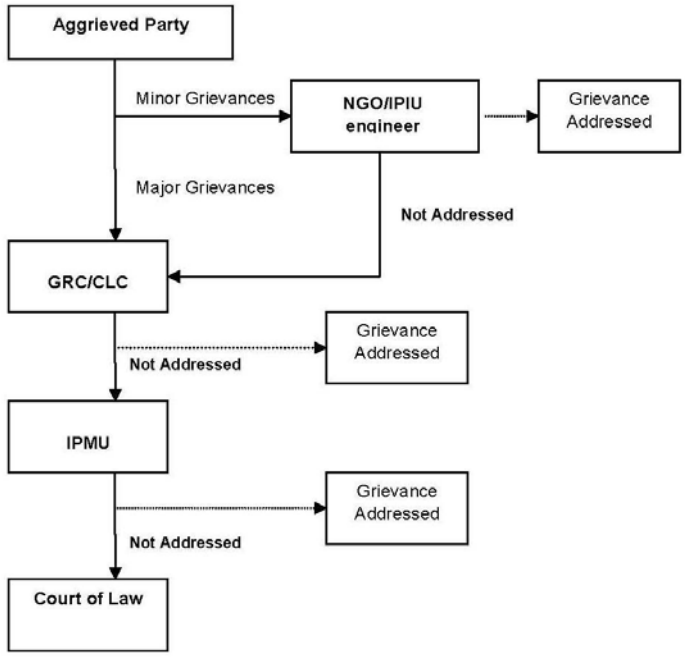
101. Based on ADB requirements, the following will be posted on ADB website: (i) this IEE, upon receipt; (ii) a new or updated IEE, if prepared, reflecting significant changes in the Project during design or implementation; (iii) corrective action plan prepared during Project implementation to address unanticipated environmental impacts and to rectify non-compliance to EMP provisions; and (iv) environmental monitoring reports, upon receipt.

VI. GRIEVANCE REDRESS MECHANISM

102. Grievances of affected persons will first be brought to the attention of the implementing NGO or IPIU engineer. Grievances not redressed by the NGO or IPIU will be brought to the City Level Committees (CLC) set up to monitor project implementation in each town. The CLC, acting as a grievance redress committee (GRC) is chaired by the District Collector with representatives from the ULB, state government agencies, IPIU, community-based organizations (CBOs) and NGOs. As GRC, the CLC will meet every month. The GRC will determine the merit of each grievance, and resolve grievances within a month of receiving the complaint, failing which the grievance will be addressed by the inter-ministerial Empowered Committee. The Committee will be chaired by the Minister of Urban Development and Local Self Government Department (LSGD), and members will include Ministers, Directors and/or representatives of other relevant Government Ministries and Departments. Grievance not redressed by the GRC will be referred to the IPMU for action failing which grievances will be referred by DPs/APs to the appropriate courts of law. The IPIU will keep records of all grievances received including: contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. The grievance redress process is shown in **Figure 2**.

103. All costs involved in resolving the complaints will be borne by the IPMU. The GRCs will continue to function throughout the project duration.

Figure 2: Grievance Redress Mechanism



CLC = City Level Committee, GRC = Grievance Redress Committee, IPIU=Investment Program Implementation Unit, IPMU = Investment Progarm Management Unit, NGO = nongovernmental organization,

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements

104. The main agencies involved in managing and implementing the subproject are:

(i) LSGD is responsible for management, coordination, and execution of all activities funded under the loan;
(ii) IPMU is responsible for coordinating construction of subprojects across all towns, and for ensuring consistency of approach and performance;
(iii) IPMC assists IPMU in managing the program and assures technical quality of design and construction;
(iv) DSCs design the infrastructure, manage tendering of Contractors and supervise the construction process;
(v) IPIUs appoint and manage Construction Contractors to build elements of the infrastructure in a particular town.
(vi) An inter-ministerial Empowered Committee[5] (EC) assists LSGD in providing policy guidance and coordination across all towns and subprojects.; and
(vii) City Level Committees[6] (CLCs) have also been established in each town to monitor project implementation in the town and provide recommendations to the IPIU where necessary.

[5] The EC is chaired by the Minister of Urban Development and LSG, and members include Ministers, Directors and/or representatives of other relevant Government Ministries and Departments.

6 CLCs are chaired by District Collectors, with members including officials of the ULB, local representatives of state government agencies, the IPIU, and local NGOs and CBOs.

105. **Figure 3** shows institutional responsibility for implementation of environmental safeguard at different level.

1. Responsible for carrying out mitigation measures

106. During construction stage, implementation of mitigation measures is the construction contractor's responsibility while during operation stage, O and M contractor and Archaeological Department will be responsible for the conduct of maintenance or repair works.

107. To ensure implementation of mitigation measures during the construction period, contract clauses (**Appendix 3**) for environmental provisions will be part of the civil works contracts. Contractors' conformity with contract procedures and specifications during construction will be carefully monitored by IPIU.

2. Responsible for carrying out monitoring measures

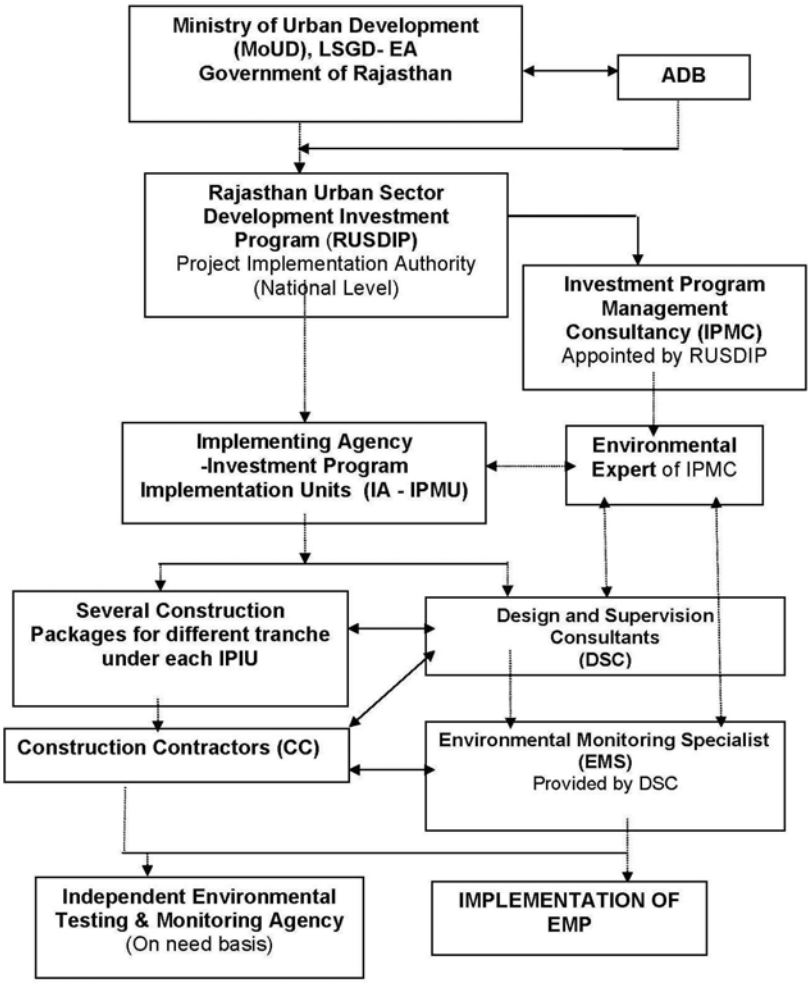
108. During construction, DSC's Environment Safeguards Officer and the designated representative of IPIU will monitor the construction contractor's environmental performance. Department of Archaeology And Museum's local staff will also closely monitor works in 84 pillared Cenotaph.

109. During the operation stage, monitoring will be the responsibility of department of archaeology and museum and BMB

3. Responsible for reporting

110. LGSD will submit to ADB quarterly reports on implementation of the EMP and will permit ADB to field annual environmental review missions which will review in detail the environmental aspects of the Project. Any major accidents having serious environmental consequences will be reported immediately.

Figure 3: Institutional Arrangement



B. Environmental Mitigation Plan

111. **Tables 4 to 6** shows the potential adverse environmental impacts, proposed mitigation measures, responsible parties, and estimated cost of implementation. This EMP will be included in the bid documents and will be further reviewed and updated during implementation.

C. Environmental Monitoring Program

112. **Tables 7 to 9** shows the proposed environmental monitoring program for this sub-project. It includes all relevant environmental parameters, description of sampling stations, frequency of monitoring, applicable standards, responsible parties, and estimated cost. Monitoring activities during the detailed engineering design stage will from part of the baseline conditions of the subproject sites and will be used as the reference for acceptance of restoration works by the construction contractors.

Table 4: Anticipated Impacts and Mitigation Measures – Pre-construction Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Design Consideration	Unacceptable design for the existing heritage sites	(i) Obtain "No Objection Certification" from Rajasthan Department of Archaeology and Museum (ii) Obtain "No Objection Certification" from local government.	IPIU and DSC	"No Objection Certificate" from (i) Rajasthan Department of Archaeology and Museum; (ii) local government
Utilities	Telephone lines, electric poles and wires, water and sewer lines within the working area	(i) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (ii) Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.	DSC	(i) list of affected utilities and operators; (ii) bid document to include requirement for a contingency plan for service interruptions
Asbestos Cement Pipes	Risk of contact with carcinogenic materials	(i) Require DSC to develop AC Protocol; (ii) Develop reporting procedures to inform management immediately if AC pipes are encountered; and (ii) Require construction consultants to develop and apply an AC Management Plan, as part of the over-all health and safety (H and S) plan, to protect both workers and citizens in case accidental uncovering of AC pipes. This AC Management Plan should also contain national and international standards for safe removal and long-term disposal of all asbestos-containing material encountered.	IPIU and DSC	(i) Asbestos Cement Protocol; (ii) requirement for AC Management included in bid documents
Social and Cultural Resources	Ground disturbance can uncover	(i) Consult department of	IPIU and DSC	Chance Finds Protocol

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
	and damage archaeological and historical remains	archaeology and museum to obtain an expert assessment of the archaeological potential of the site; (ii) Consider alternatives if the site is found to be of medium or high risk; (iii) Include state and local archaeological, cultural and historical authorities, and interest groups in consultation forums as project stakeholders so that their expertise can be made available; and (iv) Develop a protocol for use by the construction contractors in conducting any excavation work, to ensure that any chance finds are recognised and measures are taken to ensure they are protected and conserved.		
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	(i) Prioritize areas within or nearest possible vacant space in the subproject sites; (ii) If it is deemed necessary to locate elsewhere, consider sites that will not promote instability and result in destruction of property, vegetation, irrigation, and drinking water supply systems; (iii) Do not consider residential areas; (iv) Take extreme care in selecting sites to avoid direct disposal to water body or in areas which will inconvenience the community.	IPIU and DSC to determine locations prior to award of construction contracts.	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in	(i) Prioritize sites already permitted by the Mining Department;	IPIU and DSC to prepare list of approved quarry sites and sources of materials	(i) list of approved quarry sites and sources of materials; (ii) bid document to include

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
	accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	(ii) If other sites are necessary, inform construction contractor that it is their responsibility to verify the suitability of all material sources and to obtain the approval of IPIU; and (iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from PMU.		requirement for verification of suitability of sources and permit for additional quarry sites if necessary.

Table 5: Anticipated Impacts and Mitigation Measures – Construction Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Sources of Materials	Extraction of rocks and material may cause ground instability	(i) Use quarry sites and sources permitted by government; (ii) Verify suitability of all material sources and obtain approval of Investment Program Implementation Unit (IPIU); (iii) If additional quarries will be required after construction has started, obtain written approval from IPMU; and; (iv) Submit to DSC on a monthly basis documentation of sources of materials.	Construction Contractor	Construction Contractor documentation
Air Quality	Emissions from construction vehicles, equipment, and machinery used for excavation and construction resulting to dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons)	(i) Consult with IPIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials; (ii) Excavate the bridge foundations at the same time as the access roads are built so that dug material is used immediately, avoiding the need to stockpile on site; (iii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;	Construction Contractor	(i) Location of stockpiles; (ii) complaints from sensitive receptors; (iii) heavy equipment and machinery with air pollution control devices (iii) ambient air for respirable particulate matter (RPM) and suspended particulate matter (SPM); (iv) vehicular emissions such as sulphur dioxide (SO2), nitrous oxides (NOx), carbon monoxide (CO), and hydrocarbons

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(iv) Use tarpaulins to cover sand and other loose material when transported by trucks; and (v) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.		
Surface water quality	Run-off from stockpiled materials, and chemical contamination from chemicals, fuels and lubricants during construction works can contaminate downstream surface water quality.	(i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets; (ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with IPIU/DSC on designated disposal areas; (iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies; (iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (v) Dispose any silt, debris, and other materials collected from dewatering and cleaning activities; (vi) Dispose any wastes generated by construction activities in designated sites; and (vii) Dispose any spent chemicals (from the chemical washing) according to the chemical's Material Safety Data Sheet (MSDS) of the chemical; (viii) Prevent at all times chemical contamination of surface water bodies and lakes; (ix) Conduct surface quality	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) number of silt traps installed along drainages leading to water bodies; (iii) records of surface water quality inspection; (iv) effectiveness of water management measures; (v) for inland water: suspended solids, oil and grease, biological oxygen demand (BOD), and coliforms. .(vi) Physical inspection for use and disposal of chemical used

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		inspection according to the Environmental Management Plan (EMP).		
Noise Levels	Increase in noise level due to earth-moving and excavation equipment, and the transportation of equipment, materials, and people	(i) Plan activities in consultation with IPIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance; (ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach; (iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and (iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.	Construction Contractor	(i) Complaints from sensitive receptors; (ii) use of silencers in noise-producing equipment and sound barriers; (iii) Equivalent day and night time noise levels
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure located at project area	(i) Obtain from IPIU and/or DSC the list of affected utilities and operators; (ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of services; and (iii) Develop and implement an AC Pipes Management Plan	Construction Contractor	(i) Existing Utilities Contingency Plan; (ii) Asbestos Cement Pipes Management Plan
Landscape and Aesthetics	solid wastes as well as excess construction materials	(i) Prepare and implement Waste Management Plan; (ii) Avoid stockpiling of excess excavated soils; (ii) Coordinate with BMB for beneficial uses of excess	Construction Contractor	(i) Waste Management Plan; (ii) complaints from sensitive receptors; (iii) IPIU/DSC to report in writing that the necessary environmental restoration work has been

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		excavated soils or immediately dispose to designated areas; (iv) Recover used oil and lubricants and reuse or remove from the sites; (v) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; (vi) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (vii) Request IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.		adequately performed before acceptance of work.
Accessibility	traffic problems and conflicts in right-of-way (ROW)	(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites; (ii) Schedule transport and hauling activities during non-peak hours; (iii) Locate entry and exit points in areas where there is low potential for traffic congestion; (iv) Keep the site free from all unnecessary obstructions; (v) Drive vehicles in a considerate manner; (vi) Coordinate with Bundi Municipal Traffic Office for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors; (iii) number of signages placed at subproject sites.

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.		
Socio-Economic – Income.	impede the access of tourists to nearby shops	(i) Leave spaces for access between mounds of soil; (ii) Provide walkways and metal sheets where required to maintain access across trenches for people and vehicles; (iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools; (iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and (v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.	Construction Contractor	(i) complaints from sensitive receptors; (ii) number of walkways, signages, and metal sheets placed at subproject sites.
Socio-Economic - Employment	generation of contractual employment and increase in local revenue	(i) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and (ii) Secure construction materials from local market.	Construction Contractor	(i) employment records; (ii) records of sources of materials
Occupational Health and Safety	occupational hazards which can arise from working in infrastructures like roads and bridges	(i) Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment; (c) H and S Training	Construction Contractor	(i) site-specific Health and Safety (H and S) Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water;

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

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		outfitted with audible back-up alarms; (xi) Use chemical during chemical wash as directed by the manufacturer in Material Safety Data Sheet (MSDS), use appropriate personal protective equipments such as suitable hand gloves, safety goggles, apron etc, (xii) Only trained and experienced worker should be deployed for chemical washing (xiii) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and (xiv) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.		
Asbestos Cement Pipes	health risk	(i) Train all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognise them in situ; (ii) Report to management	Construction Contractor	(i) records of trainings; (ii) AC Management Plan approved by PIU/DSC

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		immediately if AC pipes are encountered; (iii) Develop and apply AC Management Plan.		
Community Health and Safety.	traffic accidents and vehicle collision with pedestrians	(i) Plan routes to avoid times of peak-pedestrian activities. (ii) Liaise with IPIU/DSC in identifying high-risk areas on route cards/maps. (iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. (iv) Provide road signs and flag persons to warn of dangerous conditions.	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors
Work Camps	temporary air and noise pollution from machine operation, water pollution from storage and use of fuels, oils, solvents, and lubricants	(i) Consult with IPIU/DSC before locating project offices, sheds, and construction plants; (ii) Minimize removal of vegetation and disallow cutting of trees; (iii) Provide water and sanitation facilities for employees; (iv) Prohibit employees from poaching wildlife and cutting of trees for firewood; (v) Train employees in the storage and handling of materials which can potentially cause soil contamination; (vi) Recover used oil and lubricants and reuse or remove from the site; (vii) Manage solid waste and Baori /lake silt-garbage according to the following preference hierarchy: reuse, recycling and disposal to designated areas;	Construction Contractor	(i) complaints from sensitive receptors; (ii) water and sanitation facilities for employees; and (iii) IPIU/DSC report in writing that the camp has been vacated and restored to pre-project conditions

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (ix) Request IPIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.		
Social and Cultural Resources	risk of archaeological chance finds	(i) Strictly follow the protocol for chance finds in any excavation work; (ii) Request IPIU/DSC or any authorized person with archaeological field training to observe excavation; (iii) Stop work immediately to allow further investigation if any finds are suspected; and (iv) Inform IPIU/DSC if a find is suspected, and take any action they require ensuring its removal or protection in situ. (v) Work closely with department of archaeology and museum to ensure monitoring of all works and compliance with all department of archaeology and museum rules	Construction Contractor/department of archaeology and museum field staff	(i) records of chance finds

Table 6: Anticipated Impacts and Mitigation Measures – Operation and Maintenance Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Economic Development and Social and Cultural Resources	temporary disruption of activities	(i) Complete work in these areas quickly; and (ii) Provide wooden bridges for pedestrians and metal sheets for vehicles to allow access across open trenches where required; and (iv) Consult municipal authorities, custodians of important buildings, cultural and tourism authorities and local communities in advance of the work to identify and	BMB and O and M Contractors in close coordination with department of archaeology and museum	complaints from sensitive receptors

		address key issues, and avoid working at sensitive times, such as religious and cultural festivals.		
Sanitation	Discharge from septic tanks	Frequent services for maintenance of sanitation condition	BMB and O and M Contractors in close coordination with department of archaeology and museum	Site observation and maintenance record
Drinking water quality	Health risks if not compliant with drinking water Standards	Testing of water regularly	BMB and O and M Contractors in close coordination with department of archaeology and museum	Compliance to Indian Drinking Water Quality Standards
Solid wastes	If not removed frequently – garbage dumping within the Bundi town resulting nuisance and unhygienic condition	Regular removal of waste	BMB and O and M Contractors in close coordination with department of archaeology and museum	(i) frequency of collection; (ii) complaints from sensitive receptors

Table 7: Pre-construction Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Design Consideration	not applicable	IPIU and DSC	"No Objection Certificate" from Rajasthan Department of Archaeology and Museum	checking of records	NOC issued prior to commencement of civil works	Once prior to start of construction	IPMU
Baseline Environmental Condition – Ambient Air Quality	Subproject sites	DSC	Establish baseline values of respirable particulate matter (RPM) and (ii) suspended particulate matter (SPM)	Air sample collection and analyses by in-house laboratory or accredited 3rd party laboratory	GOI Ambient Air Quality Standards	Once prior to start of construction	IPMU
Baseline Environmental Condition - Water Quality	Subproject sites	DSC	Establish baseline values of suspended solids (TSS), (iii) pH	Air sample collection and analyses by in-house laboratory or accredited 3rd	GOI Water Quality Standards	Once prior to start of construction	IPMU

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			(iv) biological oxygen demand (BOD), (v) fecal coliform	party laboratory			
Sources of Materials	not applicable	DSC	(i) list of affected utilities and operators; (ii) bid document to include requirement for a contingency plan for service interruptions	checking of records	(i) list of affected utilities and operators prepared; (ii) requirement for a contingency plan for service interruptions included in bid documents	once	IPMU
Asbestos Cement Pipes	not applicable	IPIU and DSC	(i) Asbestos Cement Protocol; (ii) requirement for AC Management included in bid documents	checking of records	(i) AC Protocol prepared; (ii) bid documents include requirements for AC Management Plan	once	IPMU
Social and Cultural Resources	not applicable	IPIU and DSC	Chance Finds Protocol	checking of records	Chance Finds Protocol provided to construction contractors prior to commencement of activities	once	IPMU
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	not applicable	IPIU and DSC to determine locations prior to award of construction contracts.	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	checking of records	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas provided to construction contractors prior to commencement of works.	once	IPMU

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Sources of Materials	not applicable	IPIU and DSC to prepare list of approved quarry sites and sources of materials	(i) list of approved quarry sites and sources of materials; (ii) bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	checking of records	(i) list of approved quarry sites and sources of materials provided to construction contractors (ii) bid document included requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	once	IPMU

Table 8: Construction Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Sources of Materials	quarries and sources of materials	Construction Contractor	Construction Contractor documentation	(i) checking of records; (ii) visual inspection of sites	(i) sites are permitted; (ii) report submitted by construction contractor monthly (until such time there is excavation work)	monthly submission for construction contractor as needed for DSC	DSC
Air Quality	construction sites and areas designated for stockpiling of materials	Construction Contractor	(i) Location of stockpiles; (ii) complaints from sensitive receptors; (iii) heavy equipment and machinery with air pollution control devices (iii) ambient air for respirable particulate matter	(i) checking of records; (ii) visual inspection of sites	(i) stockpiles on designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) air pollution control devices working properly; (iv) GOI Ambient	monthly for checking records	DSC in coordination with department of archaeology and museum (where necessary i.e. near 84 pillared Cenotaph)

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			(RPM) and suspended particulate matter (SPM); (iv) vehicular emissions such as sulphur dioxide (SO2), nitrous oxides (NOx), carbon monoxide (CO), and hydrocarbons (HC)		Quality Standards for ambient air quality; (iv) GOI Vehicular Emission Standards for SO2, NOx, CO and HC.		
Surface Water Quality	(i) construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials;	Construction Contractor	(i) Areas for stockpiles, storage of fuels and lubricants and waste materials; (ii) number of silt traps installed along drainages leading to water bodies; (iii) records of surface water quality inspection; (iv) effectiveness of water management measures; (v) for inland water: suspended solids, oil and grease, biological oxygen demand (BOD), and coliforms.	visual inspection; Sample collection and laboratory analyses	(i) designated areas only; (ii) silt traps installed and functioning; (iii) no noticeable increase in suspended solids and silt from construction activities (iv) GOI Standards for Water Discharges to Inland Waters and Land for Irrigation	Monthly	DSC in coordination with department of archaeology and museum (where necessary i.e. near 84 pillared Cenotaph)
Noise Levels	(i) construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and	Construction Contractor	(i) Complaints from sensitive receptors; (ii) use of silencers in noise-producing equipment and sound barriers; (iii)	(i) checking of records; (ii) visual inspection	(i) complaints from sensitive receptors satisfactorily addressed; and (ii) silencers in noise-producing	Monthly	DSC in coordination with department of archaeology and museum (where necessary i.e. near

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
	waste materials; (iii) work camps		Equivalent day and night time noise levels		equipment functioning as design; and (iii) sound barriers installed where necessary		84 pillared Cenotaph)
Existing Utilities and Infrastructure	(i) construction sites; (ii) alignment of affected utilities	Construction Contractor	(i) Existing Utilities Contingency Plan; (ii) Asbestos Cement Pipes Management Plan	(i) checking of records; (ii) visual inspection	implementation according to Utilities Contingency Plan and Asbestos Cement Plan	as needed	DSC
Landscape and Aesthetics	(i) construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials; (iii) work camps	Construction Contractor	(i) Waste Management Plan; (ii) complaints from sensitive receptors; (iii) IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.	(i) checking of records; (ii) visual inspection	(i) no accumulation of solid wastes on-site; (ii) implementation of Waste Management Plan; (iii) complaints from sensitive receptors satisfactorily addressed.	monthly	DSC in coordination with department of archaeology and MUSEUM (where necessary i.e. near 84 pillared Cenotaph)
Accessibility	(i) construction sites; (ii) traffic routes	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors; (iii) number of signages placed at subproject sites.	visual inspection	(i) implementation of Traffic Management Plan; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) signages visible and located in designated areas	Monthly	DSC in coordination with department of archaeology and museum (where necessary i.e. near 84 pillared Cenotaph)
Socio-Economic - Income	construction sites	Construction Contractor	(i) complaints from sensitive receptors; (ii) number of walkways,	visual inspection	(i) complaints from sensitive receptors satisfactorily addressed;	Quarterly	DSC

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			signages, and metal sheets placed at subproject sites.		(ii) walkways, ramps, and metal sheets provided (iii) signages visible and located in designated areas		
Asbestos Cement Pipes	construction sites	Construction Contractors	(i) records of trainings; (ii) AC Management Plan approved by IPIU/DSC	checking of records	no exposure to AC pipes	as needed	IPIU and DSC
Socio-Economic - Income	construction sites	Construction Contractor	(i) employment records; (ii) records of sources of materials	checking of records	number of employees from Bundi equal or greater than 50% of total workforce	quarterly	DSC
Occupational Health and Safety	construction sites	Construction Contractor	(i) site-specific Health and Safety (H and S) Plan; (ii) Equipped first-aid stations; (iii) Medical insurance coverage for workers; (iv) Number of accidents; (v) Supplies of potable drinking water; (vi) Clean eating areas where workers are not exposed to hazardous or noxious substances; (vii) record of H and S orientation	(i) checking of records; (ii) visual inspection	(i) implementation of H and S plan; (ii) number of work-related accidents; (iii) % usage of personal protective equipment; (iv) number of first-aid stations, frequency of potable water delivery, provision of clean eating area, and number of sign boards are according to approved plan; (v) % of moving equipment outfitted with audible back-up alarms	Quarterly	DSC

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			trainings (viii) personal protective equipments; (ix) % of moving equipment outfitted with audible back-up alarms; (xi) sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.				
Community Health and Safety	construction sites	Construction Contractor	(i) Traffic Management Plan; (ii) complaints from sensitive receptors	visual inspection	(i) implementation of Traffic Management Plan; (ii) complaints from sensitive receptors satisfactorily addressed	Quarterly	DSC in coordination with department of archaeology and museum (where necessary i.e. near 84 pillared Cenotaph)
Work Camps	work camps	Construction Contractor	(i) complaints from sensitive receptors; (ii) water and sanitation facilities for employees; and (iii) IPIU/DSC report in writing that the camp has been vacated and restored to pre-project conditions	visual inspection	(i) designated areas only; (ii) complaints from sensitive receptors satisfactorily addressed	quarterly	DSC in coordination with department of archaeology and museum (where necessary i.e. near 84 pillared Cenotaph)
Chance Finds	construction sites	Construction Contractor	records of chance finds	checking of records	Implementation of Chance Finds	as needed	DSC in coordination with

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
					Protocol		(where necessary i.e. near 84 pillared Cenotaph)
Disposal and use of Chemical/ acids	Construction sites	Construction Contractor	(i) Disposal of used chemical/ acids (ii) personal protective equipments;	(i) checking of records; (ii) visual inspection	Records of proper disposal	As needed	DSC in coordination with Municipality
Storage of chemical and acids	Storage site	Construction Contractor	(i) record of H and S orientation trainings (ii) personal protective equipments; (iii) sign boards for hazardous substances and areas for storage and disposal.	) checking of records; (ii) visual inspection	Records of proper storage	As needed	IPIU and DSC

Table 9: Operation and Maintenance Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Economic Development and Social and Cultural Resources	subproject sites	BMB and O and M Contractors in close coordination with department of archaeology and museum	complaints from sensitive receptors	checking of records	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU
Sanitation	subproject sites	BMB and O and M Contractors in close coordination with	complaints from sensitive receptors	checking of records	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU
Water Quality	subproject sites	BMB and O and M	Drinking Water	laboratory	compliance with	as needed	IPMU

		Contractors in close coordination with department of archaeology and museum	Quality Standards	analyses	standards		
On-site Solid Waste Management	subproject sites	BMB and O and M Contractors in close coordination with department of archaeology and museum	complaints from sensitive receptors	checking of records	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU

D. Environmental Management Plan Costs

113. Most of the mitigation measures require the Construction Contractors to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance. Regardless of this, any costs of mitigation by the construction contractors or DSC are included in the budgets for the civil works and do not need to be estimated separately here. Mitigation that is the responsibility of LSGD will be provided as part of their management of the project, so this also does not need to be duplicated here.

114. The remaining actions in the EMP are the various environmental monitoring activities to be conducted by the Environmental Monitoring Specialist (EMS) in the DSC. These have been budgeted elsewhere but budget is listed below in the event additional person months are required and found necessary by DSC, and their costs are shown in **Table 10**. The figures show that the total cost of environmental management and monitoring for the subproject is INR 500,000.

Table 10: Environmental Management and Monitoring Costs (INR)

Item	Quantity	Unit Cost	Total Cost	Sub-total	Source of Funds
1. Implementation of EMP					
Domestic Environmental Monitoring Specialist	1 x 2 month	150,000[7]	300,000		DSC
TOTAL				**300,000**	

EMP = Environmental Management Plan.

VIII. FINDINGS AND RECOMMENDATIONS

115. The process described in this document has assessed the environmental impacts of all elements of the infrastructure proposed under the Bundi Heritage Sites Subproject. Potential negative impacts were identified in relation to construction and operation of the improved infrastructure. No impacts were identified as being due to either project design or location. These were discussed with department of archaeology and museum and specialists responsible for the subproject engineering aspects, and as a result mitigation measures have been developed to reduce all negative impacts to acceptable levels.

116. During the construction phase, impacts mainly arise from the need to excavate and dispose of waste soil and from the disturbance of residents, businesses, traffic and important buildings by the construction works. These are common impacts of construction in built-up areas, and there are well developed methods for their mitigation.

117. The use of AC pipes in the existing water distribution network presents a particular problem, as workers and the public will need to be protected from inhalation of asbestos dust, which can be carcinogenic. This has been addressed in the EMP.

118. It is proposed that the project will employ in the workforce people who live in the vicinity of construction sites to provide them with a short-term economic gain; and ensure that people employed in the longer term to maintain and operate the new facilities are residents of nearby communities.

[7] Unit costs of domestic consultants include fee, travel, accommodation and subsistence

119. Once the heritage site renovated, most facilities will operate with routine maintenance, which should not affect the environment. The infrastructure will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. It will also be conducted in areas that have already been excavated.

120. Mitigation will be assured by a program of environmental monitoring to be conducted during construction and operation stages, with assistance from department of archaeology and museum. The environmental monitoring program will ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. The Project Implementation Unit (PIU) and Design and Supervision Consultants (DSC) will work closely with department of archaeology and museum in implementing the program. Any requirements for remedial action will be reported to the IPMU.

121. The main impacts of the subproject will be beneficial to the citizens of Bundi as improved infrastructure in the Bundi town area will lead to socio-economic gains for the town.

122. The stakeholders were involved in developing the IEE through face-to-face discussions on site and a large public meeting held in the town, after which views expressed were incorporated into the IEE and the planning and development of the project. The IEE will be made available at public locations in the town and will be disclosed to a wider audience via the ADB website. The consultation process will be continued and expanded during project implementation, when a nationally-recognised NGO will be appointed to handle this key element to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation

IX. CONCLUSIONS

123. The subproject is not anticipated to cause significant adverse impacts. The potential adverse impacts that are associated with design, construction, and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

124. Based on the findings of the IEE, the classification of the Project as Category “B” is confirmed, and no further special study or detailed EIA needs to be undertaken to comply with ADB SPS (2009) or GoI EIA Notification (2006).

Appendix 1 – Rapid Environmental Assessment (REA) Checklist - Bundi Heritage Site

A. REA checklist for City Gates-Bundi

SCREENING QUESTIONS			Yes	No	REMARKS
A.	**Project Siting**				
Is the project area …….					
♦	Densely populated ?		√		Within Bundi town
♦	Heavy with development activities?		√		Market and residential activities near gates
♦	Adjacent to or within any environmentally sensitive area				
	●	Cultural heritage site	√		Temples are located near all the city gates, one tourist place (Sukh Mahal) and Jaitsagar lake is situated near Bada Talab Gate No location is within ASI heritage list
	●	Protected Area		√	
	●	Wetland		√	
	●	Mangrove		√	
	●	Estuarine		√	
	●	Buffer zone of protected area		√	
	●	Special area for protecting biodiversity		√	
	●	Bay		√	
B.	**Potential Environmental Impacts**				
Will the Project causes ……..					
♦	Impairment of historical/cultural monuments/areas and loss/damage to these sites?			√	Designs will be reviewed and approved by Rajasthan Department of Archaeology and Museum (for the 84-pillared Cenotaph) and local government (for the other heritage 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.?		√		These gates are situated in dense populated (Except Bada Talab Gate) and commercial place and construction activities may cause interference with utilities and blockage of access. Mitigation measures will be applied as per EMP
♦	dislocation of involuntary resettlement of people		√		These gates (except Bada Talab Gate) are mostly encroached by local residents, who had made residence and shops with the walls of gates
♦	noise and vibration due to blasting and other civil works?			√	No any activity shall cause such results
♦	discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		√		Chemical used in chemical washing may be hazardous if discharged in to sewer. Safety procedure will be followed as per EMP

♦	social conflicts between construction workers from other areas and community workers?		√	Mostly workers shall be hired locally
♦	road blocking and temporary flooding due to land excavation during the rainy season?		√	No land excavation is proposed near gates
♦	noise and dust from construction activities?	√		Temporary disturbances. No heavy excavation and construction work is proposed, mitigation measures should be followed
♦	traffic disturbances due to construction material transport and wastes?		√	Transport of construction materials shall be done during no peak hours
♦	temporary silt runoff due to construction?		√	Mitigation measures should be followed during execution of work
♦	hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		√	No sewer system exists in project areas

B. REA checklist- 84 Pillared Cenotaph

SCREENING QUESTIONS			Yes	No	REMARKS
A.	**Project Siting**				
Is the project area …….					
♦	Densely populated ?			√	The area is having separate boundary wall
♦	Heavy with development activities?			√	No
♦	Adjacent to or within any environmentally sensitive area				
	●	Cultural heritage site	√		This monument is a department of archaeology and museum protected monument, build in 1740, and a cultural heritage site
	●	Protected Area		√	
	●	Wetland		√	
	●	Mangrove		√	
	●	Estuarine		√	
	●	Buffer zone of protected area		√	
	●	Special area for protecting biodiversity		√	
	●	Bay		√	
B.	**Potential Environmental Impacts**				
Will the Project causes ……..					
♦	Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√		Works proposed may cause some changes in structure. Works should be done according to and prior permission of department of archaeology and museum

♦	interference with other utilities and blocking of access to buildings, nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		√	No such problem may exist during construction except disturbance to tourists
♦	dislocation of involuntary resettlement of people		√	The entire work area is protected by department of archaeology and museum
♦	noise and vibration due to blasting and other civil works?		√	No any activity shall cause such results
♦	discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?	√		Spent chemical after chemical wash may be treated as hazardous, MSDS of chemical should be strictly followed
♦	social conflicts between construction workers from other areas and community workers?		√	Mostly workers should be hired locally
♦	road blocking and temporary flooding due to land excavation during the rainy season?		√	no land excavation is required in the project
♦	noise and dust from construction activities?	√		Temporary disturbances. No heavy excavation and construction work is proposed, mitigation measures should be followed
♦	traffic disturbances due to construction material transport and wastes?		√	No heavy construction works are proposed which may disturb the traffic due to construction material transport
♦	temporary silt runoff due to construction?		√	No silt runoff is expected
♦	hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		√	No sewer system exists in project

C. REA checklist- Naval Sagar Lake and Baori

	SCREENING QUESTIONS		Yes	No	REMARKS
A.	**Project Siting**				
Is the project area …….					
♦	Densely populated ?		√		There are residential and commercial activities near the lake
♦	Heavy with development activities?			√	Lake itself if not having any development activities
♦	Adjacent to or within any environmentally sensitive area				
	●	Cultural heritage site	√		The lake itself is a cultural heritage site and in the way to famous Taragarh fort of Bundi. No location is within ASI heritage list
	●	Protected Area		√	No
	●	Wetland		√	
	●	Mangrove		√	

	●	Estuarine		√	
	●	Buffer zone of protected area		√	
	●	Special area for protecting biodiversity	√		Fishes in the pond are protected from fishing due to religious reasons
	●	Bay		√	
B.	**Potential Environmental Impacts**				
Will the Project causes ……..					
♦	Impairment of historical/cultural monuments/areas and loss/damage to these sites?		√		Works proposed may cause change to this structure, Works should be done according to and prior permission of LSGD
♦	interference with other utilities and blocking of access to buildings, nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?			√	No such problem may exist during construction except disturbance to tourists
♦	dislocation of involuntary resettlement of people			√	The entire work area is not populated
♦	noise and vibration due to blasting and other civil works?			√	No any activity shall cause such results
♦	discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		√		Spent chemical after chemical wash may be treated as hazardous, MSDS of chemical should be strictly followed
♦	social conflicts between construction workers from other areas and community workers?			√	Mostly workers should be hired locally
♦	road blocking and temporary flooding due to land excavation during the rainy season?			√	no land excavation is required in the project
♦	noise and dust from construction activities?			√	No heavy excavation and construction work is proposed, mitigation measures should be followed
♦	traffic disturbances due to construction material transport and wastes?			√	No heavy construction works are proposed which may disturb the traffic due to construction material transport
♦	temporary silt runoff due to construction?			√	management of silt should be done
♦	hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?			√	No sewer system exists in project

Appendix 2
Public Consultation- Environment

Sub Project-: Heritage Site (Bundi)

Issues discussed

- General Observations
- Awareness and extent of the project and development components
- Benefits of the Project for the economic and Socio-cultural development
- Labour availability in the Project area or requirement of outside labour involvement
- Local disturbances due to Project Construction Work
- Local disturbances during project operation work.
- Necessity of tree felling etc. at project site
- Water logging and drainage problem if any
- Major environmental problems expected,
- Forest and sensitive area nearby the project site
- Other problems, encountered, if any
-

A. Public Consultation at Khoja Gate, Lanka Gate and Meera Gate

Date and time of Consultation:- 13.09.2010, 03.00 P.M.
Location- Khoja Gate, Lanka Gate, Meera Gate, Bundi

Table: Issues of the Public Consultation- Design phase

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including	People are not much aware of the project. DSC consultant informs the people about the proposed projects	
2	In what way they may associate with the project	They demand that local people of the area should be engaged during implementation of the same. Some people need associated infrastructure developments like toilet, drinking water facilities, drainage etc.	Local people should be deployed during construction works, improvements of basic amenities should be
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No any, a wildlife sanctuary is situated about 12 km from the town	
4	Presence of historical/ cultural/ religious sites nearby	Khoja Gate, Lanka Gate and Meera Gate are historical structures. A Ganesh Temple is situated on one side of Meera Gate, A Ganpati Temple is situated on one side of Khoja Gate, A Bhairon Temple is situated on one side of Lanka Gate	Proposed works should not affect the structures of temple, instead some restoration works for drainage and repairing of steps should be done on demand of local
5	Unfavourable climatic	May to June there is very hot season; otherwise the condition of climate is favourable	

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
6	Occurrence of flood	No report of Flood in the project area. Some times area is inundated due to failure of drainage system during heavy rain	Proper drainage system should be developed
7	Drainage and sewerage problem facing	No sewerage system in the project area. Drainage system is also in poor condition	Drainage system and Sewerage system should be improved
8	Present drinking water problem – quantity and quality	People get water supply from PHED. Quality and quantity is good enough	Drinking water facility should be provided for visitors
9	Present solid waste collection and disposal	Municipality takes care of the Solid waste collection, which is manually and disposed off in disposal site.	Dust bins should be taken in to consideration in DPR
10	Availability of labour during construction	Sufficient labour will be available in this area.	
11	Access road to project site	Access road is available.	
12	Perception on tree felling and afforestation	Tree cutting not required in this project.	
13	Dust and noise pollution and disturbances	Dust and noise problem shall arise up to some extent during execution , shopkeepers, nearby residents and tourists shall be affected	Mitigation measures for prevention of dust and noise should be taken during execution of
14	Setting up worker camp site within the village/	Labours will come from nearby location No need for setting up labour camp	
15	Safety of residents during construction	There may arise safety problem due to construction works and plying of vehicles because these roads are busy roads situated within city	Safety of residents and visitors should be taken in to consideration
16	Requirement of enhancement of other facilities	They want the conservation of these historical structures and some other facilities like toilet, parking and drinking water etc.	Toilet, drinking water and parking should be provided

NAME AND POSITION OF PERSONS CONSULTED:

1. Raj Shekhar- Shopkeeper, Buliwal Medicals, Near Khoja Gate
2. Mushtaq Ahmad and Hazi Abdul Sattar- Shopkeeper, pathan Trunk House, Lanka Gate
3. Badri Lal- Cycle repairing shop, Lanka Gate
4. Abdul Ghalib- Raja Fish and Chicken Shop, Meera Gate
5. Din Dayal Chitera- Local resident, Near Khoja Gate
6. Mahabir Saini- Local Resident, Near Meera Gate
7. Chotu Lal Saini- Local Resident, Near Meera Gate

B. Public Consultation at Shukla Baori Gate, Bada Talab Gate, Bhairon Gate and Surang Gate

Date and time of Consultation:- 13.09.2010, 04-05 P.M.
Location- Shukla Baori Gate, Bada Talab Gate, Bhairon Gate, Surang Gate

Table: Issues of the Public Consultation- Design phase

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	People are not much aware of the project. DSC consultant informs the people about the proposed projects	
2	In what way they may associate with the project	They demand that local people of the area should be engaged during implementation of the same. Some people need associated infrastructure developments like toilet, drinking water facilities, drainage etc.	Local people should be deployed during construction works, improvements of basic amenities should be done
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No any, a wildlife sanctuary is situated about 12 km from the city	
4	Presence of historical/ cultural/ religious sites nearby	Shukla Baori Gate, Bada Talab Gate, Bhairo Gate, Surang Gate are historical city gates of Bundi town. A baori, A Dargah and twoTemples are situated near Shukla Baori Gate, a Hanuman temple, a big pond (Jait Sagar Lake) and tourist place (Sukh Mahal) is situated near Bada Talab Gate, Naval Sagar Lake is situated near Bhairon Gate and Surang Gate	Proposed works should not affect the structures of temple, instead some restoration works for drainage and repairing of steps should be doe on demand of local
5	Unfavourable climatic condition	May to June there is very hot season; otherwise the condition of climate is favourable	
6	Occurrence of flood	No report of Flood in the project area. Some times area near Shukla Baori and Surang Gate is inundated due to failure of drainage system during heavy rain	Proper drainage system should be developed
7	Drainage and sewerage problem facing	No sewerage system in the project area. Drainage system is also in poor condition	Drainage system and Sewerage system should be improved
8	Present drinking water problem – quantity and quality	People get water supply from PHED. Quality and quantity is good enough	Drinking water facility should be provided for visitors
9	Present solid waste collection and disposal problem	Municipality takes care of the Solid waste collection, which is manually and disposed off in disposal site.	Dust bins should be taken in to consideration in DPR
10	Availability of labour during construction time	Sufficient labour will be available in this area.	

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
11	Access road to project site	Access road is available to all the gate structures	
12	Perception on tree felling and afforestation	Tree cutting not required in this project.	
13	Dust and noise pollution and disturbances during construction work	Dust and noise problem shall arise up to some extent during execution , shopkeepers, nearby residents and tourists shall be affected	Mitigation measures for prevention of dust and noise should be taken during execution of works
14	Setting up worker camp site within the village/ project locality	Labours will come from nearby location No need for setting up labour camp	
15	Safety of residents during construction phase and plying of vehicle for construction activities	There may arise safety problem due to construction works and plying of vehicles because these roads are busy roads situated within city, thousands of people go through these gates daily	Safety of residents and visitors should be taken in to consideration
16	Requirement of enhancement of other facilities	They want the conservation of these historical structures and some other facilities like toilet, parking and drinking water etc.	Toilet, drinking water and parking should be provided

NAME AND POSITION OF PERSONS CONSULTED:

1. Abdul Sattar- resident near Shukla Baori Gate
2. Channa, Wasif Khan- Resident near Shukla Baori Gate
3. Chaman, Acchhu- Resident near Shukla Baori Gate
4. Jaichand- local visitor of Bada Talab Gate
5. Raj Mistry- Local Resident, near Bhairon Gate
6. Jawahar vir Singh- local Resident, near Bhairon Gate
7. Rajiv Shankar- Shopkeeper, near Surang Gate
8. Vasim Ahmad- local Resident near Surang Gate

C. Public Consultation near Baoris

Date and time of Consultation:- 13.09.2010, 11.00 A.M.
Location- Nagar Sagar Kund, Naruki Baori, Nahardhos ki Baori Bundi

Table: Issues of the Public Consultation- Design phase

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including coverage area	People are not much aware of the project. DSC consultant informs the people about the proposed projects	
2	In what way they may associate with the project	They demand that local people of the area should be engaged during implementation of the same. Some people need associated infrastructure developments like toilet, drinking water facilities, drainage etc.	Local people should be deployed during construction works, improvements of basic amenities should be done

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No any, a wildlife sanctuary is situated about 12 km from the town	
4	Presence of historical/ cultural/ religious sites nearby	Nagar Sagar Kund, Naruki baori and Nahardhos ki Baori are historical, cultural and religious sites. Many temples are situated near these sites	Proposed works should not affect the structures of temple
5	Unfavourable climatic condition	May to June there is very hot season; otherwise the condition of climate is favourable for work.	
6	Occurrence of flood	No report of Flood in the project area.	
7	Drainage and sewerage problem facing	No sewerage system in the project area. Drainage system is also in poor condition	Drainage system and Sewerage system should be improved
8	Present drinking water problem – quantity and quality	People get water supply from PHED. Quality and quantity is good enough	Drinking water facility should be provided for visitors
9	Present solid waste collection and disposal problem	Municipality takes care of the Solid waste collection, which is manually and disposed off in disposal site.	Dust bins should be taken in to consideration in DPR
10	Availability of labour during construction time	Sufficient labour will be available in this area.	
11	Access road to project site	Access road is available.	
12	Perception on tree felling and afforestation	Tree cutting not required in this project.	
13	Dust and noise pollution and disturbances during construction work	Dust and noise problem shall arise up to some extent during execution , shopkeepers, nearby residents and tourists shall be affected	Mitigation measures for prevention of dust and noise should be taken during execution of works
14	Setting up worker camp site within the village/ project locality	Labours will come from nearby location No need for setting up labour camp	
15	Safety of residents during construction phase and plying of vehicle for construction activities	There may arise safety problem due to construction works and plying of vehicles because these roads are busy roads situated within city	Safety of residents and visitors should be taken in to consideration
16	Requirement of enhancement of other facilities	They want the conservation of these historical structures and some other facilities like toilet, parking and drinking water etc.	Toilet, drinking water and parking should be provided

NAME AND POSITION OF PERSONS CONSULTED:

1. Rajeev Shukla- Pan Shopkeeper, near Nagar Sagar Kund
2. Shekhar- Local Resident, near Naruki Baori
3. Jyti Lal Meena- Shopkeeper, Near Naruki Baori
4. Ram Dayal- Local visitor Nagar Sagar Kund
5. Atal Bihari Shakya- Local visitor, Nahardhos Ki Baori
6. Ramjot Shashtri- Local Resident, near Nahardhos ki Baori

7. Shiv Kant- Local resident, near Nahardhos ki baori
8. Ratan Lal- Shop keeper, near Nagar Sagar Kund

D. Public Consultation at Naval Sagar Lake

Date and time of Consultation:- 13.09.2010, 12.00 A.M.
Location: Naval Sagar Lake, Bundi

Table: Issues of the Public Consultation- Design phase

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
1	Awareness of the project – including	People are not much aware of the project. DSC consultant informs the people about the proposed projects	
2	In what way they may associate with the project	Some people need associated infrastructure developments like toilet, drinking water facilities, drainage etc.	improvements of basic amenities should be done
3	Presence of any forest, wild life or any sensitive / unique environmental	No any, a wildlife sanctuary is situated about 12 km from the city, but Naval Sagar Lake itself contains variety of fishes, though fishing activity is prohibited in this lake due to religious reasons	The aquatic fauna shall be preserved during construction works
4	Presence of historical/ cultural/ religious sites	There is a temple for Varun(rain god) and the other is a Mahadeo temple in the famous lake and there are a few religious structures near the periphery of lake	Proposed works should not affect the structures of
5	Unfavourable climatic condition	May to June there is very hot season; otherwise the condition of climate is favourable for work.	
6	Occurrence of flood	No report of Flood in the project area.	
7	Drainage and sewerage problem facing	No sewerage system in the project area. Drainage system is also in poor condition	Drainage system and Sewerage system should be improved
8	Present drinking water problem – quantity and quality	People get water supply from PHED. Quality and quantity is good enough	Drinking water facility should be provided for visitors
9	Present solid waste collection and disposal	Municipality takes care of the Solid waste collection, which is manually and disposed off in disposal site.	Dust bins should be taken in to consideration in
10	Availability of labour during construction	Sufficient labour will be available in this area.	
11	Access road to project site	Access road is available.	
12	Perception on tree felling and afforestation	Tree cutting not required in this project.	

S. No.	Key Issues/Demands	Perception of community	Action to be Taken
13	Dust and noise pollution and disturbances during	Dust and noise problem shall arise up to some extent during execution , shopkeepers, nearby residents and tourists shall be affected	Mitigation measures for prevention of dust and noise should be taken during execution of works
14	Setting up worker camp site within the village/	Labours will come from nearby location, no need for setting up labour camp	
15	Safety of residents during construction	There may arise safety problem due to construction works and plying of vehicles because these roads are busy roads situated within city	Safety of residents and visitors should be taken in to consideration
16	Requirement of enhancement of other	They want the conservation of these historical structures and some other facilities like toilet, parking and drinking water etc.	Toilet, drinking water and parking should be provided

NAME AND POSITION OF PERSONS CONSULTED:

8. Seema Rani- local visitor
9. Jitendra- Local Resident, near Naval Sagar Lake
10. Chanchal Singh- Shopkeeper, Near Naval Sagar Lake
11. Dina Nath- Local visitor
12. B.P. Sharma- Local visitor
13. Lalta Prasad- Local Resident, near Naval Sagar Lake

Appendix 3

Recommended Contract Clauses

A. Sources of Materials

(i) Use quarry sites and sources permitted by government;
(ii) Verify suitability of all material sources and obtain approval of IPIU;
(iii) If additional quarries will be required after construction has started, obtain written approval from IPMU; and;
(iv) Submit to DSC on a monthly basis documentation of sources of materials.

B. Air Quality

(i) Consult with IPIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
(ii) Excavate the bridge foundations at the same time as the access roads are built so that dug material is used immediately, avoiding the need to stockpile on site;
(iii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
(iv) Measurement of air quality at heritage site as per EMP
(v) Use tarpaulins to cover sand and other loose material when transported by trucks; and
(vi) Fit all heavy equipment and machinery with air pollution control devices which are operating correctly.

C. Surface Water Quality

(i) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
(ii) Prioritize re-use of excess spoils and materials in the construction works. If spoils will be disposed, consult with IPIU/DSC on designated disposal areas;
(iii) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
(iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies;
(v) Dispose any silt, debris, and other materials collected from dewatering and cleaning activities;
(vi) Dispose any wastes generated by construction activities in designated sites; and
(vii) Dispose any spent chemicals (from the chemical washing) according to the chemical's Material Safety Data Sheet (MSDS) of the chemical;
(viii) Prevent at all times chemical contamination of surface water bodies and lakes;
(ix) Dispose any wastes generated by construction activities in designated sites
(x) Do not dispose spent of left chemical after chemical washing in any water body or drain, dispose according to Material Safety Data Sheet (MSDS) of the chemical and
(xi) Conduct surface quality inspection according to the Environmental Management Plan (EMP).

D. Noise Levels

(i) Plan activities in consultation with IPIU/DSC so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance;
(ii) Require horns not be used unless it is necessary to warn other road users or animals of the vehicle's approach;
(iii) Minimize noise from construction equipment by using vehicle silencers, fitting jackhammers with noise-reducing mufflers, and portable street barriers the sound impact to surrounding sensitive receptor; and
(iv) Maintain maximum sound levels not exceeding 80 decibels (dbA) when measured at a distance of 10 m or more from the vehicle/s.
(v) Measurement of noise level at sub-project locations as per EMP

E. Existing Infrastructure and Facilities

(i) Obtain from IPIU and/or DSC the list of affected utilities and operators;
(ii) Prepare a contingency plan to include actions to be done in case of unintentional interruption of services; and
(iii) Develop and implement an Asbestos Cement Pipes Management Plan

F. Accessibility

(i) Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites;
(ii) Schedule transport and hauling activities during non-peak hours;
(iii) Locate entry and exit points in areas where there is low potential for traffic congestion;
(iv) Keep the site free from all unnecessary obstructions;
(v) Drive vehicles in a considerate manner;
(vi) Coordinate with Bundi Traffic Office for temporary road diversions and with for provision of traffic aids if transportation activities cannot be avoided during peak hours; and
(vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers for concerns/complaints.

G. Landscape and Aesthetics

(i) Prepare and implement Waste Management Plan;
(ii) Recover used oil and lubricants and reuse or remove from the sites; (iii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
(iv) Remove all wreckage, garbage from lake, silt, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
(v) Request IPIU/DSC to report in writing that the necessary environmental restoration work has been adequately performed before acceptance of work.

H. Socio-Economic – Income

(i) Leave spaces for access between mounds of soil;
(ii) Provide walkways and metal sheets where required to maintain access across trenches for people and vehicles;
(iii) Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools;
(iv) Consult businesses and institutions regarding operating hours and factoring this in work schedules; and
(v) Provide sign boards for pedestrians to inform nature and duration of construction works and contact numbers for concerns/complaints.

I. Socio-Economic – Employment

(i) Employ at least 50% of the labour force, or to the maximum extent, local persons within the 2-km immediate area if manpower is available; and
(ii) Secure construction materials from local market.

J. Occupational Health and Safety

(i) Develop and implement site-specific Health and Safety (H and S) Plan which will include measures such as: (a) excluding public from the site; (b) ensuring all workers are provided with and use Personal Protective Equipment; (c) H and S Training for all site personnel; (d) documented procedures to be followed for all site activities; and (e) documentation of work-related accidents;
(ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;
(iii) Provide medical insurance coverage for workers;
(iv) Secure all installations from unauthorized intrusion and accident risks;
(v) Provide supplies of potable drinking water;
(vi) Provide clean eating areas where workers are not exposed to hazardous or noxious substances;

(vii) Provide H and S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers;
(viii) Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted;
(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;
(x) Ensure moving equipment is outfitted with audible back-up alarms;
(xi) Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and
(xii) Use chemical during chemical wash as directed by the manufacturer in Material Safety Data Sheet (MSDS), use appropriate personal protective equipments such as suitable hand gloves, safety goggles, apron etc,
(xiii) Only trained and experienced worker should be deployed for chemical washing
(xiv) Disallow worker exposure to noise level greater than 85 dBA for a duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
(xv) Use proper stairs, staging, platforms, barricades and Personal Protective Equipments (PPEs) such as safety belt, while working at height more that 1.5 meters.

K. Asbestos Cement Pipes

(i) Train all personnel (including manual labourers) to enable them to understand the dangers of AC pipes and to be able to recognise them in situ;
(ii) Report to management immediately if AC pipes are encountered;
(iii) Develop and apply AC Management Plan.

L. Community Health and Safety.

(i) Plan routes to avoid times of peak-pedestrian activities.
(ii) Liaise with IPIU/DSC in identifying high-risk areas on route cards/maps.
(iii) Maintain regularly the vehicles and use of manufacturer-approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure.
(iv) Provide road signs and flag persons to warn of dangerous conditions.

M. Work Camps

(i) Consult with IPIU/DSC before locating project offices, sheds, and construction plants;
(ii) Minimize removal of vegetation and disallow cutting of trees;
(iii) Provide water and sanitation facilities for employees;
(iv) Prohibit employees from poaching wildlife and cutting of trees for firewood;
(v) Train employees in the storage and handling of materials which can potentially cause soil contamination;
(vi) Recover used oil and lubricants and reuse or remove from the site;
(vii) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
(viii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
(ix) Request IPIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

N. Social and Cultural Resources

(i) Strictly follow the protocol for chance finds in any excavation work;
(ii) Request IPIU/DSC or any authorized person with archaeological field training to observe excavation;
(iii) Stop work immediately to allow further investigation if any finds are suspected; and

(iv) Inform IPIU/DSC if a find is suspected, and take any action they require ensuring its removal or protection in situ.