

Initial Environmental Examination

Document Stage: IEE
Project Number: 40031
ADB Loan No.: 2506
Month Year: JULY 2012

India: Rajasthan Urban Sector Development
Investment Program—Bundi Roads Improvement
Subproject (Tr-02)

Prepared by Local Self Government Department

For the Government of Rajasthan
Rajasthan Urban Infrastructure Development Project

The initial environmental examination is a document of the borrower. The views expressed herein do not necessarily represent those of ADB's Board of Directors, Management, or staff, and may be preliminary in nature.

ABBREVIATIONS

ADB	—	Asian Development Bank
BOQ	—	bill of quantity
BMB	----	Bundi Municipal Board
CBO	—	community-based organization
CFE	—	Consent for Establishment
CFO	—	Consent for Operation
CGWB	—	Central Ground Water Board
CLC	—	City Level Committees
CLIP	—	City Level Investment Plan
CWR	—	clear water reservoirs
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
GLR	—	ground level reservoir
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
ITI	—	industrial training institutes
JNNURM	—	Jawaharlal Nehru National Urban Renewal Mission
LSGD	—	Local Self Government Department
MFF	—	multitranches financing facility
MLD	—	million liters per day
MOEF	—	National Ministry of Environment and Forests
NAAQS	—	National Ambient Air Quality Standards
NGO	—	nongovernmental organization
NRFP	—	National Resettlement and Rehabilitation Policy
NRW	—	non-revenue water
O and M	—	operation and maintenance
OHSA	—	Occupational Health and Safety Administration
OHSR	—	overhead storage reservoirs
OMC	—	Operations and Maintenance Contractors
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
$\mu\text{g}/\text{m}^3$	—	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

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
I. INTRODUCTION	1
A. Purpose of the Report	1
B. Extent of the Initial Environmental Examination	1
II. DESCRIPTION OF THE PROJECT	4
A. Type, Category and Need.....	4
B. Location and Implementation Schedule	5
C. Description of the Subproject	5
III. DESCRIPTION OF THE ENVIRONMENT	8
A. Physical Resources	8
B. Ecological Resources	11
C. Economic Development.....	11
D. Social and Cultural Resources.....	12
IV. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION.....	13
A. Pre-Construction- Location & Design	14
B. Construction.....	15
C. Operation and Maintenance	21
V. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE.....	23
A. Project stakeholders	23
B. Consultations and Disclosures to date.....	23
C. Future Consultation and Disclosure	24
VI. GRIEVANCE REDRESS MECHANISM	25
VII. ENVIRONMENTAL MANAGEMENT PLAN.....	26
A. Institutional Arrangements.....	26

B.	Environmental Mitigation Plan	29
C.	Environmental Monitoring Program	29
D.	Environmental Management Plan Costs.....	48
VIII.	FINDINGS AND RECOMMENDATIONS.....	48
IX.	CONCLUSIONS	49

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 Phase II 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 Program 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 Environmental Policy 2002. 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 Roads improvement Subproject as part of RUIDP Phase II – Tranche 2 (additional). The subproject site is located in Bundi town, the administrative center of Bundi District. The subproject covers widening and strengthening of 13 existing roads in Bundi town.
3. The subproject is needed to improve the roads network system particularly widening and strengthening of roads of Bundi Town.
4. Detailed design began in the year 2009 and completed in middle of 2010. Construction of all elements will begin in the year 2012, and work will be completed by 2013.
5. The subproject sites are existing 13 roads within the Bundi town. It is not prone to water-logging, salinisation, and flash flood. There are also no protected areas, wetlands, mangroves, or estuaries within the sub project sites. Trees, vegetation (mostly shrubs and grasses), and animals in the subproject site are those commonly found in built-up areas.
6. 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 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.
7. During the construction phase, impacts mainly arise from the need to excavate large areas which can result to increase in dust and noise levels, disturbance to residents and businesses along the delivery routes, and traffic. These are common impacts of construction in built-up areas, and there are well developed methods for their mitigation.
8. One field in which impacts are low of interest in the subproject is archaeology because, a series of specific measures have been developed to avoid damaging important remains during construction.

9. 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

10. There were limited opportunities to provide environmental enhancements, but certain measures were included. For example the sub 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.

11. Once the system is operating the environmental condition of the town will be improved due to improved road surface and width resulting lesser pollution from the vehicles.

12. Also, the work will be conducted in areas that have already been exploited for existing roads within Right of Way (ROW), so there will be not much need to protect archaeological materials.

13. 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. Any requirements for remedial action will be reported to the IPMU.

14. The main impacts of the operating the improved road network and other subproject components will be beneficial to the citizens of Bundi town because they will be provided with safe and comfortable city roads.

15. 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.

16. 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 Environment Policy (2002) or Gol EIA Notification (2006).

I. INTRODUCTION

A. Purpose of the Report

1. The 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. This will be achieved through investments in urban infrastructure (water supply; sewerage and sanitation; Roads improvement; 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 (the Government) through the Jawaharlal Nehru National Urban Renewal Mission (JNNURM) and Urban Infrastructure Development Scheme for Small and Medium Towns (UIDSSMT).

2. RUIDP Phase II is implemented over a seven year period beginning in 2008, and funded by a loan via a Multitranchise Financing Facility (MFF) of 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 Program Management Unit (IPMU) of the Rajasthan Urban Infrastructure Development Project (RUIDP).

3. This Initial Environmental Examination (IEE) has been prepared for the Bundi Roads improvement subproject as part of RUIDP Phase II. The subproject covers widening and strengthening of 13 existing roads of Bundi town.

4. This IEE 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 IEE 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 Initial Environmental Examination

5. This IEE 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 as per ADB's Environment Policy (2002) and Government of India (the Government) Environmental Impact Assessment (EIA) Notification of 2006.

1. ADB Policy

6. 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 Environment Policy 2002. 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 impacts 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.** As per ADB's Environment Policy 2002, environmental assessment reports for ADB projects are intended to be accessible to interested parties and the general public. The summary IEE/EIA reports are required to be circulated worldwide, through the depository library system and are placed on the ADB website. The summary EIA (in case of category A project) or summary IEE (in case of category B project) reports are made available to the general public at least 120 days before Board consideration of the loan, or in relevant cases, before approval of significant changes in project scope. Full EIA or IEE reports are also made available to interested parties upon request. The LSGD will provide relevant information on the project's environmental issue in a form and language accessible to those being consulted.

2. National Law

10. The Government's 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 categorized as A or B depending on the scale of the project and the nature of its impacts.

11. Categories A projects require EC 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 categorizes 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 EC 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. The summary of environmental regulations and mandatory requirements for the proposed subproject is shown in **Table 1.1**.

13. The only type of infrastructure provided by the RUSDIP that is specified in the EIA Notification is solid waste management, where EC is required for all Common¹ Municipal Solid Waste Management Facilities (CMSWMF) (facilities that are shared by more than one town). For widening of existing road within town limit no Environmental Clearance is required.

Table 1.1: Applicable Environmental Regulations & Legislations and its applicability

Acts/Guidelines	Purpose	Applicability to subproject
The EIA notification, 2006 (and its subsequent amendments in 2009) provides for categorization of projects into category A and B, based on extent of impact	This states that Environmental Clearance (EC) 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 categorized as A or B depending on the scale of the project and the nature of its impacts. Categories A projects require Environmental Clearance from the National Ministry of Environment and Forests (MoEF). Category B projects require environmental clearance from the State Environment Impact Assessment Authority (SEIAA).	Not applicable The sub project is not included in schedule of environmental impact assessment notification 2006 and its subsequent amendments till dates so it is not categories as either Category A or Category B. As a result, environmental clearance is not required, either from the state or the central Government.
The Wildlife Conservation Act, 1972,	Clearance from state and national wildlife boards, Central Empowered Committee of Hon'ble Supreme Court of India and the State Wildlife Department, as applicable.	Not Applicable
Rajasthan Forest (Conservation) Act, 1953	Clearance from Forest department for cutting of trees, if any. Clearance from ULB for cutting of road side trees	Applicable for road side tree cut only
The Ancient Monuments and Archaeological Sites and Remains Act, 1958,	Permission from the Archaeological Survey of India for carrying out any construction activities within the prohibited and regulated	Not Applicable

¹ For the purpose of EIA Notification, common municipal solid waste management facilities may be referred as centralized MSW facility for an given town, city, region. It is further to mention a common facility need not have surrounding ULBs included.(Technical EIA Guidance Manual for CMSWMF)

Acts/Guidelines	Purpose	Applicability to subproject
and the rules, 1959 provide guidance for carrying out activities, including conservation, construction and reuse in and around the protected monuments.	areas of the ancient monuments and archaeologically protected sites.	
Water (Prevention and control of pollution) Act, 1974, as amended Air (prevention and control of pollution) Act, 1981, as amended	Consent to Establish (CTE) and Consent to Operate (CTO) from the RSPCB for setting up hot mix plants, wet mix plants, stone crushers and diesel generators (if installed for construction). To be obtained by the Contractor, prior to construction.	Applicable
Water (Prevention and Control of Pollution) Cess Act, 1977 including Rules	Applicable to all activities, which discharge effluents as a result of process or operations	Not Applicable
Public Liability and Insurance Act 1991	Protection form hazardous materials and accidents.	Applicable
Noise Pollution (Regulation and Control Act), 2000	The standards for noise for day and night have been promulgated by the MoEF for various land uses. DG sets at construction sites should be provided with acoustics enclosures.	Applicable
Central Motor Vehicle Act 1988 and Central Motor Vehicle Rules 1989	To check vehicular air and noise pollution. All vehicles in Use shall obtain Pollution Under Control (PUC) certificates by the contractor	Applicable
Child Labour Act 1986	No child shall be employed or permitted to work in any of the scheduled occupations	Applicable
Ground Water (Regulation, Development and Management) Rules, 2007	For development and withdrawal of ground water	Applicable in case of non availability of ground water

II. DESCRIPTION OF THE PROJECT

A. Type, Category and Need

14. **Type.** This is a Roads improvement subproject intended to improve the current situation in Bundi in terms of providing a safe and comfortable city road network.

15. **Category.** Environmental examination indicates the proposed subproject falls within ADB's environmental Category B² 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.

² This category includes projects judged likely to have some adverse environmental impacts, but of less significance than Category A projects. Accordingly, there is a need for an ADB IEE during project preparation to determine whether any impacts are likely to be sufficiently significant to warrant further studies or an ADB EIA.

16. **Need.** The subproject is needed because the present road network of Bundi town is insufficient to cope with the growing needs of safe and pollution free road network with the ease of growing population and increasing number of vehicles. Present roads are having insufficient width and are in damaged and poor conditions. As per requirement widening and strengthening of this 20.35 km length of the town road is, therefore, absolutely necessary to ease traffic situation within the city, to provide relief and time savings to through traffic, and to reduce accidents, congestion and operating expenses of the vehicles. This will also improve the environment of Bundi town.

B. Location and Implementation Schedule

17. **Location.** The subproject sites are existing 13 different roads located in Bundi town, the headquarters town of Bundi district, whose length varies from 500m to 1.5 km. Total length of all the roads is around 14.68 km. The details of roads are as below-

1. Ranjeet Cinema Tiraha to Mahaveer circle via Lic Office.
2. Rotary Circle (N.H.12) to Bihari Circle to Rani ji ki Bawari to Patrol Pump by pass.
3. Road Circuit to Dwarika hotel to Ambedkar Circle to andi Tiraha (NH.12)
4. NH-12 to Khoja gate to Azad park via Chatrapura Village .
5. Unala ki Dungri Road.
6. Ambedkar Circle to N.H.12 via Silor Road.
7. Govt. Collage Choraha to S.P. Office.
8. S.P. Office Tiraha to Murti Nandan Colony via Dayanand Colony.
9. S.P. Tiraha to New Tehsil Bundi.
10. Puliya Nainwa road to Jawahar Colony Tiraha via P.H.E.D. Office.
11. Gate No. 1 to Gate No. 6 back line along Community center Bundi
12. Link Road to Nainwa Road to Inderprasta Colony.
13. Road Near Girls sr. Secondary school Vikas Nagar Bundi.

18. **Implementation Schedule.** Detailed design began in the year 2010 and completed in middle of 2010. Construction of all elements will begin in the year 2012, and work will be completed in 2013. Design period for this sub project is 15 years and ultimate year for optimum utility of the project is 2041

C. Description of the Subproject

1. Existing Roads condition

19. The section of road of Bundi city passes from various busy commercial/populated area of city. At present the existing carriageway varies from 3.5 to 9.0 m for most of the stretch. Due to inadequate carriageway width, the road becomes congested resulting into low speeds and to possibility of accidents, whereby the traffic passing through this stretch suffers the most. There are number of schools, commercial buildings and hospital on the road which gets disturbed due to traffic congestion and horn blowing. For sections of the package road, no change in the existing gradients is proposed as the same are satisfactorily within the IRC Standards throughout. Widening, however, has been proposed according to present requirement of 4-laning (divided), 3 Lane and 2 lanes.

2. Subproject Components

20. Descriptions of proposed works, in existing 13 roads taken in the subproject are as follows-

Road No 1 is divided in three parts. First from Ranjeet Cinema to LIC office tiraha, this stretch is found very important seeing its intensity of vehicular and pedestrian traffic. This part is suggested to widen up to 10 m with provision of Interlocking tiles and footpath.

Road No 2, Rotary circle (NH-12) to Bihari Circle to Rani ji ki Bawari to Patrol Pump by-pass, being the important section of the town, road caters for all type of traffic light, medium and heavy vehicles including buses and trucks. Average width of existing road has been found only 5.9 m which is insufficient to cater growing pace of traffic. Therefore, it is necessary to upgrade this package road section for traffic worthiness, in conformity with the other Roads.

Road No 3, Dwarika hotel to Ambedkar Circle to Mandi Tiraha (NH.12) is also important stretch.

Road No.4 from NH-12 to Khoja gate to Azad park via Chatrapura Village. Dwarika Hotel to Chattarpura village is completely damaged, and further up to NH 12 it is gravel road. New Cement concrete road of 7.0m width for complete length is planned.

Road No.5, Unala ki Dungri road is colony road.

Road No.6 from Ambedkar circle to N.H 12 via Silor road is found in good condition, but requirement of widening has been found for 100 m length near Ambedkar circle and further up to NH-12. From ch 0 to ch160 it is widened to 10.5 m with 2.25 m interlocking tiles on both side of road. Next section from Ch160 to Ch 1300 is also widened to 10.5 m but with flexible pavement.

Road No. 7, 8 and 9, road condition is good but due to narrow width widening is required.

Road No.10 is state highway and seeing its importance this stretch is widened to 10.5 m with existing CC pavement. Interlocking tiles of 2.25 and footpath of 2m is also provided on both side of road.

Road No 11,12 and 13 are colony roads. They are planned according to availability of space. These entire roads are widened to 5m with cement concrete pavement.

3. Traffic Projections

21 Growth of Traffic for a town is altogether different from growth for a highway. For a city/town it depends on population of the town and density in particular area. Other factors which affect the traffic intensity of the road is its location on map of that city. Growth of town affects traffic growth. Therefore, keeping in view the future expansion of town, and in accordance with IRC: 37 - 2001, a growth factor of 7.5% per annum has been used to predict the future traffic.

22 Projected traffic for the horizon year 2016 (1.5Years Construction Period & 5 Years Design Life) on different location of project city roads works out as under:

Near Devpura village:	13814 pcu/day
Temple Nainway road:	29447 pcu/day
Rani ji ki Bavri:	27677 pcu/day
Lanka gate:	20803 pcu/day

23 Projected Peak Hour traffic for the horizon year 2016 (1.5Years Construction Period & 5 Years Design Life) on different location of project city roads works out as under:

Near Devpura village:	1018 pcu / Hour
Temple Nainway road:	2274 pcu / Hour
Rani ji ki Bavri:	2085 pcu / Hour
Lanka gate:	1703 pcu / Hour

4. Geometric Design Standards

24 For the proposed configuration, the geometric standards have been followed as per IRC-38. The proposed typical cross – sections of road have been designed to conform to IRC: 86 – 1983 and in consultation with PIU. The existing / proposed gradients are within the limits as per IRC: 86 – 1983, and MOST / IRC Pocket Book for Highway Engineers.

Terrain & Land width

25 Though the Bundi town is all-around covered by hills but it itself is located on a plain region. As per table 3.2 of the MORTH /IRC Pocket Book for Highway Engineers -2002, the package terrain is classified as plain (cross-slope 0-10).

26 Section of the stretches meeting National highway is hilly, having average gradient 1 in 70 for grain Mandi road and gradient of 1 in 25 for road beyond Mahaveer circle.

27 Being a city road most of the area around is populated with markets, residential, hospitals, schools, offices etc. For most of length of project road there is enough ROW.

(a) Carriageway

The carriageway width for all the roads is taken as under

Road No	Chainage From	Chainage to	Proposed Carriageway	Proposed Interlocking Tiles
Road No-1	0/000	220/000	Widened to 10.0m	1.5m both side
Road No.1	220/000			2m both side
Road No.2	0/000	2/500	10.5 m	
	2/500	3/000	2 x 7.0 m	
	3/000	4/650	10.5 m	
Road No.3	0/000	1/700	7.0 m	1.5 m both side
Road No-4	0/000	2/500	7.0 Mtr	
Road No-5	0/000	710/000	5.5 Mtr	
Road No-6	0/000	1/300	Widened to 10.5 Mtr	2m both side for ch 0 to ch 160
Road No-7	0/000	415/000	7 m	
Road No-8	0/000	1000/000	7m	
Road No-9	0/000	588/000	7m	
Road No-10	0/000	544/000	10.5 m	2.5m both side
Road No-11	0/000	778/000	5.5 m	
Road No-12	0/000	156/000	3.5 m	
Road No-13	0/000	248/000	3.5 m	

(b) Shoulder width

A width of 1.5 m to 2.5 for hard shoulders of 200 mm thick interlocking tiles, on both side, has been proposed for Road No..1, 3, 6 and 11 of the project road.

(c) Camber

The proposed camber for road carriageway has been taken as 2.5%, 3% for the hard shoulders and 5 % for berms (unpaved if provide). In the curved portions, however the slope of shoulder has been kept in line with the super elevation and berms kept flat taking advantage of the slopes.

(d) Horizontal Alignment

No change in the alignment of the existing road is proposed, except where curves are required to be improved.

The horizontal curves of road alignment (arterial road / IRC : 86-1983) have been designed for speed 80 kmph and minimum speed of 65 kmph, and 80 kmph elsewhere, as per IRC: 38 – 1988 / Appendix 3. Design data have been indicated in the drawings. Maximum super elevation has been limited to 4 % being in urban area.

(e) Vertical Alignment

For the vertical curves on the bypass road alignment, the design speed shall be 80 kmph, in keeping with the IRC Standards. No change is proposed in the profile of the existing road.

(f) Road Lighting, Traffic Lights and Relocation of HT/ LT and Telephone lines

Central median lighting or traffic lights have been proposed in this package as per decision already taken by the authorities. Existing HT/ LT lines have been proposed to be relocated to suit the requirements of the proposed future widening.

(g) Confirmation of Curve Data

Curve data and proposed center line levels indicated in the layout plan and L-section are based on the topographic survey / levels taken along the existing alignment and adopted for design / guidance and estimation purposes only. The same shall be got confirmed by the construction team by freshly reporting the details based on fresh survey to be undertaken by them for construction purposes, @ 15 m intervals for straight alignment, @ 10m intervals for horizontal curve alignment without vertical curve and @ 5m intervals for vertical curve alignments / combined horizontal and vertical curve alignment.

(h) Design of Side Drain

Precast cement concrete box culvert drain of size 0.60 M X 0.60 M is proposed for Ambedkar circle and Rani ji ki Bavri to Petrol Pump. Similar type of drain of size 1.0 M X 1.0 M is considered for 100 M length for road from Ambedkar circle to Silor road, and 100m length for Khoja gate, on both side of road.

III. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

1. Administrative Boundaries

28. 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

29. **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.

30 **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.

31 **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 proposed road sites are located in an area with low damage risk zone, water (gully/sheet) erosion and not prone to flash floods.

3. Geology, Geomorphology, and Soils

32 **Geology.** The various rocks type exposed in the area belong to Bhilwara and Deccan 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.

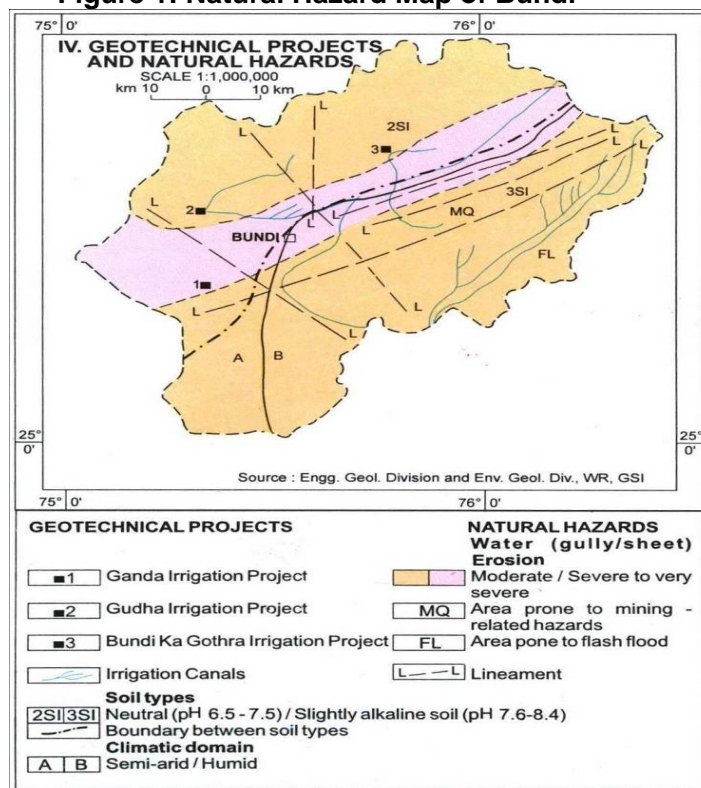
33 **Geomorphology.** The district is classified into structural plain, pediment, alluvial plain, and badland (ravines). The ground water potential range from 5 to 10 liters per second (lps). Mineral Resources. Sizeable reserves of good quality clay, marble, limestone, zinc, lead, copper, iron, rock phosphates, and building stones are found in the district. The subproject site do not have mineral resources.

34 **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

35. 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.

Figure 1: Natural Hazard Map of Bundi



5. Air & Noise Quality

36. Ambient Air and Noise Quality Monitoring was done in November 2011 in Bundi town, as shown below in **Table 3.1**. Two monitoring locations are selected for covering all the project roads located within 0-2 km. Traffic is the only significant pollutant in Bundi. Levels of oxides of sulphur and nitrogen are within the National Ambient Air Quality Standards (NAAQS). Location of sampling sites is shown in Appendix 5.

Table 3.1: Ambient Air & Noise Quality

SL. NO.	Monitoring Location	Air Monitoring (Average value in $\mu\text{g}/\text{m}^3$)					Noise Monitoring dB(A)	
		PM _{2.5}	RPM or PM ₁₀	SO ₂	NO ₂	CO	L _{Day}	L _{Night}
1	Police Control Room, Near Raniji Ki Baori	34.84	49.88	9.0	15.41	161	53.8	40.4
2	Near Circuit House	26.22	40.76	7.96	12.91	156	54.9	43
Permissible limits as per CPCB Notification, New Delhi, 18 th November, 2009		60	100	80	80	4 mg/m ³	55	45

6. Surface Water

37. There is no surface water body exist within the impact zone of proposed sub-project. 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

38 The Central Ground Water Board monitors several national hydrographic monitoring stations in and around Bundi. Records of monitoring conducted in recent years (2009-2010) shows ground water table ranged between 5 to 20 meters below ground level.

39 Records of groundwater quality monitoring in recent years (2009-2010) from Central Ground Water Board 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 Salinity ($EC < 3000 \mu S/cm$ at $25^{\circ}C$) and Fluoride ($< 1.5 mg/l$).

B. Ecological Resources

40 Bundi town has been converted for agricultural use and there are no remaining natural habitats in the area. There are no protected areas nearby the subproject locations. **Appendix 4** shows the No objection certificate (NOC) from Forest Department which indicates that no roads located within forest land.

41. **Flora.** Flora is limited to planted trees and shrubs, and the fauna comprises domesticated animals (cows, goats, pigs and chickens), plus other species able to live close to man (urban birds, rodents and some insects). Vegetation in and around the alignment of the roads are sparse.

42 **Fauna.** No classified, endangered or extinct species is found in Bundi town. Animals were not noted in and around project locations.

C Economic Development

43 The participation ratio of workers is 27.1%. 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

44 Bundi town encompasses 20.23 km² 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. All the proposed road areas classified as residential- commercial mixed areas.

2. Commerce, Industry and Agriculture

45 **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.

46 **Industries.** There are many small- to large-scale industries located in and around Bundi town. These are mainly located in the industrial areas of Bswari-Govindpur, Bundi By-pass, Bundi-Nainwa Road, Bundi Bundi, and Indergarh and 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.

47 **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

48 **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.

49 **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.

50 **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).

51 **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.

52 **Transportation.** Bundi is well-connected to all the cities within Rajasthan from Railway and Road networks. Bundi Railway Station lies in between the Kota-Udaipur route and Bundi district lies on NH-12.

D. Social and Cultural Resources

53. **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 km².

54. **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).

55 There is one general hospital, one tuberculosis hospital, and one primary health center in Bundi town. List of health and educational facilities and other sensitive receptors near the proposed roads are given in **Appendix 6** attached with this report.

56 **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).

57 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.

58 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.

59 The subproject sites are not located in or near any historically-, culturally-, archaeologically- or architecturally-significant or tourist area except one historical monument Raniji Ki Baori near proposed road no. 2, which is protected by Department of Archaeology and Museums, Govt. of Rajasthan. The walls and structures of this historical monument is not being affected by this project as the existing road width shall be maintained up to the length of boundary wall of the Raniji Ki Baori. List of cultural, historical and religious places near the proposed roads are attached as **Appendix 6** with this report.

IV. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION

60 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's Environment Policy 2002, 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 sites for construction of roads and approach roads (ii) main routes/intersections which will be traversed by construction vehicles; and (ii) 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 improvement.

61 The ADB Rapid Environmental Assessment Checklist for Roads and Highways 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.

62 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 Bundi, will not cause direct impact on biodiversity values. The subproject will be in properties held by the local self 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 & Design

63 **Environmentally-sensitive areas.** Location impacts are not significant as there are no environmentally sensitive areas within the subproject. A few trees may be affected or to be cut and vegetation (mostly shrubs and grasses) will be cleared in this road subproject. Prior to construction, the Design and Supervision Consultants (DSC) in close coordination with the Bundi Investment Project Implementation Unit (IPIU) will (i) make inventory of the trees to be cut; (ii) obtain tree-cutting permit from BMB and/or District Collector; and (iii) include in the BID documents provisions on re plantation of 3 trees for every one tree cut during construction.

64 **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.

65 **Existing Roads.** Area of land required for widening is included in the plan drawings. Affected communities will be consulted prior to finalizing any subproject lay-out and design and they will be informed well in advance before the start of the work about nature of disturbance and duration of impact.

66 **Social and Cultural Resources.** Bundi is an area of rich and varied cultural heritage which includes a fort, many baories, lakes 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 subproject, excavation will occur in and around existing road ROWs, so it could be that there is a low risk of such impacts. Nevertheless, 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.

67 **Site selection of construction work camps, hot mix plant, stockpile areas, storage areas, and disposal areas.** Priority is to locate these near the project 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 sanctuaries, tiger reserves, wetlands, swamps, or in areas which will inconvenience the community. All locations would be included in the design specifications and on plan drawings.

68 **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 be located away from population centres, 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 Urban Local Body. 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 out areas of No Significant Impacts

69 From the descriptions given in Section II.C, it is clear that implementation of the subproject should not have major negative impacts because it will affect only one site, at which all construction will be conducted within a relatively small area.

70 Because of this there are several aspects of the environment that 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 4.1**, with an explanation of the reasoning in each case

Table 4.1: 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.
Protected Areas	No any protected areas near the sub project site
Flora and Fauna	No rare or endangered species found near the sub project site.
Economic Development	Activities are not large enough to permanently affect this feature.
Land Use	No change in land use.
Commerce, Industry, and Agriculture	Activities are not large enough to affect these features, only some short term effect on trade and commerce, which is analysed in Resettlement plan
Population	Activities are not large enough to affect this feature.
Historical, Archaeological, Paleontological, or Architectural sites	No scheduled or unscheduled historical, archaeological, paleontological, or architectural sites within the subproject site, except Rani Ji Ki Baori, historic site which falls near project road no. 2, outside the impact zone

71 These environmental factors have thus been screened out presently but will be assessed again before implementation and during construction and be revised if found necessary.

2. Construction method

72 As explained above, this subproject will involve widening and strengthening of 13 different existing roads of Bundi city.

73 Road construction is generally started with Clearing and Grubbing of the area of construction. Thereafter Survey work will be carried out including fixing of TBM. After survey earthwork will be done including items like excavation, cutting, loosening & re-compacting, filling wide embankment /sub grade. Then Sub base will be prepared i.e. Granular sub base / Drainage layer. Thereafter Base course will be prepared i.e. Wet Mix Macadam /Water Bound Macadam. Dense Bituminous Macadam and finally wearing course will be laid. Then finally road marking, road signage, road furniture is fixed. The salient details of works to be undertaken in the subproject are given in section II B&C.

74 The operation will be conducted by a team of around one hundred men, roughly 50% unskilled labour and 50% with various skills including truck drivers, vehicle and machine operatives, surveyors, foremen and supervisors, etc. The operation should be completed in around 18 months.

3. Anticipated Environmental Impacts and Mitigation Measures

75 Although all work will be conducted at a single, relatively small site, construction will involve a great deal of excavation and earth moving over a period of approximately 15-30 days for each road. However these physical environmental impacts are generic construction-related impacts associated with (i) road construction and (ii) removal and relocation of utility lines. These impacts are not expected to be significant and permanent, and can be managed through adoption of good engineering practices and undertaking specific mitigation measures.

76 **Sources of Materials.** Significant amount of gravel, sand, and cement will be 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 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

77 **Air Quality.** Emissions from construction vehicles, equipment, and machinery used for excavation and road construction will induce impacts on the air quality in the construction sites as well on the road users (pedestrians and vehicles). Anticipated impacts include dusts and increase in concentration of vehicle-related pollutants such as carbon monoxide, sulphur 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;
- (i) Excavate the road 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;

- (ii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
- (iii) 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.

78 **Surface Water Quality.** Construction activities may result mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from fuels and lubricants during construction works, which may contaminate downstream surface water quality, *nallahs*, ponds and lakes of the town. These potential impacts are temporary and short-term duration only and to ensure these are mitigated, construction contractor will be required to:

- (ii) Avoid stockpiling of earth fill especially during the monsoon season unless covered by tarpaulins or plastic sheets;
- (iii) Prioritize re-use of excess soils and materials in the construction works. If soils will be disposed, consult with IPIU/DSC on designated disposal areas;
- (iv) Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies;
- (v) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; and
- (vi) Dispose any wastes generated by construction activities in designated sites

79 **Noise Levels.** There are no adjacent settlements, health facilities, paleontological, or architectural sites near the construction sites. The sensitive receptors are the road users and general public and visitors of Bundi heritage sites. 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.

80 **Existing Infrastructure and Facilities.** Telephone lines, electric poles and wires, water and sewer lines within the existing road ROW will be removed/shifted thus there is anticipated disruption of service during construction. Excavation could however damage existing infrastructure located alongside roads, in particular water supply pipes and sewer lines. It will be particularly 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 Asbestos Cement Pipes Management Plan

81 **Flora and Fauna.** There are no protected areas in or within the subproject sites. Few trees and shrubs are the vegetation noted in the area, which may be affected due to construction activities. Land-clearing activities and presence of workers in the sites can damage or cause loss of existing flora. Potential impacts are negative but reversible by mitigation measures. The construction contractors will be required to:

- (i) Minimize removal of vegetation and disallow cutting of trees if not required for the construction activities;
- (ii) If tree removal will be required, obtain tree-cutting permit from the Municipal Board or District Collector;
- (iii) Earth-ball trees and transplant to IPIU-approved areas;
- (iv) Require to plant three native trees for every one that is removed; and
- (v) Prohibit employees from cutting of trees for firewood.

82 **Landscape and Aesthetics.** The construction activities will produce solid wastes as well as excess construction materials. Such waste could include removed concrete, wood, trees and plants, packaging material, empty containers, spoiled soil, sludge, oils, lubricants, paints, chemicals, worn-out spares, remnants of construction materials, 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) 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, 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.

83 **Transportation – 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 Traffic Department for temporary road diversions and 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.

84 **Socio-Economic.** Manpower will be required during the whole period of 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:

- (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) Procure construction materials from local market.

85 **Occupational Health and Safety.** Workers need to be mindful of the occupational hazards which can arise from working in infrastructures like roads and roads. 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&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&S Training³ 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&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) Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection

³ 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.

shall be enforced actively.

86. Community Health and Safety. Hazards posed to the public; specifically in high-pedestrian areas (such as the busy road) 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.

87 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) Train employees in the storage and handling of materials which can potentially cause soil contamination;
- (v) Recover used oil and lubricants and reuse or remove from the site;
- (vi) Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
- (vii) Remove all wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and
- (viii) Request IPIU/DSC to report in writing that the camp has been vacated and restored to pre-project conditions before acceptance of work.

88 Social and Cultural Resources. For this subproject, excavation for road base will occur in and around existing road ROWs, so it could be that there is a low risk of such impacts. Nevertheless, the construction contractor will be required to:

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

89 Most of the subproject roads are having inhabitations, markets, religious places and public utilities, so action should be taken to minimise disturbance as far as possible. This will require:

- Consultation with the local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed;

- Involving the community in planning the work programme so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times;
- Avoiding conducting noise-generating activities at night;
- Implementing the measures described in EMP to reduce dust and noise;
- Utilising modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensuring that these are maintained to manufacturers' specifications at all times.

90 There is invariably a safety risk when substantial construction such as this is conducted in an urban area, and precautions will thus be needed to ensure the safety of both workers and citizens. The Contractor will be required to produce and implement a site Health and Safety Plan, and this should include such measures as:

- Excluding the public from the site;
- Ensuring that all workers are provided with and use appropriate Personal Protective Equipment;
- Health and Safety Training for all site personnel;
- Documented procedures to be followed for all site activities;
- Accident reports and records; Etc.

C. Operation and Maintenance

91 O&M of the roads will be the responsibility of the Road Department of BMB. The roads have a design life of 15 years, during which it shall require periodical repairs or refurbishments. The stability and integrity of the roads will be monitored periodically to detect any problems and allow remedial action if required. Routine maintenance will include:

- Small scale *ad hoc* repairs of surface damage caused by traffic use or accidents;
- Repairs and replacement of damaged safety barriers and signs; and
- Regular unblocking of drains to prevent damage from flooding in the monsoon.

1. Screening out areas of no significant impact

92 Because roads generally operate with the need for regular repair and maintenance (see below), there are several environmental factors that should be unaffected once the constructed roads begin to function. These are identified in **Table 4.2** 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 4.2: Fields in which operation and maintenance of the completed road improvement 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.
Geohydrology and Groundwater	Activities will not be large enough to affect these features
Protected Areas	Subproject sites are not located near protected areas
Flora and Fauna	No rare or endangered species.
Land Use	No change in land use.

Commerce, Industry, and Agriculture	Activities are not large enough to affect these features
Population	Activities are not large enough to affect this feature.
Paleontological, or Architectural sites	No paleontological or architectural sites near the subproject sites

2. Anticipated Impacts and Mitigation Measures

93 **Air Quality.** Once the roads are completed and operating it will improve the physical environment by removing the current severe traffic congestion in the areas. This will indirectly result to less air pollution in the area. The potential impact is positive and long-term.

94. **Noise Level.** As expected of any road/bridge infrastructures, noise levels tend to increase with vehicular traffic. To mitigate this impact, BMB will put signages and implement “no blowing of horns” zones where there are sensitive receptors (such as the Hospitals, schools).

95. **Accessibility.** Portions of the roads may be affected during routine repairs. However, the works will be very small in scale, and will be conducted manually by small teams of men with simple equipment (shovels, wheelbarrows, tarmac blender, etc.). Even if larger vehicles will be used to refurbish larger portions of the roadways, the work will be very short in duration. The potential impacts are negative although will not cause significant physical impacts. To maintain the safety of workers and road-users, BMB will coordinate with the Traffic Police Department so that warning signs and traffic diversions can be set up when necessary.

96. **Ecological Resources.** As there are no significant ecological resources in or around the town, the operation of the roads and the routine maintenance and repair of the road and surroundings will have no ecological impacts. In fact by planting trees near the roads, there would be some small ecological gain and improvement of aesthetic environment.

97. **Economic Development.** The roads will improve the infrastructure of the town by providing a more efficient and effective transportation route, and this should have positive impacts on the overall economy by reducing time spent idle in stationary traffic by delivery vehicles, employees and customers. It may also make further positive contributions to the development of particular sectors, for example by making the area more attractive to tourists and allowing the more efficient transportation of agricultural produce and other goods to and from the town.

98 **Social and Cultural Resources.** Effects of the operating roads on social and cultural resources in the town will be relatively small in scale and intangible in nature, and are thus difficult to assess and quantify.

99 The citizens of the town will benefit from a more effective transportation route as they will spend less time in stationary traffic exposed to noise, pollution and the associated physical and psychological stresses. Since people commuting on these roads will save time, they will socially much better off than before. People may also benefit from an improvement in the economy of the town, although it would require much larger improvements in transportation and other infrastructure for this to be recordable.

100 Repairing work of the road will not be physically invasive to historical, social and cultural resources as widening shall not be done near these resources and existing width of road shall be maintained, so there will be no risk to these resources.

V. PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

A. Project stakeholders

101 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.

102 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, Gol, and Ministry of Finance.

B. Consultations and Disclosures to date

103 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 if any;
- (viii) Forest and sensitive area nearby the project site; and
- (ix) Movement of wild animals nearby the project site.

104. The public Consultation and group discussion meeting were conduct by RUIDP on Date 31 May 2009 after advertising in Local NEWS papers. The objective of the meeting was to appraise the stakeholders about the environmental and social impacts of the proposed program and the safeguards provided in the program to mitigate the same. In the specific context of Bundi, the environmental and social impacts of the proposed subprojects under Tranche 2 and 3 in Bundi were discussed.

105. Public consultation was also carried out at proposed subproject roads during design phase at different locations of some proposed roads. 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, and widening of roads prior to construction activities. 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.

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

- (i) Proposed Roads improvement project should ensure to improve the traffic condition of town;
- (ii) Executive agency should give preference to engage reputed contractors as people do not faith about the local contractors in respect of quality of works as well as timely completion of work;
- (iii) Efforts should be made by government to maintain the road in good conditions all the time
- (iv) Livelihood affected households should be given assistance in the mode of cash compensation;
- (v) Local people should be employed by the contractor during construction work;
- (vi) Adequate safety measures should be taken during construction work;
- (vii) Mobile kiosks/vendors/hawkers have shown willingness to shift in nearby places without taking any compensation and assistance from the Executing Agency; and
- (iii) 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.

107. 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

108. 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 and 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.

109. For this subproject, the CAPP consultant 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:

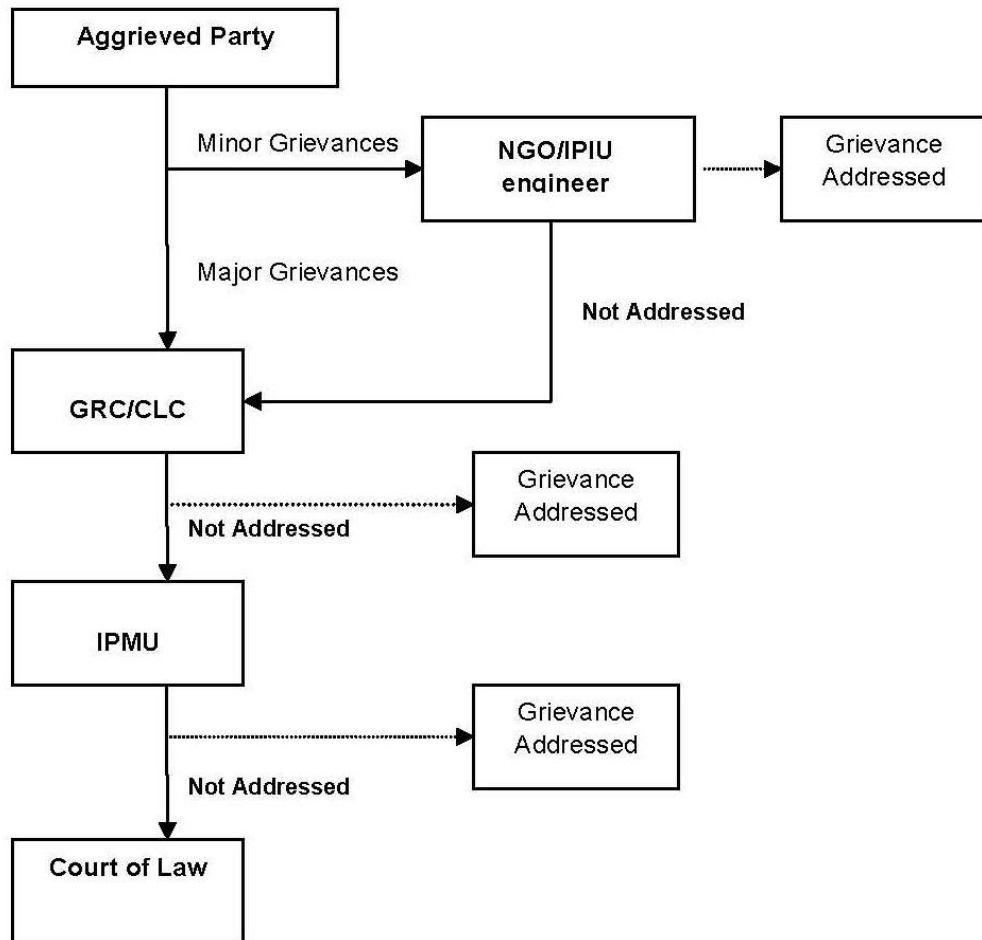
- (a) Focus-group discussions with affected persons and other stakeholders (including women's groups, NGOs and CBOs) to hear their views and concerns, so that these can be addressed in subproject design where necessary; and
- (b) Structured consultation meetings with the institutional stakeholders (government 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;
- (iii) 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.

110. Based on ADB Environment Policy (2002) requirements, the environmental assessment reports of ADB projects are intended to be accessible to interested parties, and the general public. The summary IEE (SIEE) reports are required to be circulated worldwide, through the depository library system and are placed on the ADB website. The full IEE reports are also made available to the interested parties upon request.

VI. GRIEVANCE REDRESS MECHANISM

111. 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 non-government organizations (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 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; failure at this level will be referred 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**.

112. 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 – RUSDIP

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

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements

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

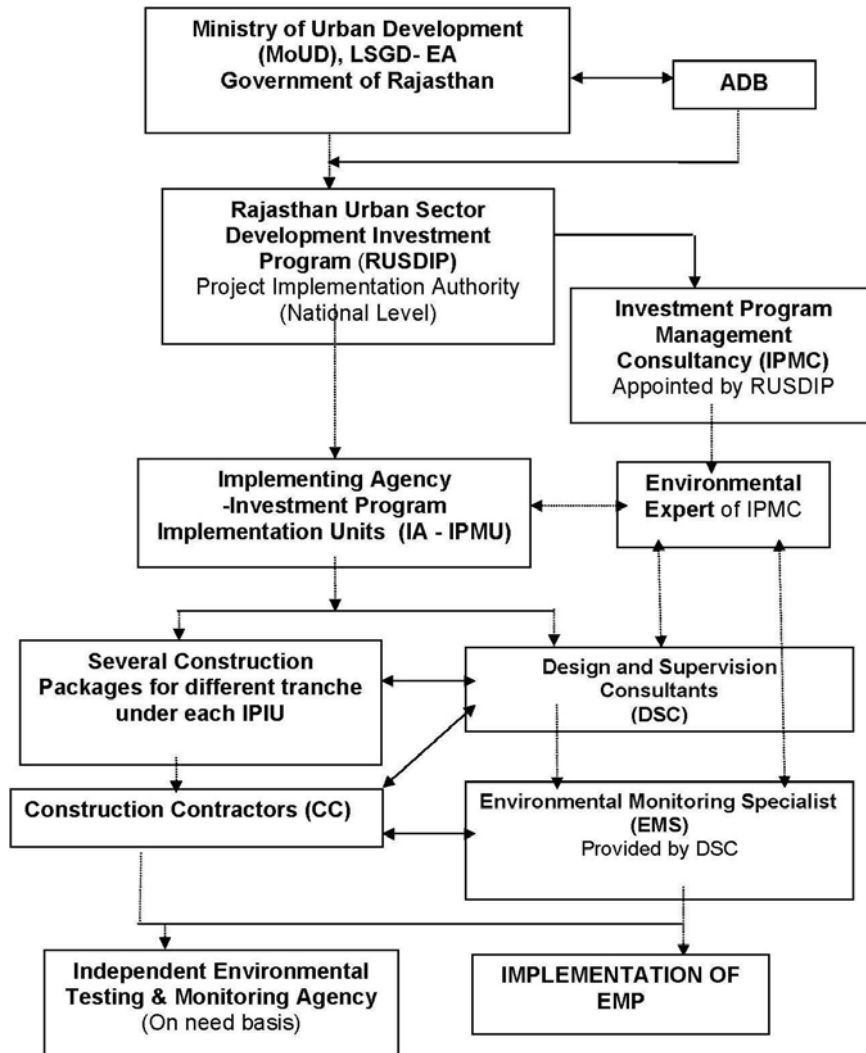
- (i) LSGD is responsible for management, coordination, and execution of all activities funded under the loan;
- (ii) IPMU is responsible for coordinating construction of subprojects across all towns, and for ensuring consistency of approach and performance;
- (iii) IPMC assists IPMU in managing the 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 Committee⁴ (EC) assists LSGD in providing policy guidance and coordination across all towns and subprojects.; and
- (vii) City Level Committees⁵ (CLCs) have also been established in each town to monitor project implementation in the town and provide recommendations to the IPIU where necessary.

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

⁴ 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.

⁵ 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.

Figure 3: Institutional Responsibility- RUSDIP

1. Responsible for carrying out mitigation measures

115. During construction stage, implementation of mitigation measures is the construction contractor's responsibility while during operation stage, BMB will be responsible for the conduct of maintenance or repair works.

116. 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

117. During construction, DSC's Environment Safeguards Officer and the designated representative of IPIU will monitor the construction contractor's environmental performance.

118. During the operation stage, monitoring will be the responsibility of BMB.

3. Responsible for reporting

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

B. Environmental Mitigation Plan

120. **Tables 7.1 to 7.3** show the potential adverse environmental impacts, proposed mitigation measures, and responsible parties. This EMP will be included in the BID documents and will be further reviewed and updated during implementation.

C. Environmental Monitoring Program

121. **Tables 7.4 to 7.6** show the proposed environmental monitoring program for this subproject. 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 form 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 7.1: Anticipated Impacts and Mitigation Measures – Pre-construction Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Environmentally-sensitive Areas	A few trees will be cut and vegetation (mostly shrubs and grasses) will be cleared in the sub-project area	(i) Inventory the trees to be cut; (ii) Obtain tree-cutting permit from Municipal Board/Council and/or District Collector; and (iii) Include in the BID documents provisions on replacement of 3 trees for every one tree cut during construction.	Design and Supervision Consultants (DSC) in close coordination with the Municipal Board/ Investment Program Implementation Unit (IPIU)	(i) Inventory of trees; (ii) Tree-cutting permit; (iii) Location and number of trees replaced for every one tree cut
Utilities	Telephone lines, electric poles and wires, water and sewer lines within the existing bridge right-of-way (ROW) will be removed.	(i) Integrate utility ducts to the proposed bridge designs; (ii) Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction phase; and (iii) Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services.	DSC	(i) design specification showing utility ducts if necessary; (ii) list of affected utilities and operators; (iii) BID document to include requirement for a contingency plan for service interruptions
Access Roads	Disruption to traffic flow and sensitive receptors	(i) Include entry and exit points plan drawings; and (ii) Consult affected communities prior to finalizing subproject lay-out and design.	DSC and Non-government Organization in charge of public consultation and disclosure	(i) plan drawings showing extent of widening of roads; (ii) records of future public consultations
Educational and Health Care facilities	Air and noise pollution and disturbance to students and patients	(i) List out the educational and health care facilities near the proposed roads (ii) Prepare mitigation measures to avoid any disturbance to these facilities	DSC	(i) List of sensitive receptors (ii) Mitigation and monitoring plan specially for sensitive receptors
Social and Cultural Resources	Ground disturbance can uncover and damage archaeological and historical remains	(i) Consult Archaeological Survey of India (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;	IPIU and DSC	Chance Finds Protocol

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>(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</p> <p>(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.</p>		
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	<p>(i) Prioritize areas within or nearest possible vacant space in the subproject sites;</p> <p>(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;</p> <p>(iii) Do not consider residential areas;</p> <p>(iv) Take extreme care in selecting sites to avoid direct disposal to <i>nallah</i>/water body or in areas which will inconvenience the community.</p>	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 accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	<p>(i) Prioritize sites already permitted by the Mining Department;</p> <p>(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</p> <p>(iii) If additional quarries will be required after construction is started, inform construction contractor to obtain a written approval from IPMU.</p>	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.

Table 7.2: 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 unauthorised sites may cause general scouring resulting in endangerment of bridges and continuous degradation of town regime.	(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 ground 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) 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.	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 (SO ₂), nitrous oxides (NO _x), carbon monoxide (CO), and hydrocarbons
Surface water quality	Mobilization of settled silt materials, run-off from stockpiled materials, and chemical contamination from 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 soils and materials in the construction works. If soils 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;	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

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(iv) Place storage areas for fuels and lubricants away from any drainage leading to water bodies; (v) Dispose any wastes generated by construction activities in designated sites; and		management measures; (v) for inland water: suspended solids, oil and grease, biological oxygen demand (BOD), and coliforms.
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 to minimise 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 levels
Existing Infrastructure and Facilities	Disruption of service and damage to existing infrastructure located alongside roads, in particular water supply pipes and sewer lines.	(i) Obtain from IPIU and/or DSC the list of affected utilities and operators; (ii) Prepare a contingency plan to include actions to be taken in case of unintentional interruption of services; and (iii) Develop and implement an Asbestos Cement Pipes Management Plan	Construction Contractor	(i) Existing Utilities Contingency Plan; (ii) Asbestos Cement Pipes Management Plan
Flora and Fauna	Land-clearing activities and presence of workers in the sites can damage or cause loss of existing flora	(i) Minimize removal of vegetation and disallow cutting of trees if not required for the construction activities; (ii) If tree-removal will be required, obtain tree-cutting permit from the Municipal Council or District Collector;	Construction Contractor	(i) tree-cutting permit for affected trees; (ii) number of replanted trees

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(iii) Earth-ball trees and transplant to IPIU-approved areas; (iv) Require to plant three native trees for every one that is removed; and (v) Prohibit employees from cutting of trees for firewood.		
Landscape and Aesthetics	solid wastes as well as excess construction materials	(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, 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.	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.
Transportation 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 and speed limit; (vi) Coordinate with Traffic Office for temporary road diversions and with provision of traffic aids if transportation	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
		<p>activities cannot be avoided during peak hours; and</p> <p>(vii) Notify affected sensitive receptors by providing sign boards informing nature and duration of construction works and contact numbers of concerns/complaints. (viii) provide planks across trenches for easy access wherever is required (ix) restore trenches immediately after work is completed</p>		
Socio-Economic	generation of contractual employment and increase in local revenue	<p>(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</p> <p>(ii) Procure construction materials from local market.</p>	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	<p>(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;</p> <p>(ii) Ensure that qualified first-aid can be provided at all times. Equipped first-aid stations shall be easily accessible throughout the site;</p> <p>(iii) Provide medical insurance coverage for workers;</p> <p>(iv) Secure all installations from unauthorized intrusion and accident risks;</p> <p>(v) Provide supplies of potable drinking water;</p> <p>(vi) Provide clean eating areas where</p>	Construction Contractor	<p>(i) site-specific Health and Safety (H & S) Plan;</p> <p>(ii) Equipped first-aid stations;</p> <p>(iii) Medical insurance coverage for workers;</p> <p>(iv) Number of accidents;</p> <p>(v) Supplies of potable drinking water;</p> <p>(vi) Clean eating areas where workers are not exposed to hazardous or noxious substances;</p> <p>(vii) record of H & S orientation trainings</p> <p>(viii) personal protective equipments;</p> <p>(ix) % of moving equipment outfitted with audible back-up alarms;</p> <p>(xi) sign boards for hazardous areas such as</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>workers are not exposed to hazardous or noxious substances;</p> <p>(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;</p> <p>(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;</p> <p>(ix) Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas;</p> <p>(x) Ensure moving equipment is outfitted with audible back-up alarms;</p> <p>(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</p> <p>(xii) 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.</p>		<p>energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal.</p>
Community Health and Safety.	traffic accidents and vehicle collision with pedestrians	<p>(i) Plan routes to avoid times of peak-pedestrian activities.</p> <p>(ii) Liaise with IPIU/DSC in identifying high-risk areas on route cards/maps.</p>	Construction Contractor	<p>(i) Traffic Management Plan; (ii) complaints from sensitive receptors</p>

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		(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.		
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 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.	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
Educational and Health Care Facilities	Air and Noise pollution and disturbances to students and patients	(i) prepare a list of educational and health care facilities nearby the project sites before starting of the work (ii) Consult with the educational and health care facilities before start of the	Construction Contractor	(i) complaints from sensitive receptors; (ii) Records of construction equipment fitness (iii) PUC certificates of

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
		<p>work</p> <p>(iii) dust control measures such as water sprinkling, dust curtains, barricading should be used to avoid dust</p> <p>(iv) all the construction equipment should be well maintained and having PUC certificates to control noise and air pollutants</p> <p>(v) Near educational facilities the working schedule should be planned to minimize noise impact</p> <p>(vi) traffic control system should be provided during work near these facilities to avoid any disturbance to students and patients</p>		<p>vehicles</p> <p>(iv) traffic management plan</p> <p>(v) records of dust control measures</p>
Social and Cultural Resources	risk of archaeological chance finds	<p>(i) Strictly follow the protocol for chance finds in any excavation work;</p> <p>(ii) Request IPIU/DSC or any authorized person with archaeological field training to observe excavation;</p> <p>(iii) Stop work immediately to allow further investigation if any finds are suspected; and</p> <p>(iv) Inform IPIU/DSC if a find is suspected, and take any action they require ensuring its removal or protection in situ.</p>	Construction Contractor	(i) records of chance finds

Table 7.3: Anticipated Impacts and Mitigation Measures – Operation and Maintenance Environmental Mitigation Plan

Field	Anticipated Impact	Mitigation Measures	Responsible for Mitigation	Monitoring of Mitigation
Noise Level	noise levels tend to increase with vehicular traffic	Put signages and implement “no blowing of horns” zones where there are sensitive receptors	Municipal Road Department of BMB	complaints from sensitive receptors
Accessibility	portions of the roads may be affected during routine repairs	Coordinate with the Traffic Police Department so that warning signs and traffic	BMB	complaints from sensitive receptors

		diversions can be set up when necessary		
Ecological Resources	ecological gain from the planting of replacement trees	Coordinate with the Municipal Board for the continuous care of the planted trees.	BMB	% survival of planted trees

Table 7.4: Pre-construction Environmental Monitoring Program

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Permits – Trees and Vegetation	not applicable	Design and Supervision Consultants (DSC) in close coordination with the town Investment Project Implementation Unit (IPIU)	(i) Inventory of trees; (ii) Tree-cutting permit; (iii) Location and number of trees replaced for every one tree cut	checking of records	(i) Inventory of trees prepared; (ii) Tree-cutting permit obtained from Municipal Board or District Collector; (iii) Location identified and number of trees estimated	once	IPMU
Utilities	not applicable	DSC	(i) design specification showing utility ducts if necessary; (ii) list of affected utilities and operators; (iii) bid document to include requirement for a contingency plan for service interruptions	checking of records	(i) utility ducts included in the design; (ii) list of affected utilities and operators prepared; (iii) requirement for a contingency plan for service interruptions included in bid documents	once	IPMU
Access Roads	not applicable	DSC and Non-government Organization in charge of public consultation and	(i) plan drawings showing extent of widening of roads; (ii) records of future	checking of records	(i) plan drawings include entry and exit points; (ii) stakeholders consulted; (iii)	once	IPMU

Field	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
		disclosure	public consultations		updated IEE and EMP disclosed		
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
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
Baseline Environment Condition – Ambient Air Quality and noise level	Subproject sites	DSC	Establish baseline values of respirable particulate	Air sample collection and analyses by in-house	GOI Ambient Air 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
			matter (RPM) and suspended particulate matter (SPM) and Noise level	laboratory or accredited 3rd party laboratory			

Table7.5: Construction Environmental Monitoring Program

Mitigation Measures	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 (RPM)	(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 Quality	monthly for checking records, six monthly ambient air monitoring during construction phase	DSC, IPIU

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			and suspended particulate matter (SPM) at the locations of base line monitoring; (iv) vehicular emissions such as sulphur dioxide (SO ₂), nitrous oxides (NOx), carbon monoxide (CO), and hydrocarbons (HC)		Standards for ambient air quality; (iv) GOI Vehicular Emission Standards for SO ₂ , NOx, CO and HC.		
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	visual inspection	(i) designated areas only; (ii) silt traps installed and functioning;	monthly	DSC
Noise Levels	(i) construction sites; (ii) areas for stockpiles, storage of fuels and lubricants and waste materials; (iii) work camps	Construction Contractor	(i) Complaints from sensitive receptors; (ii) use of silencers in noise-producing equipment and sound barriers; (iii) equivalent day and night time levels	(i) checking of records; (ii) visual inspection	(i) complaints from sensitive receptors satisfactorily addressed; and (ii) silencers in noise-producing equipment functioning as design; and (iii) sound	Monthly for checking records and six monthly for noise level monitoring at the time of construction	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			monitoring at the locations of base line monitoring		barriers installed where necessary		
Existing Infrastructure and Facilities	(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
Flora and Fauna	(i) construction sites; (ii) location where replacement trees will be planted	Construction Contractor	(i) tree-cutting permit for affected trees; (ii) number of replanted trees	(i) checking of records; (ii) visual inspection	number of trees cut, replanted and location according to the tree-cutting permit	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
Transportation	(i) construction	Construction	(i) Traffic	visual	(i)	Monthly	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
- Accessibility	sites; (ii) traffic routes	Contractor	Management Plan; (ii) complaints from sensitive receptors; (iii) number of signages placed at subproject sites.	inspection	implementation of Traffic Management Plan; (ii) complaints from sensitive receptors satisfactorily addressed; (iii) signages visible and located in designated areas		
Socio-Economic	construction sites	Construction Contractor	(i) employment records; (ii) records of sources of materials	checking of records	number of employees from town 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	(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	Quarterly	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
			<p>where workers are not exposed to hazardous or noxious substances;</p> <p>(vii) record of H & S orientation trainings</p> <p>(viii) personal protective equipments;</p> <p>(ix) % of moving equipment outfitted with audible back-up alarms;</p> <p>(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.</p>		<p>clean eating area, and number of sign boards are according to approved plan;</p> <p>(v) % of moving equipment outfitted with audible back-up alarms</p>		
Community Health and Safety.	construction sites	Construction Contractor	<p>(i) Traffic Management Plan;</p> <p>(ii) complaints from sensitive receptors</p>	visual inspection	<p>(i) implementation of Traffic Management Plan;</p> <p>(ii) complaints from sensitive</p>	Quarterly	DSC

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
					receptors satisfactorily addressed		
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
Social and Cultural Resources	construction sites	Construction Contractor	records of chance finds	checking of records	Implementation of Chance Finds Protocol	as needed	DSC

Table 7.6: Operation and Maintenance Environmental Monitoring Program

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Noise Levels	subproject sites	Bundi Municipal Board (BMB)	complaints from sensitive receptors, noise level monitoring for day and night time at the locations of O&M	checking of records	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU
Accessibility	subproject sites	BMB	complaints from sensitive receptors	checking of records	complaints from sensitive receptors satisfactorily addressed	as needed	IPMU

Mitigation Measures	Location	Responsible for Mitigation	Monitoring of Mitigation	Method of Monitoring	Indicators/ Standards	Frequency	Responsible for Monitoring
Ecological Resources	subproject sites	BMB	% survival of planted trees	checking of records	at least 80% survival rate	quarterly	IPMU

D. Environmental Management Plan Costs

122 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.

123 The remaining actions in the Environmental Management Plan are the various environmental monitoring activities. These have not been budgeted elsewhere, and their costs are shown in **Table 7.7**. The figures show that the total cost of environmental management and monitoring for the subproject as a whole is Indian Rupees (INR) 444,000.

Table 7.7: Environmental management and monitoring costs (INR)

Item	Quantity	Unit Cost	Total Cost	Sub-total (Rs.)	Source of Funds
1. Implementation of EMP (2 years)- construction period					
Domestic Environmental Monitoring Specialist	1 x 2 month	150,000 ⁶	300,000		DSC
Survey and monitoring expenses - air and noise quality					DSC
Air Quality Monitoring (2 locations twice six monthly for 2 years)	16	6000	96,000		
Noise Monitoring (same as air)	16	3000	48,000		
TOTAL				444,000	

VIII. FINDINGS AND RECOMMENDATIONS

124. The process described in this document has assessed the environmental impacts of all elements of the infrastructure proposed under the Bundi Roads improvement Subproject. Potential negative impacts were identified in relation to construction and operation of the improved infrastructure, but no impacts were identified as being due to either the subproject design or location. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. These were discussed with specialists responsible for the engineering aspects, and as a result some measures have already been included in the outline designs for the infrastructure. This means that the number of impacts and their significance has already been reduced by amending the design.

125. Regardless of these and various other actions taken during the IEE process and in developing the project, there will still be impacts on the environment when the infrastructure is built and when it is operating. This is mainly because of the invasive nature of work; some parts of which are within densely populated area of the town; and because Bundi is an area with a rich history, in which there is a high risk that ground disturbance may uncover important remains. Because of these factors the most significant impacts are on the physical environment, the human environment, and the cultural heritage.

⁶ Unit costs of domestic consultants include fee, travel, accommodation and subsistence

126. One field in which impacts are much less routine is archaeology, and here a series of specific measures have been developed to avoid damaging important remains.

127. 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 encountered accidentally during excavation work.

128. 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 plant trees around completed parts of the roads once it is operating, to improve the appearance and provide a small ecological gain.

129. Once the system is operating, it will be important that Bundi Municipal Board maintains the subproject roads as a whole in proper operating order, because the town environment will deteriorate rapidly due to damaged roads if the system begins to fail. The project will provide capacity building, public education and financial support to ensure continuation of the operating system.

130. The main impacts of the operating waste management system will be beneficial as the general environment of the town will improve considerably as there will be less traffic congestion due to wider and smoother roads. Some people will also gain socio-economically from being employed in companies engaged to operate the system, or in the expanded Municipality manpower.

131. Mitigation will be assured by a program of environmental monitoring conducted during construction and operation to ensure that all measures are implemented, and to determine whether the environment is protected as intended. This will include observations on- and off-site, document checks, and interviews with workers and beneficiaries, and any requirements for remedial action will be reported to the IPMU. There will also be a longer-term survey to monitor the expected improvements in the town environment from the Roads improvement.

132. Finally, 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

133. The environmental impacts of the proposed improvements in Roads infrastructure in Bundi Town have been assessed by the Initial Environmental Examination reported in this document, conducted according to ADB guidelines. The overall conclusion is that providing the mitigation, compensation and enhancement measures are implemented in full, there should be no significant negative environmental impacts as a result of location, design, construction or operation of the subproject. There should in fact be some small benefits from recommended mitigation and enhancement measures, and major improvements in the town environment once the scheme is in operation.

134. During designing stage, location of subproject sites are existing 13 roads in the town and at government land only, no requirement of private land acquisition. Therefore no additional impact is expected.

135. There are no uncertainties in the analysis, and no additional work is required to comply with ADB procedure.

Appendix 1

Rapid Environmental Assessment (REA) Checklist

<p>Instructions:</p> <p>(i) The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (RSES), for endorsement by Director, RSES and for approval by the Chief Compliance Officer.</p> <p>(ii) This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and Indigenous Peoples; (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.</p> <p>(iii) Answer the questions assuming the “without mitigation” case. The purpose is to identify potential impacts. Use the “remarks” section to discuss any anticipated mitigation measures.</p>

Country/Project Title:	India/Rajasthan Urban Sector Development Investment Programme
Sector Division:	Widening and strengthening of roads at Bundi

Screening Questions	Yes	No	Remarks
A. PROJECT SITING IS THE PROJECT AREA ADJACENT TO OR WITHIN ANY OF THE FOLLOWING ENVIRONMENTALLY SENSITIVE AREAS?			
▪ CULTURAL HERITAGE SITE		√	Rani Ji Ki Baori situated besides one road – the boundary of the Baori is separated from the road by a 1.5 m wide paved footpath from the project road and is therefore not likely to be damaged. The main structure is about 20 m inside. No widening of road is proposed on this side. No Impact expected
▪ PROTECTED AREA	√		Rani Ji Ki Baori situated besides one road – the boundary of the Baori is separated from the road by a 1.5 m wide paved footpath from the project road and is therefore not likely to be damaged. The main structure is about 20 m inside. No widening of road is proposed on that side. No Impact expected
▪ WETLAND		√	NO
▪ MANGROVE		√	NO
▪ ESTUARINE		√	NO

Screening Questions	Yes	No	Remarks
▪ BUFFER ZONE OF PROTECTED AREA		√	NO
▪ SPECIAL AREA FOR PROTECTING BIODIVERSITY		√	NO
B. POTENTIAL ENVIRONMENTAL IMPACTS WILL THE PROJECT CAUSE...			
▪ encroachment on historical/cultural areas; disfiguration of landscape by road embankments, cuts, fills, and quarries?		√	One temple (Radha Krishna temple) and 1 Gurudwara are situated just along the road at a distance of 1.5m and 1m respectively. There is no space for widening at this side of the project road. The widening is proposed on the other side of the road. The distance of the project road from outer wall of one more temple (Hansa Devi temple) is 1.5 m. the widening can be done with reducing that gap on remaining space. No impact
▪ encroachment on precious ecology (e.g. sensitive or protected areas)?		√	There is no encroachment on precious ecology in this area.
▪ alteration of surface water hydrology of waterways crossed by roads, resulting in increased sediment in streams affected by increased soil erosion at construction site?		√	There is no surface water resources exist in the vicinity of our project area.
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		√	There is no surface water resources exist in this area.
▪ increased local air pollution due to rock crushing, cutting and filling works, and chemicals from asphalt processing?	√		During construction phase there will be increased air pollution due to asphalt processing and rock cutting. The location of asphalt processing and rock cutting machinery will be established far from human settlements and any environmental sensitive location to avoid impacts from increased air pollution.
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation during project construction and operation?		√	No
▪ noise and vibration due to blasting and other civil works?		√	No blasting work will be involved in the project.
▪ dislocation or involuntary resettlement of people?	√		Some temporary shops (stalls) within ROW will temporarily be shifted in vicinity to maintain there livelihood during construction, for which shifting assistance/livelihood assistance will be provided which is covered in RP

Screening Questions	Yes	No	Remarks
▪ dislocation and compulsory resettlement of people living in right-of-way?		√	No
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		√	No
▪ other social concerns relating to inconveniences in living conditions in the project areas that may trigger cases of upper respiratory problems and stress?		√	Generated dust may cause some short term impact, but mitigation measures will be applied
▪ hazardous driving conditions where construction interferes with pre-existing roads?		√	Contractor will provide alternate road during construction phase and will maintain traffic management to avoid any hazardous driving condition.
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?		√	Local labour will be employed for this work if required then contractor will provide all necessary facilities in workers camp to avoid any sanitation and solid waste disposal problem.
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?		√	There is no water logging condition
▪ accident risks associated with increased vehicular traffic, leading to accidental spills of toxic materials?	√		Pre-existing traffic may result accidents due to construction vehicle therefore proper management plan to be followed
▪ increased noise and air pollution resulting from traffic volume?	√		Pre-existing traffic and future construction activities may increase noise and air pollution.
▪ increased risk of water pollution from oil, grease and fuel spills, and other materials from vehicles using the road?		√	There is no surface and ground water resource in this area.
▪ social conflicts if workers from other regions or countries are hired?		√	Local labour will be employed
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		√	No
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?		√	No
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning.		√	No

Climate Change and Disaster Risk Questions The following questions are not for environmental categorization. They are included in this checklist to help identify potential climate and disaster risks.	Yes	No	REMARKS
<ul style="list-style-type: none"> • Is the Project area subject to hazards such as earthquakes, floods, landslides, tropical cyclone winds, storm surges, tsunami or volcanic eruptions and climate changes (see Appendix I) 		√	Bundi lies in a low damage risk zone
<ul style="list-style-type: none"> ▪ Could changes in temperature, precipitation, or extreme events patterns over the Project lifespan affect technical or financial sustainability (eg., increased erosion or landslides could increase maintenance costs, permafrost melting or increased soil moisture content could affect sub0-grade). 		√	NO
<ul style="list-style-type: none"> ▪ Are there any demographic or socio-economic aspects of the Project area that are already vulnerable (eg., high incidence of marginalized populations, rural-urban migrants, illegal settlements, ethnic minorities, women or children)? 		√	NO
<ul style="list-style-type: none"> ▪ Could the Project potentially increase the climate or disaster vulnerability of the surrounding area (e.g., by encouraging settlement in areas that will be more affected by floods in the future, or encouraging settlement in earthquake zones)? 		√	NO

Note: Hazards are potentially damaging physical events.

Appendix 2

PUBLIC CONSULTATION- ENVIRONMENT**Bundi: Roads Improvement sub project****Issues discussed**

- Awareness and extent of the project and development components
- Benefits of Project for the economic and social Upliftment of Community
- Labour availability in the Project area or requirement of outside labour involvement
- Local disturbances due to Project Construction Work
- Necessity of tree felling etc. at project sites
- Water logging and drainage problem if any
- Drinking water problem
- Forest and sensitive area nearby the project site
- Movement of wild animal if any

CONSULTATION 1

1. **Date and time of Consultation: 07.07.2010, 04.20 p.m.**
2. **Location: Dhan Mandi and Khoja Gate**
3. **Proposed Road Name. Road no. 4 NH-12 to Khoja gate to Azad park via Chatrapura Village**

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community	Action to be taken
1	Awareness of the project – including coverage area	Mostly people except the affected persons are unaware of the project	Before start of the project caution boards indicating the nature or work to be displayed
2	In what way they may associate with the project	They will be benefitted by overcoming the problem of traffic jam during peak hours at narrow places	
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No such issue	
4	Presence of historical/ cultural/ religious sites nearby	No any	
5	Un favorable climatic condition	Very hot during summer (upto 48 degree celcius) and very cold during winter	
6	Occurrence of flood	No flood occurred during last 20 years	
7	Drainage and sewerage problem facing	Satisfactory drainage system exist, no existence of sewer line	Sewer system to be provided
8	Present drinking water problem – quantity and quality	No any	
9	Present solid waste collection and disposal problem	Not satisfactory, SW is dumped by public at roadside and open areas, seldom municipal body collects SW from the points	Proper SW collection and disposal facility to be provided
10	Availability of labour during	Yes, labors are easily available	

Sr. No.	Key Issues/Demands	Perception of community	Action to be taken
	construction time		
11	Access road to project site	Yes	
12	Perception of villagers on tree felling and afforestation	Trees are coming on government land	Compensatory plantation to be done against any tree felling
13	Dust and noise pollution and disturbances during construction work	These may affect people up to some extent	Proper mitigation measures to be taken
14	Setting up worker camp site within the village/ project locality	Project road passing through market place and residential area so worker camp should be set up at open area	Worker camp should be away from residential area
15	Safety of residents during construction phase and plying of vehicle for construction activities	Yes during construction phase road traffic and safety of road users may be affected	Plan should be made to maintain the safety of people and safe traffic flow
16	Requirement of enhancement of other facilities	People want public urinal at some places	Public urinal should be provided at some places

NAME AND POSITION OF PERSONS CONSULTED

- Satya Narayan- Shopkeeper, Dhan mandi
- Kamlesh Kumar- Shopkeeper, Dhan mandi
- Ramesh Chand Gurjar- house owner near Dhan mandi, bypass road
- KishoriLal – shopkeeper, Khoja gate
- Lal Bahadir- local resident, Khoja gate

Summary of outcome:

People are not showing eagerness for the project. Because they do not suffer upto great extent as the traffic flow through the road is less. They are worried about the demolition of their temporary structures and shops.

CONSULTATION 2

1. Date and time of Consultation: 07.07.2010, 02.20 p.m.
2. Location: Rotary circle, and Vill. Devpura
3. Proposed Road Name: road no.2 Rotary Circle (N.H.12) to Bihari Circle to Rani ji ki Baori to Patrol Pump by pass

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community	Action to be taken
1	Awareness of the project – including coverage area	Mostly people are aware of the project	

Sr. No.	Key Issues/Demands	Perception of community	Action to be taken
2	In what way they may associate with the project	They will be benefitted by overcoming the problem of traffic jam during peak hours at narrow places, people from nearby villages are willing to work during construction phase	local people should be considered for deployment during construction phase
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No such issue	
4	Presence of historical/ cultural/ religious sites nearby	One old Baori 15 mtrs from road at vill. Devpura	
5	Un favorable climatic condition	Very hot during summer (upto 48 degree celcius) and very cold during winter	
6	Occurrence of flood	No flood occurred during last 20 years	
7	Drainage and sewerage problem facing	Satisfactory drainage system exist, no existence of sewer line	Sewer system to be provided
8	Present drinking water problem – quantity and quality	No any	
9	Present solid waste collection and disposal problem	SW is collected by municipal corporation from time to time	
10	Availability of labour during construction time	Yes, labours are easily available	
11	Access road to project site	Yes	
12	Perception of villagers on tree felling and afforestation	Mostly Trees are coming on government land and people are agree for tree felling	Compensatory plantation to be done for the cut trees
13	Dust and noise pollution and disturbances during construction work	These may affect people up to some extent	Proper mitigation measures to be taken
14	Setting up worker camp site within the village/ project locality	Project road goes from market place and residential area so worker camp should be set up away from this area	Worker camp should be away from residential area
15	Safety of residents during construction phase and plying of vehicle for construction activities	Yes during construction phase road traffic and safety of road users may be affected	Plan should be made to maintain the safety of people and safe traffic flow
16	Requirement of enhancement of other facilities	People want public urinal and drinking water facilities at some places	Public urinal and drinking water facility should be provided at some places

NAME AND POSITION OF PERSONS CONSULTED

- Azmudding- Shop keeper(tyre puncture shop) at rotary club triangle
- Dinesh Kumar Verma- driver, Bundi
- Ram Nivas- Shop keeper and house owner- Vill. Devpura
- Amber Lal- Vill Devpura
- Nand Lal Sumar- Vill. Devpura
- Bajrang Lal- Vill Devpura
- Hora Lal- Vill Devpura

Summary of outcome:

People are in favour of widening of road because they suffer from existing road as it is narrow at some place. Some are worried about the demolition of their temporary structures and shops but they are

agreeing for it. People want to restructure the Rotary triangle as it is very unsafe and caused few fatal accidents in the past.

CONSULTATION 3

1. **Date and time of Consultation: 07.07.2010, 3.25 p.m.**
2. **Location- Bus Stand, Raniji Ki Baori, Gurudwara**
3. **Proposed Road name- Road no. 2: Rotary Circle (N.H.12) to Bihari Circle to Rani ji ki Bawari to Patrol Pump by pass**

Table: Issues of the Public Consultation- Design phase

Sr. No.	Key Issues/Demands	Perception of community	Action to be taken
1	Awareness of the project – including coverage area	Mostly people are aware of the project	
2	In what way they may associate with the project	They will be benefitted by overcoming the problem of traffic jam during peak hours at narrow places	
3	Presence of any forest, wild life or any sensitive / unique environmental components nearby the project area	No such issue	
4	Presence of historical/ cultural/ religious sites nearby	Rani Ji Ki Baori, 2 temples, 1 Gurudwara should not be affected during construction	Proper care should be taken to preserve the monuments
5	Unfavorable climatic condition	Very hot during summer (upto 48 degree celcius) and very cold during winter	
6	Occurrence of flood	No flood occurred during last 20 years, sometimes water logging exists during heavy rain	Proper attention should be given to prevent water logging
7	Drainage and sewerage problem facing	Satisfactory drainage system exist	
8	Present drinking water problem – quantity and quality	No any but scarcity during summer	
9	Present solid waste collection and disposal problem	SW is collected by municipal corporation regularly	
10	Availability of labour during construction time	Yes, labours are easily available	
11	Access road to project site	Yes	
12	Perception of villagers on tree felling and afforestation	Mostly Trees are coming on government land and people are agree to tree felling	Compensatory plantation to be done for the cut trees
13	Dust and noise pollution and disturbances during construction work	These may affect people up to some extent	Proper mitigation measures to be taken
14	Setting up worker camp site within the village/ project locality	Project road goes from market place and residential area so worker camp should be set up away from this area	Worker camp should be away from residential area
15	Safety of residents during construction phase and plying of vehicle for construction activities	Yes during construction phase road traffic and safety of road users may be affected	Plan should be made to maintain the safety of people and safe traffic flow
16	Requirement of enhancement of other	Requested for footpath	Proper footpath

Sr. No.	Key Issues/Demands	Perception of community	Action to be taken
	facilities		should be provided

NAME AND POSITION OF PERSONS CONSULTED

- Raj Kumar- Hotel Diamond, near Rani Ji Ki Baori
- Heera Lal- Shop keeper, near Guru Dwara
- Ram kumar- Resident near Bus stand
- Ashish tiwari- Driver
- Shailesh- local resident
- Balram- Kirana Shop keeper

Summary of outcome:

People are in favour of widening of road because they suffer from existing road as it is narrow at some places. Shopkeepers are worried about the demolition of their temporary structures and shops. People requested project authority to save religious and historical places.

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 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.
- B. Air Quality
- (i) Consult with IPIU/DSC on the designated areas for stockpiling of clay, soils, gravel, and other construction materials;
 - (ii) Damp down exposed soil and any stockpiled on site by spraying with water when necessary during dry weather;
 - (iii) 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.
 - (v) Carry out air quality monitoring
- 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 wastes generated by construction activities in designated sites; and
 - (vi) 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.
- 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) Co-ordinate 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.

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, 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) 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.
- 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.
- J. 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.
- L. 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.
- M. 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.

Appendix 4

NOC from Forest Department, Bundi for proposed Bundi Roads

कार्यालय मण्डल वन अधिकारी, बून्दी

क्रमांक : एफ()वन संरक्षण/मबअ/2012/ 639 दिनांक : 13-1-12

निर्देशित : अधिशासी अभियन्ता
आर.यू.एस.डी.आई.पी.
बून्दी।

विषय : परियोजना द्वारा किये जा रहे सड़क निर्माण कार्यों के सम्बन्ध में।
प्रसंग : आपका पत्र क्रमांक आर.यू.एस.डी.आई.पी./बून्दी/2011-12/1324 दि. 13.1.12

महोदय,

उपरोक्त विषय में लेख है कि आपके उपरोक्त प्रासंगिक पत्र के साथ संलग्न सूची/नक्शा में अंकित निम्न सड़कें सेंचूरी क्षेत्र के बाहर हैं। इन पर परियोजना कार्य कराने में कोई आपत्ति नहीं है।

संलग्न :- सूची एक।

क्रमांक : एफ()वन संरक्षण/मबअ/2012/ प्रतििलिपि क्षेत्रीय वन अधिकारी, राभगढ़ को सूचनाार्थ।

मण्डल वन अधिकारी
बून्दी

दिनांक :

मण्डल वन अधिकारी
बून्दी

RUIDP द्वारा परियोजनान्तर्गत मे ली गई सडकों का विवरण

क्र०सं०	रोड नम्बर	विवरण
1	2	रंजीत सिनेमा तिराहे से महावीर सर्किल वाया एल.आई.सी. ऑफिस।
2	3	रोटरी सर्किल एन.एच.-12 से बिहारी सर्किल, रानी जी की बावडी से पेट्रोल पम्प बाईपास तक।
3	4	सर्कट हाउस से द्वारिका होटल, अम्बेडकर सर्किल होते हुए मण्डी तिराहा एन.एच.-12 तक।
4	5	एन.एच.-12 से खोजागेट, आजाद पार्क वाया छत्रपुरा विलेज।
5	6	उन्हाला की डूंगरी रोड।
6	7	अम्बेडकर सर्किल से एन.एच.-12 वाया सिलोर रोड।
7	8	गवर्नमेन्ट कॉलेज चौराहा से एस.पी. ऑफिस तक।
8	9	एस.पी. ऑफिस से मारुतीनन्दन कॉलोनी वाया दयानन्द कॉलोनी।
9	10	एस.पी. तिराहा से नई तहसील बून्दी।
10	11	नैनवां रोड पुलिया से जवाहर कॉलोनी तिराहा वाया पी.एच.ई.डी. ऑफिस।
11	16	पुरानी मादून्दा रोड से हाउसिंग बोर्ड कॉलोनी वाया वीनस पब्लिक स्कूल।
12	17	सम्पर्क सडक नैनवां रोड से इन्द्रप्रस्थ कॉलोनी।
13	18	बालिका उच्च माध्यमिक विद्यालय के पास से विकास नगर बून्दी।

मण्डल वर्न अधिकारी
बून्दी



English Translation of NOC letter from forest department, Bundi for proposed roads**Office of the Circle Forest Officer, Bundi**

Serial: F() Forest conservation/MDA/212/639

Date:13/01/2012

Executive Engineer
RUIDP, Bundi**Sub: Regarding road construction work through Project**

Ref: Your letter no. RUSDIP/Bundi/2011-12/1324 dated 13.1.2012

Sir,

In reference to the above subject it is stated that the following roads listed in the list/map attached with your above letter are out of the century area. There is no objection to conduct project work on these roads.

Attached: A list

Circle Forest Officer
Bundi

Serial No. F()Forest conservation/MDA/2012

Copy to Regional Forest officer, Ramgarh for information

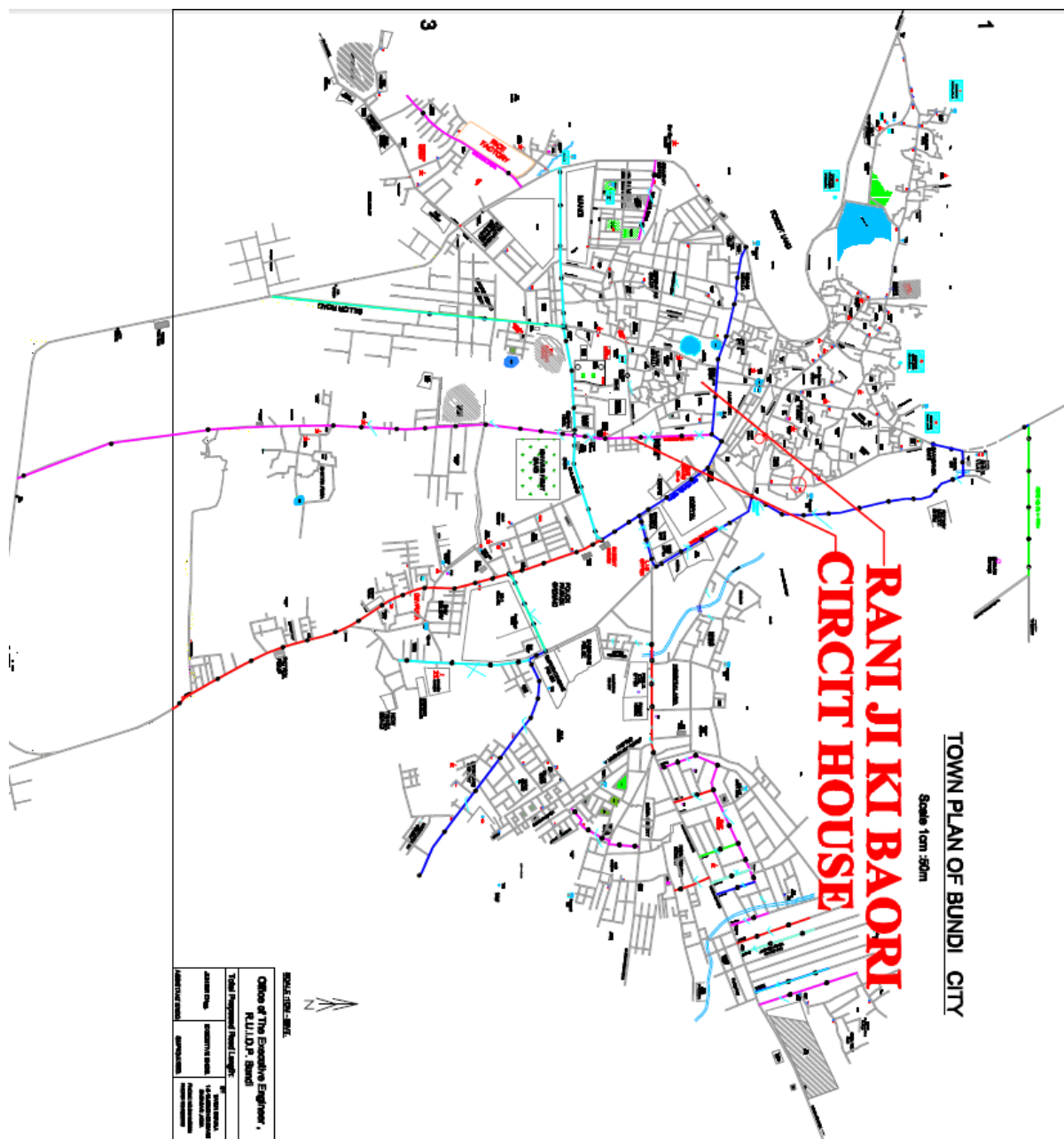
Circle Forest Officer
Bundi

Description of the roads taken under project by RUIDP

Sr. No	Road No.	Description
1	2	Ranjeet Cinema Tiraha to Mahaveer circle via Lic Office
2	3	Rotary Circle (N.H.12) to Bihari Circle to Rani ji ki Bawari to Patrol Pump by pass
3	4	Road Circuit to Dwarika hotel to Ambedkar Circle to andi Tiraha (NH.12)
4	5	NH-12 to Khoja gate to Azad park via Chatrapura Village
5	6	Unala ki Dungri Road
6	7	Ambedkar Circle to N.H.12 via Silor Road
7	8	Govt. Collage Choraha to S.P. Office
8	9	S.P. Office Tiraha to Murti Nandan Colony via Dayanand Colony
9	10	S.P. Tiraha to New Tehsil Bundi
10	11	Puliya Nainwa road to Jawahar Colony Tiraha via P.H.E.D. Office
11	16	Gate No. 1 to Gate No. 6 back line along Community center Bundi
12	17	Link Road to Nainwa Road to Inderprasta Colony
13	18	Road Near Girls sr. Secondary school Vikas Nagar Bundi

Circle Forest Officer
Bundi

Appendix 5



Appendix 6

List of sensitive receptors in Bundi Roads Project

S.No. of the road	Name of Project Road	Side (Left/Right)	Name of Sensitive receptors (e.g. school, religious, historical, hospitals, any other)	Nature of Sensitivity(details of sensitive receptors)
1.	Ranjeet Cinema Tiraha to Mahaveer circle via Lic Office.	Right	Temple	Shiv Mandir
		Right	School	Adarsh Vidya mandir
		Right	Temple	Malan Masi Balaji Mandir
		Right	School	Jyotiba Fule Senior Sec. School
		Right	Masjid	Masjid
		Right	Hospital	State veterinary hospital
2.	Rotary Circle (N.H.12) to Bihari Circle to Rani ji ki Bawari to Patrol Pump by pass	Left	Collage	Maha Laxmi ITI
		Left	Hospital	Nemach Eye Hospital
		Left	Hospital	Bundi Eye Hospital
		Right	School	Rajkiya ucch parathamik vidyalaya
		Left	Jain Mandir	Jain Mandir
		Left	Collage	Govt Collage, Bundi
		Right	Police Kotwali	Police Kotwali
		Right	Circuit House	Government Circuit House
		Left	School	Govt Senior Sec. School
		Right	Hospital	Govt. Hospital
		Left	Nursing home	Sada Sukhi Nusing Home
		Left	Temple	Hema Devi Mandir
		Left	Temple	Bhuteshvar Mandir
		Right	Park	Azad Park
		Left	Historical place	Rani ji ki Baoari
Right	Temple	Mata ji ka mandir		
4.	NH-12 to Khoja gate to Azad park via Chatrapura Village	Right	School	School
		Right	Hospital	City Hospital (private)
		Left	Hospital	Govt Hospital
5.	Unala ki Dungri Road.	Right	School	Gyan Deep Public School
		Right	Temple	Shiv Mandir
6.	Ambedkar Circle to N.H.12 via Silor Road	Left	School	School
		Right	Temple	Shiv Mandir
		Left	Rain Basera	Rain Basera
		Right	Temple	Jain Mandir
7.	Govt. Collage Choraha to S.P. Office	Right	Masjid	Masjid
8.	S.P. Office Tiraha to Murti Nandan Colony via Dayanand Colony	Right	Temple	Choth Mata Mnadir
		Left	School	Primary School
		Right	School	Pailet Sen. Sec. School
		Right	Hostel	Shakti Bhawan Hostel
		Left	Temple	Gansesh Temple
Left	Temple	Hanuman Mandir		
11.	Old Matunda Road to Housing Board	Left	Coaching Center	GETS Computer Coaching center

	Colony via Venus Public School	Right	School	Nutan Bhartiya Sen. Sec. School
12.	Link Road to Nainwa Road to Inderprasta Colony	-	-	-
13.	Road near Girls sr. Secondary school Vikas Nagar Bundi	Left and Right	No any, only residential colony	No any, only residential colony