Final Report

CUMULATIVE IMPACT ASSESSMENT OF MUGHALSARAI-LUDHIANA SECTION ON EASTERN DEDICATED FREIGHT CORRIDOR

डेडीकेटेड फ्रेट कोरीडोर

SUBMITTED TO:
DEDICATED FREIGHT CORRIDOR CORPORATION LTD. (DFCCIL)
December, 2016

Prepared by:
IRG SYSTEMS SOUTH ASIA PVT. LTD.
in association with
ABNAKI INFRASTRUCTURE APPLICATIONS & INTEGRATED DEVELOPMENT PRIVATE LIMITED

TABLE OF CONTENTS

List of Tables

List of Figures

List of Annexures

ABBREVIATION	
ASI	Archaeological Survey of India
BEE	Bureau of Energy Efficiency
CEAI	Consulting Engineers Association of India
CEPI	Comprehensive Environment Pollution Index
CERC	Central Electricity Regulatory Commission
CGWB	Central Ground Water Board
CIA	Cumulative Impact Assessment
CIA	Comprehensive Impact Assessment
CPCB	Central Pollution Control Board
DFC	Dedicated Freight Corridors
DFCCIL	Dedicated Freight Corridor Corporation of India Ltd.
DBFOT	Design Built Finance Operate Transfer
DIC	District Industries
DMIC	Delhi Mumbai Industrial Corridor
DTP	District Town Planner
EDFC	Eastern Dedicated Freight Corridor
EIA	Environment Impact Assessment
EMP	Environment Management Plan
EPA	Environment Protection Act
FCI	Food Corporation of India
GDP	Gross Domestic Product
GHG	Green House Gas
GNDA	Greater Noida Development Authority
GOI	Government of India
HSIIDC	Haryana State Industrial & Infrastructure Development Corporation
IFC	International Finance Corporation
IMD	India Meteorological Department
IR	Indian Railways
IWAI	Inland Waterways Authority of India
MDR	Major District Roads
MLD	Milion Litre Per day
MoEFCC	Ministry of Environment, Forest & Climate Change
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NHAI	National Highway Authority of India
NOCs	No Objection Certificates
NTPC	National Thermal Power Corporation
ORGI	Office of the Registrar General & Census Commissioner of India
PAF	Project Affected Families
PSIDC	Punjab State Industrial Development Corporation
PWD	Public Work Department
RFP	Request for Proposal
RPM	Respirable Particulate Matter
SEZ	Special Economic Zone
SIA	Social Impact Assessment
SIDC	State Industrial Development Corporation
SPCB	State Pollution Control Board
TTZ	Taj Trapezium Zone
UPSIDC	Uttar Pradesh State Industrial Development Corporation
VECs	Valued Environmental and Social Components
WFPR	Work Force Participation Rate

EXECUTIVE SUMMARY

The railway network connecting the four metros of Delhi, Mumbai, Kolkata and Chennai carries more than 55% of the freight and passenger traffic of Indian Railways (IR) and is known as 'Golden Quadrilateral' of IR. To cater the growing traffic needs of this corridor and ensure efficient transportation of freight, DFCCIL has proposed to develop Dedicated Freight Corridors (DFC) along this network. Dedicated Freight Corridor Corporation of India Ltd. (DFCCIL) has sought World Bank Loan assistance for Implementation of part of Eastern Dedicated Freight Corridor (EDFC) starting from Sahnewal (Ludhiana) to Mugalsarai.

In this context, DFCCIL intends to carry out Cumulative Impact Assessment (CIA) of Eastern Dedicated Freight Corridor (EDFC) from Mughalsarai to Sahnewal (Ludhiana) for: (a) analyzing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible. DFCCIL has awarded M/s IRGSSA & M/s Abnaki Infrastructure Applications & Integrated Development Private Limited, the task of carrying out Cumulative Impact Assessment (CIA) study. Consultants are submitting the Final Report since the startup of this assignment from 13th May 2015, incorporating the comments of stakeholders workshops organised by DFCCIL on August 08, 2016 in New Delhi for Delhi/NCR and November 30, 2016 in Lucknow for Uttar Pradesh.

The main objectives of this study includes assessment of the potential impacts and risks of a proposed and other developments over time on a chosen VEC; Verify that the proposed development's cumulative social and environmental impacts and risks will not exceed a threshold that could compromise the sustainability or viability of selected VECs; Confirm that the proposed development's value and feasibility are not limited by cumulative social and environmental effects; Support the development of governance structures for making decisions and managing cumulative impacts at the appropriate geographic scale (e.g., airshed, river catchment, town, regional landscape); Ensure that the concerns of affected communities about the cumulative impacts of a proposed development are identified, documented, and addressed; and Manage potential reputation risks

Approach as specified in RFP, IFC guidelines and other similar type of studies for carrying out CIA has been followed to conduct this study. Approach & methodology for this study include seven activities like Activity 1: Scoping – VECs, Spatial and Temporal Boundaries; Activity 2: Other Activities and Environmental Drivers; Activity 3: Establish Information on Baseline Status of VECs; Activity 4: Assess Cumulative Impact on VECs; Activity 5: Assess Significance of Anticipated Cumulative Impacts; Activity 6: Management of Cumulative Impacts: Design and Implementation and Activity 7: Stakeholder Engagement

The EDFC alignment from Sahnewal to Mughalsarai passes through the states of Punjab, Haryana and Uttar Pradesh covering 1237.46 kms. Proposed alignment is divided into three sections, i.e. EDFC-1 (Bhaupur-Khurja), EDFC-2 (Bhaupur to Mugalsarai) & EDFC-3 (Sahnewal to Khurja-Dadri). Regulatory review of the project shows that about ten environmental regulations may be applicable on the project against which NOC / clearances may be obtained. Further, Operational Directives / Safeguard Policies related to environment & social sector are also applicable to the project.

In order to conduct the detailed CIA study of the project, three buffer boundaries have been considered; i.e. 100 mtrs, 300 mtrs and 10 kms. The basis for delineating these three buffer boundaries are based on the EIA reports of EDFC (EDFC – 1, EDFC – 2 and EDFC – 3), IFC guidelines and stakeholders consultations and the expert's consultation/ judgment.

- **100 mtrs buffer** – This area includes the 100 m area from centre line of proposed alignment, thus also includes ROW. ***This area will be the direct influence zone as this will experience the maximum stress in terms of physiographic, biological & social change. (Refer Annexure - 6.1)***
- **300 mtrs buffer** – Archeological & cultural features lying within 300 m of proposed alignment are the ones which may be impacted due to EDFC development.
- **10 kms buffer** – It is being considered that the extent of area of influence of the project may not go upto 10 kms as per the expert's and stakeholder's consultations. Therefore the farthest distance covered in the CIA boundary is 10 kms.
- Areas beyond 10 kms areas are also considered for purpose of CIA study if they involve and have potential to undergo significant change/development due to EDFC corridor or vice versa. This delineation of study area not only covers project where only localized effects are expected but also effects, which are regional in scale.

Cumulative opinions of various stakeholders which are directly & indirectly impacted due to proposed development, and extensive review of the existing environmental and social impact assessment studies of the proposed project has been obtained to identify the Valuable Enviromental Components (VECs). Further, overlay mapping and GIS have been used for identifying the spatial distribution of VECs. Also indicators have been identified which can determine status/conditions of VECs and are given below.

Identified VECs and VECs Monitoring Indicators

Sr. No.	Valuable Environmental Components		Indicators	References / Basis
1	**Physical Features / Habitats**	**Urban Centers / Agglomerations**	Population	PCA U.P., Punjab, Haryana.
2			Literacy	PCA U.P., Punjab, Haryana.
3			WFPR	PCA U.P., Punjab, Haryana.
4			GDP	PCA U.P., Punjab, Haryana / Experts consultation
5			Standard of living	PCA U.P., Punjab, Haryana / Experts consultation
6			Pressure on existing resources	Experts consultation
7		**Land Resources**	Soil Erosion	Experts / Stakeholders consultation
8			Soil Quality	Experts / Stakeholders consultation
9			Land Use Change	EIA / SIA (EDFC - 1, 2, 3)
10	**Ecological Profile**	**Bio Diversity**	Impact on flora & fauna	EIA / SIA (EDFC - 1, 2, 3), DFCC
11		**Agriculture**	Agricultural production	Experts / Stakeholders consultation
12	**Physical Environmental Profile**	**Air**	Air Quality Index	Experts / Stakeholders consultation
13		**Noise**	Noise Levels	Experts / Stakeholders consultation
14		**Water**	Water quality	Experts / Stakeholders consultation
15			Ground Water Resources	Experts / Stakeholders consultation
16		**Climate change**	GHG	Experts / Stakeholders consultation
17			Erratic Rainfall	Experts / Stakeholders consultation
18			Flash Flooding	Experts / Stakeholders consultation
19			Temperature Change	Experts / Stakeholders consultation
20	**Socio Economic**	**Infrastructure**	Roads	Experts / Stakeholders consultation
21			Traffic Congestion (Main Routes)	Traffic Projections, Stakeholders consultation
22			Traffic Congestion (Feeder Routes)	Traffic Projections, Stakeholders consultation
23			Rails	DFCC
24			Air Connectivity	Experts / Stakeholders consultation
25			Health Facilities (Number)	Experts / Stakeholders consultation
26			Education Facilities (Number)	Experts / Stakeholders consultation
27		**Industry**	Number of Industries	UPSIDC, PSIDC, HSIDC

Sr. No.	Valuable Environmental Components		Indicators	References / Basis
28		**Power Plants**	Power production (Number)	CEAI, CERC, BEE (Websites)
29	**Cultural Aspects**	**Archaeological Sites / Heritage Sites**	Impact on archeological Monuments	DFCC

On the basis of the identified VECs, spatial analysis, desktop study and study of the EIA & SIA Reports of the EDFC 1, 2 & 3, hotspots are identified. Hotspots identified include Khurja, Agra TTZ Area, Kanpur, Mugalsarai & Ludhiana. Hotspots are defined as the zones which have potential for expansion and can accommodate the developmental pressure. These hotspots are identified on the basis of primary study. These will be further enhanced after addition of input from stakeholder consultation and baseline study of the VECs. From the primary desktop study, it is obvious that these areas are significantly going to be impacted and this has helped focusing on these areas while carrying out stakeholder consultation.

Stakeholders have been selected with the help of expert's advice and discussion with DFCCIL. These stakeholders will be directly & indirectly impacted due to EDFC development. Stakeholders consulted include Government officials/agencies like SIDC, PWDs, NHAI, FCI, Agricultural & Irrigation Departments etc and General public. Consultations with the stakeholders have helped to identify the zones which have existing developments which have detrimental impact on environment and society, upcoming developments and planned developments in the area. These zones have been considered for carrying out CIA study.

Baseline study has been conducted to assess the existing condition or status of the identified VECs in the study area. Baseline study has been carried out on the basis of secondary information collected from EIA/SIA study of EDFC, data from pollution control boards, IMD, Agricultural departments and other Governmental Organization. Baseline study has provided the details of condition of identified VECs in the district through which EDFC will traverse. Through baseline study it has been identified that RPM concentration in air and noise levels in major town & cities is higher than NAAQS. Ground water quality and yield of aquifers in the study area is good. However contamination of ground water has been reported at many locations in study area. Ground water pollution is reported due leaching of industrial pollutants and usage of excess fertilizers. Ground water pollution is reported in Kanpur Nagar, Ludhiana, Firozabad etc. Surface water in the study area has been assessed and it has been found the rivers like Ganga, Kali, Hindon, Yamuna are highly polluted especially in downstream of the major towns & cities. All the districts do not have adequate sewage and effluent treatment facilities. Waste management system in the districts is also not adequate. No major eco-sensitive zone is identified within the study area. However an archaeological site (budiya ka Taal) is identified within study area along EDFC-1. For development of EDFC, large area of agricultural land has been diverted from all the districts through which EDFC will traverse. Land resources at many locations like Kanpur Nagar, Ludhiana, Patiala etc are already stressed. Future developments will further stress the land resources within these areas. Topography of the area through which EDFC traverse is flat land and geologically the study area is formed of younger alluvium of Ganga basin. Soil in this region is prone to erosion. Being alluvial, the soil is fertile and supports good crops. However, soil salinity problem is reported in some of the districts due to usage of excess fertilizers and irrigation. As per BIS classification, study area is classified as Zone III & Zone IV and has moderate to high seismic risk. Population density in the districts through which EDFC traverse varies from moderate to high. High population density is reported in Kanpur nagar, Ludhiana, Allahabad, Muzaffar Nagar and other zones.

Baseline study has helped to identify the VECs condition in the study area and through this study zones in which conditions of VECs is under stress are identified and are termed as hotspots. In addition to baseline studies hotspots are identified on the basis of literature review & stakeholder consultation. List of the finalized hotspots is given in below.

Finalized Hotspots Selected for CIA Study

S. No.	Zones	Criteria
1.	EDFC-1 (major hotspot Khurja to Bodaki)	This zone can experience high industrial growth and

S. No.	Zones	Criteria
		urbanization in future as land resources are available in plenty and connectivity will be improved due to development of EDFC and existing road infrastructure. Zone is **foreseeable as industrial hub/belt in future**
2.	EDFC-1 (major hotspot-Agra & Firozabad TTZ)	**This zone is highly sensitive as it falls under TTZ**. Any increase in pollutant concentration will show multiplied impact due to sensitivity as compared to other zones.
3.	EDFC-1 (Kanpur Dehat, Auraiya & Etawah)	Zone caters varied kind of industries. **Infrastructure facilities in the area are poor and already stressed due to existing developments.** As per stakeholder consultation, Kanpur Dehat, Auraiya and Etawah are zones identified for major developments like new industrial areas, plastic cities, townships, logistic hubs etc. Also land resources are available in Etawah and Auraiya area. These developments will impact already scarce existing infrastructure facilities in the area.
4.	EDFC-2 (major hotspot-Kanpur Nagar)	Kanpur Nagar is major industrialized area in Uttar Pradesh known for tanneries/leather producing industries, which are highly polluting. Kanpur was also declared as CEPI zone. **Baseline conditions of area are already critical**. Zone has also potential to absorb further proposed and anticipated developments like logistic hubs, industrial zones etc. These developments will significantly impact already stressed VECs
5.	EDFC-2 (major hotspot-Mugalsarai)	Mugalsarai lies within Chandauli District. District does not have major developments but its **close vicinity to Varanasi, which is highly populated city and area for development of inland water terminal make it zone foreseeable for future development.**
6.	EDFC-2 (Allahabad)	Allahabad is zone for high industrial and residential activities. Industries are not of polluting nature. In lieu of large area of the district, large land resources are available in the area. **This zone has high potential for catering large industrial and residential developments**.
7.	EDFC-2 (Mirzapur)	Area has various industrial areas and also various industrial areas are under implementation. **Varanasi to Mirzapur zone was also declared as CEPI zone.** Also zone has potential to receive various developments. Thus this zone is anticipated to experience cumulative impacts
8.	EDFC-2 (Kasuhambi)	It is anticipated with development of EDFC, **immediate industrial & infrastructural growth is expected in this region due to availability of land resources**. Also residential developments may come up within study area but in period of 4-5 years
9.	EDFC-3 (major hotspots-Ludhiana)	Ludhiana area is highly polluted, was declared as CEPI zone and also notified zone by CGWB. **Baseline conditions of area are critical.** Area supports large nos. of industries and both of polluting and non polluting types. Also various mega projects are under proposal in this zone. Thus impacts due to existing and anticipated developments in this zone will be severe and zone is thus considered for assessment of cumulative impacts.

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as "developments") when added to other existing, planned, and/or reasonably anticipated future ones. To assess the cumulative impacts, condition of

VECs of the identified hotspots due to existing developments has been assessed and the major impacted VECs have been selected out. Also nature of the impacts due to proposed/planned & anticipated development has been assessed quantitatively and the VECs which will be impacted by such developments are identified. Comparing the impacted VECs from existing development and identified VECs which may be impacted due to proposed/planned & anticipated development, it is found that future developments will also impact the VECs which are already impacted due to existing developments.

To identify the cumulative impact of the existing & future developments on these VECs in the identified hotspots, an interaction matrix has been prepared which shows how the existing, planned & proposed developments interact with the VECs in study area and what will be the cumulative impact.

Magnitude and significance of the identified impacts within hotspots has been done by assigning rating to the anticipated impacts. Rating has been done on the four parameters, i.e. Scale, severity, probability and duration. Weightage has been assigned to each of these parameters so as the average score can be calculated by multiplying the rating given to each parameter and weightage assigned. As per the assessment it is found that impact anticipated on VECs within the hotspots varies from Moderately low to High. Summary of assessment of impacts on VECs in the identified hotspots is summarized below.

Summary of the Anticipated Impacts Identified in the Zones Considered for CIA Study

S. No.	VECs	Average Scores									Remarks
		Khurja to Bodaki	Agra Firozabad TTZ	Kanpur Dehat, Auraiya &	Kanpur Nagar	Mugalsarai	Allahabad	Mirzapur	Kaushambi	Ludhiana	
1.	Air Quality	M	M	MH	MH	M	M	MH	M	MH	Impact variation from M-MH
2.	Water Quality	M	M	MH	MH	M	MH	MH	M	MH	Impact variation from M-MH
3.	Water Resources	MH	M	MH	MH	M	MH	M	M	MH	Impact variation from M-MH
4.	Noise Level	M	M	M	M	M	M	M	M	M	Moderate Impact
5.	Vibrations	ML	ML	M	M	ML	M	M	M	M	Impact variation from ML-M
6.	Bio-Diversity	MH	MH	MH	MH	MH	M	M	M	MH	Impact variation from M-MH
7.	Soil Quality	MH	M	M	MH	M	M	MH	M	M	Impact variation from M-MH
8.	Soil Erosion	M	M	M	M	M	M	M	M	M	Moderate Impact
9.	Land Use	MH	MH	MH	MH	M	M	M	M	M	Moderate Impact
10.	Quality of Life	ML	ML	ML	ML	L	ML	ML	ML	ML	Impact variation from L-ML
11.	Pressure	MH	MH	MH	H	MH	MH	MH	MH	H	Impact

S. No.	VECs	Average Scores									Remarks
		Khurja to Bodaki	Agra Firozabad TTZ	Kanpur Dehat, Auraiya &	Kanpur Nagar	Mugalsarai	Allahabad	Mirzapur	Kaushambi	Ludhiana	
	on Existing Resources										variation from MH-H
12.	Micro-Climate	MH	MH	MH	MH	M	M	M	M	MH	Impact variation from M-MH
13.	Natural Drainage Pattern	MH	M	M	M	M	M	M	M	M	Impact variation from M-MH

The anticipated impacts have been assessed as positive, negative and nil on the identified VECs. It is seen that proposed planned development will further impact VECs which are already impacted either by improving or deteriorating the condition. The cumulative impacts have been assessed from the point of various projects that are being proposed or in the implementation stage across this DFCCIL corridor. However, the impacts along this entire section of the DFCCIL collectively indicate that there would be about 5529 ha of land being acquired with 39,912 families being affected. Along with this there are about 712 structures belonging to the BPL category being affected and 52,969 vulnerable project affected persons due to the project development. 1,03,457 trees are proposed to be felled.

It has been assessed that anticipated impacts are being caused due to developments thus can be managed, if appropriate mitigation measures will be taken. All the impacts identified are mitigable and manageable.

It is assessed that cumulative GHG emissions over the 30 year period in the No-DFCCIL project scenario would have been 582 million tonnes CO_2 while in the DFCCIL project scenario it would be 124.5 million tonnes CO_2. This demonstrates that in absence of DFCCIL project approximately 4.5 times more GHG would be emitted in 30 year period for freight transportation in the Eastern and Western Corridor.

However, the anticipated negative impacts on identified VECs are localized, short term and transient in nature particularly in construction phase, which could be mitigated by implementation of environment and social management plans, applicable best practices of concerned sector(s), etc. Modal shift of freight from road to railway will further offset the anticipated impacts on negative VECs related to air quality, noise, etc. However, air quality will improve due to modal shift in operational phase of the project. Overall, it is anticipated that positive impacts like development of new infrastructure, creation of new employment opportunities, livelihood improvement leading to improved quality of life, socio-economic parameters, improved access to goods and services to be provided by the project will outweigh the anticipated negative impacts (which can be mitigated) and contribute to realisation of project objectives and intended benefits.

Further, these impacts are being caused due to existing developments and will be caused due to future developments in study area. DFCCIL will be involved directly and indirectly in majority of these developments. Developments which will be directly or indirectly linked with EDFC developments and will involve DFCCIL participation either directly or indirectly are listed below.

Role of DFCCIL in Various Developmental Projects in Study Area

S. No.	Developments	Authority Responsible Directly	Under Control/Influence of DFCCIL	Role of DFCCIL
1.	Development of EDFC	DFCCIL	Yes	To ensure implementation of project and operation of project as per proposed

S. No.	Developments	Authority Responsible Directly	Under Control/Influence of DFCCIL	Role of DFCCIL
				EMP
2.	Expansion of IR & DFC	IR & DFCCIL	Yes-directly for DFC, indirectly for IR	To carry out EIA study for expansion project and ensure implementation and operation as per proposed EMP. To learn from current development projects and include the learning from EDFC development projects in expansion project To coordinate with IR and sharing the experience for environmental protection during EDFC development project and suggesting the best methods they could take to minimize impact on environment
3.	Development of loading & unloading yards	DFCCIL	Yes	Area with good connectivity should be selected by DFCCIL for the unloading & loading yards. Also the area should not be close to sensitive locations and heavily populated areas. Roads connecting these yards to main markets should be wide enough to cater to the emerging traffic from these yards. Else DFCCIL should coordinate with State Road development authorities, DTP & NHAI to include such developments in their planning.
4.	Logistic parks	SIDCs & DICs, State Governments	Yes- indirectly	DFCCIL should provide direct connectivity to such parks so as to minimize transportation of material to DFC alignment via road.
5.	Industrial Zones	SIDCs & DICs, State Governments	Yes-indirectly	DFCCIL should arrange to establish unloading and loading yards near such zones so that these zones can get direct benefit from development of EDFC. EDFC should establish their parcel booking office in such zones and should arrange for transportation system to collect bulk freight from such zones and transport to EDFC alignment in non-peak hours to minimize the traffic congestion and reduced emission by transporting material in non peak hours. Time management should be done by DFCCIL so as delays in transportation of material to these zones can be minimized. Also DFCCIL should coordinated with SIDC & Warehouse Development and Regulatory Authority to construct warehouses near the crossing and junction stations so as material carried by trains can be
6.	Industrial Corridors	SIDCs, DICS, State Government	Yes-indirectly	DFCCIL should assess the nature of industries proposed in industrial corridor and should be able to supply such material through railways. DFCCIL should coordinated with IR to ensure transportation of the DFCCIL material through feeder routes in these corridors,

S. No.	Developments	Authority Responsible Directly	Under Control/Influence of DFCCIL	Role of DFCCIL
				if these corridors are not along the alignment of proposed DFCs.
7.	Thermal Power Plants	NTPC, Ministry of Power	Yes-indirectly	DFCCIL should assess the demand of coal by existing, proposed and planned developments. Carriage of coal should be systemized by DFCCIL so as existing gap between the demand and supply of coal can be bridged after development of EDFC. DFCCIL should ensure transportation of coal in covered wagon only. DFCCIL should ensure that dust generation should be minimized while unloading coal. It should be ensured be DFCCIL by coordinating with TPP authority so as coal can be transported immediately after its unloading
8.	Improvement of existing roads & highways or development of new highways or roads	State road & bridge development corporation & NHAI	Yes-indirectly	DFCCIL should coordinate with these authorities especially for expansion of roads & highway connected to crossing & junction stations of proposed EDFC so as traffic congestion on these routes can be minimized and thus air pollution
9.	Waterways	IWAI	Yes-indirectly	DFCCIL can coordinate with IWAI for transporting material transported through inland waterways. DFCCIL should ensure transportation of material between IWAI and DFCCIL should be in environmental sound manner.

A detailed mitigation plan has been prepared at an early stage of the project so as the mitigation of impact can be done due to project in all the project stage, i.e. pre-construction, construction and operation stage.

Mitigation measures includes the preventive measures which when taken can either eliminate or reduce the intensity of the cumulative impacts on the VECs. These mitigation measures ensure the environmental sound implementation of the project and enhance social acceptability of the project.

Mitigation measures as proposed in EIA/SIA studies have also been reviewed in detail. It has been found that mitigation measures proposed are adequate and address all major and minor issues which may have an impact on environment and society. After carrying out the CIA study and assessment of the baseline condition of the areas through which proposed EDFC traverses and nature of developments which this area will experience after development of EDFC, it is learned that some of the measures should be further added to the Mitigation plans described in EMPs prepared for EDFC so as impact not only due to EDFC development but also due to other developments in study area can be minimized. Enhancement measures includes interaction of EM cell officials with the various authorities which will develop the facilities which will be benefitted directly or indirectly due to EDFC development, enhancing the compensatory afforestation provision from 1:2 to 1:3 or more as per possibility, Identification of waste or barren land for developments in place of diversion of agricultural land, monitoring survival rate of the plantation carried out, more robust storm water management and harvesting structures etc. Additional mitigation measures includes detailed mitigation measures for borrow areas, quarry sites, improving drainage, development and maintenance of freight loading and unloading, access roads, feeder lines, Road Over Bridges (ROBs) and Railways Footover Bridges (RFOs).

Mitigation plan has been prepared for each of the proposed/planned & anticipated development. This plan includes the measures to be taken to minimize the environmental pollution due to these developments.

Mitigation measures proposed are suggestive and should be shared by DFCCIL with all the agencies aiming to carry out development in the study area. This can be done by displaying the mitigation plan in the website of DFCCIL. Also it is suggested which environment plans are required to prepared for which development. Authority responsible for such development & role of DFCCIL in such development has also been detailed.

DFCCIL should incorporate suggestive enhancement measures in their EMPs and should ensure all these suggestive measures are being complied with. DFCCIL should regularly monitor the status of the VECs in the study area on regular basis. The report should be uploaded on DFCCIL website so as any new developer or state authorities can know the status of the VEC in the study area and can plan the development accordingly. Also it is essential that environment management plan should be prepared for each development by respective responsible authority. Suggested environment management plans given above will help the agencies to include the cumulative impact in their mind while finalizing the mitigation plans.

Monitoring parameters identified which should be monitored to assess the conditions of VECs and frequency and location of monitoring is given below.

Monitoring plan

S. No.	Valuable Environmental Components		Indicators	Location	Frequency	Coordination Agency
1	**Physical Features / Habitats**	**Urban Centers / Agglomerations**	Population	District Wise	Once in 10 years	ORGI & CC
			Literacy			
			WFPR			
			GDP			
			Standard of living			
			Pressure on existing resources			
		Land Resources	Soil Quality	District Wise	Six Monthly	Agriculture Departments
			Land Use Change		Yearly	DTP
2	**Ecological Profile**	**Bio Diversity**	Inventory of flora & fauna	District Wise	Yearly	Forest Department
		Agriculture	Agricultural production	District Wise	Yearly	Agricultural Department
3	**Physical Environmental Profile**	**Air**	Air Quality Index	District Wise & within 300 m of EDFC alignment	Six Monthly	SPCBs & CPCBs
		Noise	Noise Levels	District Wise & within 300 m of EDFC alignment	Six Monthly	SPCBs & CPCBs
		Water	Water quality	District Wise	Six Monthly	Irrigation Departments & SPCBs
			Vibrations	Within 300 m of EDFC alignment	Six monthly	IR
			Ground Water Resources	District Wise	Six Monthly	CGWB & State Jal Boards
		Climate Change	GHG	For EDFC and material transportation to & from EDFC	Yearly	All the agencies transporting and receiving material from EDFC
			Erratic Rainfall	District Wise	Yearly	IMD
			Flash Flooding	District Wise	Yearly	District Disaster Management Agency & IMD
			Temperature Change	District Wise	Five Yearly	IMD
4		**Infrastructure**	Roads	Within 10 kms of EDFC alignment	Yearly	State Road & Bridge Development Corporation & NHAI
			Traffic Congestion (Main	Within 10 kms of	Yearly	Vehicle

S. No.	Valuable Environmental Components		Indicators	Location	Frequency	Coordination Agency
			Routes)	EDFC alignment		Registration Office & All the agencies transporting and receiving material from EDFC
			Traffic Congestion (Feeder Routes)	Within 10 kms of EDFC alignment	Yearly	All the agencies transporting and receiving material from EDFC
			Rails	Within 300 m from EDFC alignment	Yearly	IR
			Air Connectivity	Within 10 kms of EDFC alignment	Yearly	AAI, DGCA
			Health Facilities	District Wise	Yearly	DTP , ORGI & CC
			Education Facilities	District Wise	Yearly	DTP, ORGI & CC
		Industry	Number of Industries	District Wise	Yearly	DTP, SIDCs & DIC
		Power Plants	Power production (Number)	District Wise	Yearly	NTPC, SIDCs & DIC
5	**Cultural Aspects**	**Archaeological Sites / Heritage Sites**	Impact on archeological Monuments	Within 300 m of EDFC alignment	Yearly	ASI

The CIA report also provides Recommendations and Best practices in the sector to manage the cumulative impacts in area of influence including those which are identified as hotspots as per the CIA study as given below:

-Siting of Proposed Industries and manufacturing units should conform to State and district level Environment Atlas, State level siting guidelines, district specific siting guidelines, and Zoning atlas (e.g. Ghaziabad & Ludhiana) prepared by CPCB/SPCB related to the concerned area.

- Type and nature of proposed industries/manufacturing units should conform to Consent classification of Industries (Red, Orange and green) as applicable in the concerned area in consultation with CPCB/SPCB

-Type and nature of proposed industries/manufacturing units should conform to CEPI related guidelines/directions, in accordance with moratorium, if any, relating to the concerned area.

-Recommendations for planning and management of Railway Sidings in India as may be applicable to the DFCCIL project.

Guidelines for Environment Management of Railway sidings have been provided. These include coal sidings, cement sidings, food grain and fertilizer, POL, mineral, industrial materials, common material, container handling, and environment management plan thereof. The guidelines include conclusions, challenges and recommendations.

Organizational framework includes environment management cell which ensures implementation of project in environmental and socially sound manner. They also ensure all aspects of safety are being addressed at site as mentioned in the plan. Roles and responsibility of each of the person is defined. Further suggestions are made here to increase the scope of work of each of such person so as the cumulative impact on VECs can also be mitigated.

Based on the above analysis and implementation plan, it is expected that the proposed project will lead to sustainable development.

Chapter 1: Introduction & Background

1.0 Introduction

The railway network connecting the four metros of Delhi, Mumbai, Kolkata and Chennai carries more than 55% of the freight and passenger traffic of Indian Railways (IR) and is known as 'Golden Quadrilateral' of IR. To cater the growing traffic needs of this corridor and ensure efficient transportation of freight, DFCCIL has proposed to develop Dedicated Freight Corridors (DFC) along this network. Dedicated Freight Corridor Corporation of India Ltd. (DFCCIL) has sought World Bank Loan assistance for Implementation of part of Eastern Dedicated Freight Corridor (EDFC) starting from Sahnewal (Ludhiana) to Mugalsarai. This section is further divided into three phases namely EDFC-1 (393.85 kilometer from Bhaupur (Kanpur) to Khurja to Dadri), EDFC-2 (448.51 kilometer from Bhaupur to Mugalsarai) and EDFC-3 (395.1 from Sahnewal (Ludhiana) to Khurja-Dadri).

In this context, DFCCIL intends to carry out Cumulative Impact Assessment (CIA) of Eastern Dedicated Freight Corridor (EDFC) from Mughalsarai to Sahnewal (Ludhiana) for: (a) analyzing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible. DFCCIL has awarded M/s IRGSSA & M/s Abnaki Infrastructure Applications & Integrated Development Private Limited, the task of carrying out Cumulative Impact Assessment (CIA) study. Consultants are submitting the Interim Report since the startup of this assignment from 13th May 2015.

1.1 Objectives

The main objectives of this study are as follows:

- Assess the potential impacts and risks of a proposed and other developments over time on a chosen VEC;
- Verify that the proposed development's cumulative social and environmental impacts and risks will not exceed a threshold that could compromise the sustainability or viability of selected VECs;
- Confirm that the proposed development's value and feasibility are not limited by cumulative social and environmental effects;
- Support the development of governance structures for making decisions and managing cumulative impacts at the appropriate geographic scale (e.g., airshed, river catchment, town, regional landscape);
- Ensure that the concerns of affected communities about the cumulative impacts of a proposed development are identified, documented, and addressed; and
- Manage potential reputation risks

1.2 Study Area

The EDFC alignment from Sahnewal to Mughalsarai passes through the states of Punjab, Haryana and Uttar Pradesh. It runs all along the existing Indian Railway Track with certain detours. The entire stretches passes through plain terrain. The location map of the EDFC project corridor and details overview of alignment is given in **Figure 1.1 and Table 1.1**.

Table 1.1: Details of EDFC Project Alignment

Projects	Section	Length (km)	Number of Tracks	Approx. Cost (US$ m)
EDFC1	Bhaupur (Kanpur)-Khurja-Dadri	393.85	Double	1,453
EDFC2	Bhaupur (Kanpur)- Mughal Sarai	448.51	Double	1,670
EDFC - 3	Sahnewal (Ludhiana)-Khurja-Dadri	395.1	Single	1,583
Program		1237.46		4,696

Source: DFCCIL

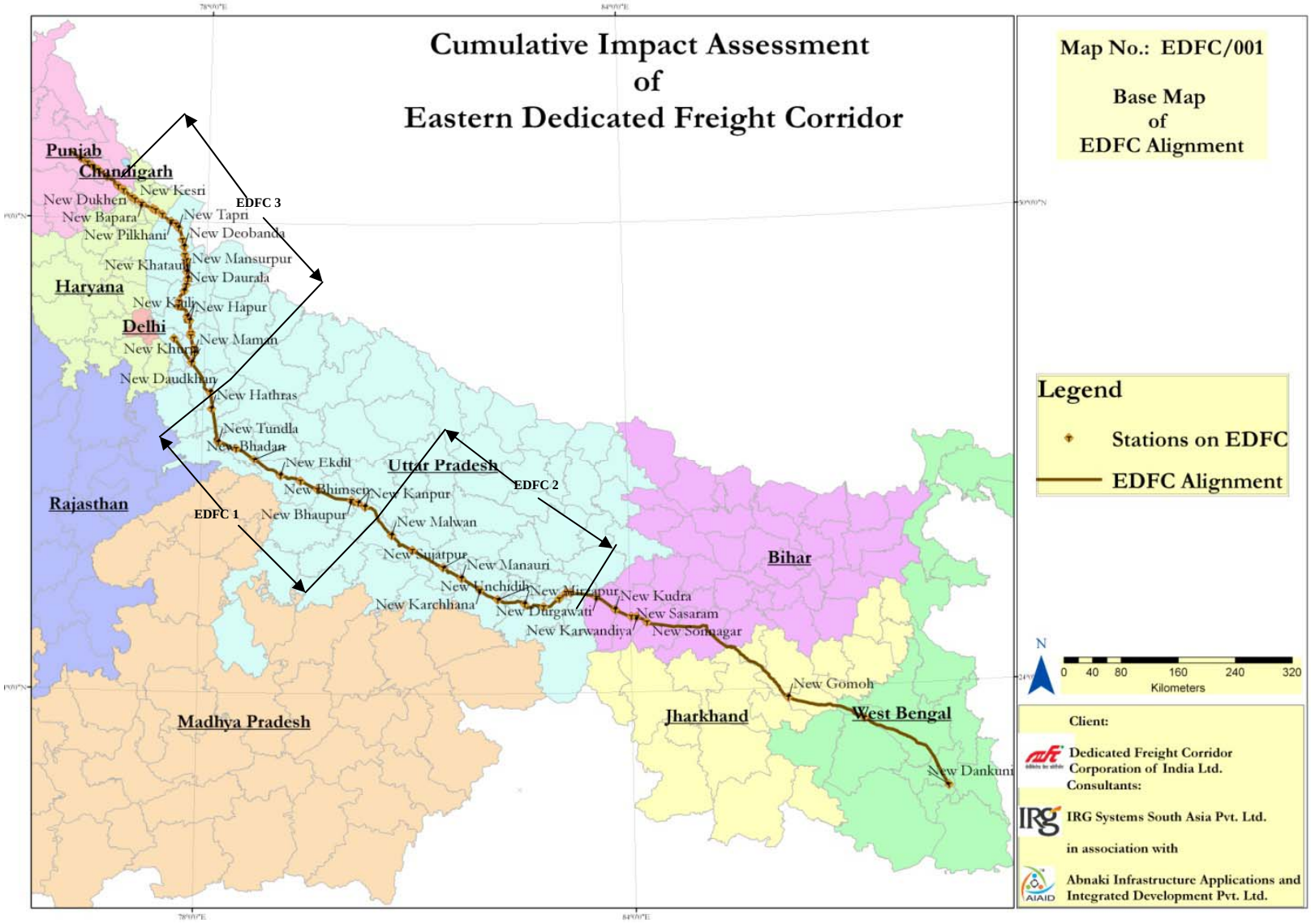


Figure 1.1: Location and Alignment of the Project

Source: IRGSSA

1.3 Approach & Methodology

Stepwise approach & methodology (A&M) is given below.

Step 1: Identify VECs, and determine spatial and temporal Boundaries for CIA
Step 2: Identify other activities and developments affecting VECs
Step 3: Establish information on baseline status of VECs
Step 4: Assess cumulative impacts on VECs
Step 5: Assess significance of predicted cumulative impacts
Step 6: Management of cumulative impacts – design and implementation

The above step wise approach has been converted into activities and tasks as mentioned below & schematically shown in **Figure 1.2.**

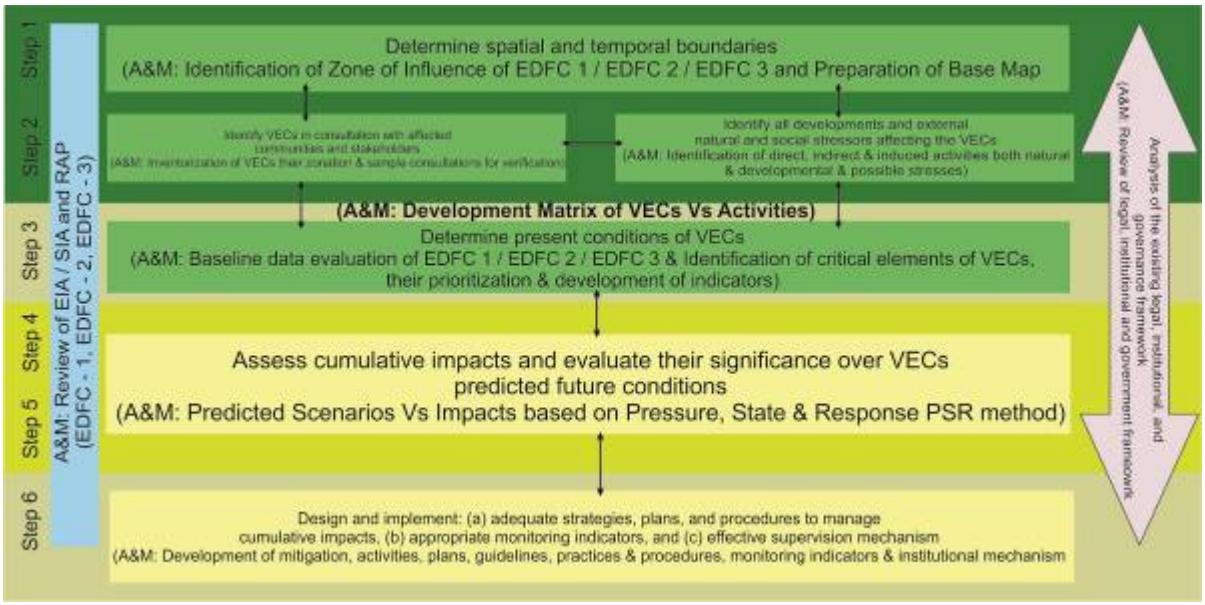


Figure 1.2: Schematic Representation of Proposed Approach & Methodology (A&M)

Activity 1: Scoping Phase I – VECs, Spatial and Temporal Boundaries

1. Identify the VECs to include in the CIA.
2. Identify the spatial boundaries of the CIA.
3. Identify the temporal extent of the CIA.

A&M: (1) Determine spatial and temporal boundaries (Identification of Zone of Influence of EDFC 1 / EDFC 2 / EDFC 3 and Preparation of Base Map) Identify VECs in consultation with affected communities and stakeholders (2) Inventorization of VECs their zonation & sample consultations for verification.

Activity 2: Other Activities and Environmental Drivers

1. Identify other existing and reasonably predictable projects and human activities that do/would affect the VECs to be included in the CIA;
2. Identify natural environmental drivers that also impact the condition of VECs identified in Step 1.

A&M: Identify all developments and external natural and social stressors affecting the VECs Identification of direct, indirect & induced activities both natural & developmental & possible stresses.

Activity 3: Establish Information on Baseline Status of VECs

1. Collect available information on the impacts of the other activities and natural drivers on the condition of the VEC;
2. Collect available information on VEC trends;
3. Collect any available information on regional thresholds for VECs (e.g. air pollution).

A&M: (1) Identify all developments and external natural and social stressors affecting the VECs Identification of direct, indirect & induced activities both natural & developmental & possible stresses (2) Development Matrix of VECs Vs Activities.

Activity 4: Assess Cumulative Impact on VECs

1. Establish indicators for expression of VEC condition. This may already be reflected in the information collected on VEC baseline status (in Step 3 above). If not, then indicators may need to be established that can be estimated from the baseline information;
2. Estimate the "future baseline" for condition of the VECs—i.e., the condition of VECs as affected by the other projects, human activities, and natural drivers; and Estimate the project impact on VEC condition. This estimation is done with the effects of planned project mitigation included; and
3. Estimate the cumulative impact on VECs—the total impact on the VECs when the impacts of the development are combined with the future baseline.

A&M: Baseline data evaluation of EDFC 1 / EDFC 2 / EDFC 3 & Identification of critical elements of VECs, their prioritization & development of indicators.

Activity 5: Assess Significance of Anticipated Cumulative Impacts

1. Assess the significance of the foreseen cumulative impacts on the VECs;

Activity 6: Management of Cumulative Impacts: Design and Implementation

1. Identify, when necessary, additional project mitigation (beyond that identified in the project ESIA) to reduce an estimated unacceptable cumulative impact on a VEC to an acceptable level. This should represent effective application of the mitigation hierarchy

in environmental and social management of the specific project contributions to the expected cumulative impacts;
2. If necessary, identify the potential, or need for, additional mitigation of other existing or reasonably predictable future projects;
3. Identify the potential for other regional strategies that could maintain VECs at acceptable conditions; and
4. Undertake best efforts to engage, enhance, and contribute to a multi-stakeholder collaborative approach for the implementation of management actions that are beyond the capacity of the project proponent.

A&M: (1) Assess cumulative impacts and evaluate their significance over VECs predicted future conditions (Predicted Scenarios Vs Impacts based on Pressure, State & Response PSR method). Design and implement: (a) adequate strategies, plans, and procedures to manage cumulative impacts, (b) appropriate monitoring indicators, and (c) effective supervision mechanism (2) Development of mitigation, activities, plans, guidelines, practices & procedures, monitoring indicators & institutional mechanism)

Activity 7: Stakeholder Engagement

1. Identify the stakeholders getting affected during the construction phase and operational phase of the project and other developmental proposals along the alignment.
2. Consultation with stakeholders including public, line departments, infrastructure, service providers and experts.
3. Incorporate input from other people knowledgeable of the study area to inform conclusions about future land use and developments in the study area.
4. Identify and finalise the Hotspots / Pressure Points based on Consultations.

1.4 Format of the Report

Cumulative Impact Assessment Report has been compiled in seven chapters after incorporating comments received on Draft Final Report and two stakeholder consultations organized in Delhi/NCR & Lucknow. The table of contents of each chapter is given below.

Chapter 1 Introduction and Background: This chapter describes Introduction; Objective of the Study as per ToR; Study Area; Approach and Methodology.
Chapter 2 Project Description: This chapter describes components of EDFC 1, EDFC 2 & EDFC 3 in an integrated manner and applicable legislations and World Bank policies.
Chapter 3 Baseline: This chapter describes cumulative baseline including EIA's of EDFC 1, EDFC 2 & EDFC 3 in an integrated manner.
Chapter 4 Other Development Proposals and Stakeholders: This chapter describes development proposals and stakeholders and consultation carried out so far.
Chapter 5 Delineation of CIA Boundary and VEC: This chapter describes fixation of CIA boundary & VECs. This chapter also describes example of a stretch analyzed for CIA, VEC impacts, management & mitigation measures.
Chapter 6 Cumulative Environmental Impact Assessment: This chapter describes impact matrix consisting of direct, indirect & induced impacts.
Chapter 7 CIA Impact Assessment Mitigations Measures: This chapter describes mitigation measures, recommendations, best practices, etc.

CHAPTER 2: DESCRIPTION OF THE PROJECT

2.0 Introduction

This chapter presents the details of three phases, their project components and salient features, based on the detailed project report prepared by DFCCIL. At first, project description has been summarized. This is followed by summary of project components of sub projects i.e. EDFC 1, EDFC 2, EDFC 3.

2.1 Project Description

The Eastern Dedicated Freight Corridor (EDFC) is divided into three sub projects namely. EDFC-1 of 344.16 kilometer length from Bhaupur-Khurja section, EDFC-2 of 448.51 kilometer length from Bhaupur to Mughalsarai section and EDFC-3 of 445.71 kilometer length from Sahnewal (Ludhiana) to Khurja - Dadri Section.

The eastern corridor encompasses a double line electrified traction corridor from Sone Nagar on the East Central Railway to Khurja on the North Central Railway, Khurja to Dadri on NCR double line electrified corridor and single electrified line from Khurja to Ludhiana on Northern Railway.

For CIA study, sections of EDFC from Mugalsarai to Khurja, Khurja to Dadri and Khurja to Ludhiana have been considered. The total length of EDFC from Mugalsarai to Khurja, Khurja to Dadri and Khurja to Ludhiana work out to 1237.46 Kms. The project map of Eastern Dedicated Freight Corridor (EDFC) is shown in **Figure 2.1**. As per DFCCIL, the revised cost estimate of Rs. 81,459 crore comprises of construction cost of Rs. 73,392 crore of the Eastern and Western DFC (Eastern DFC - Rs. 26,674 crore and Western DFC- Rs. 46,178 crore) and land cost of Rs. 8067 Crs. The various other salient features of each corridor are described in the below given **Table 2.1**.

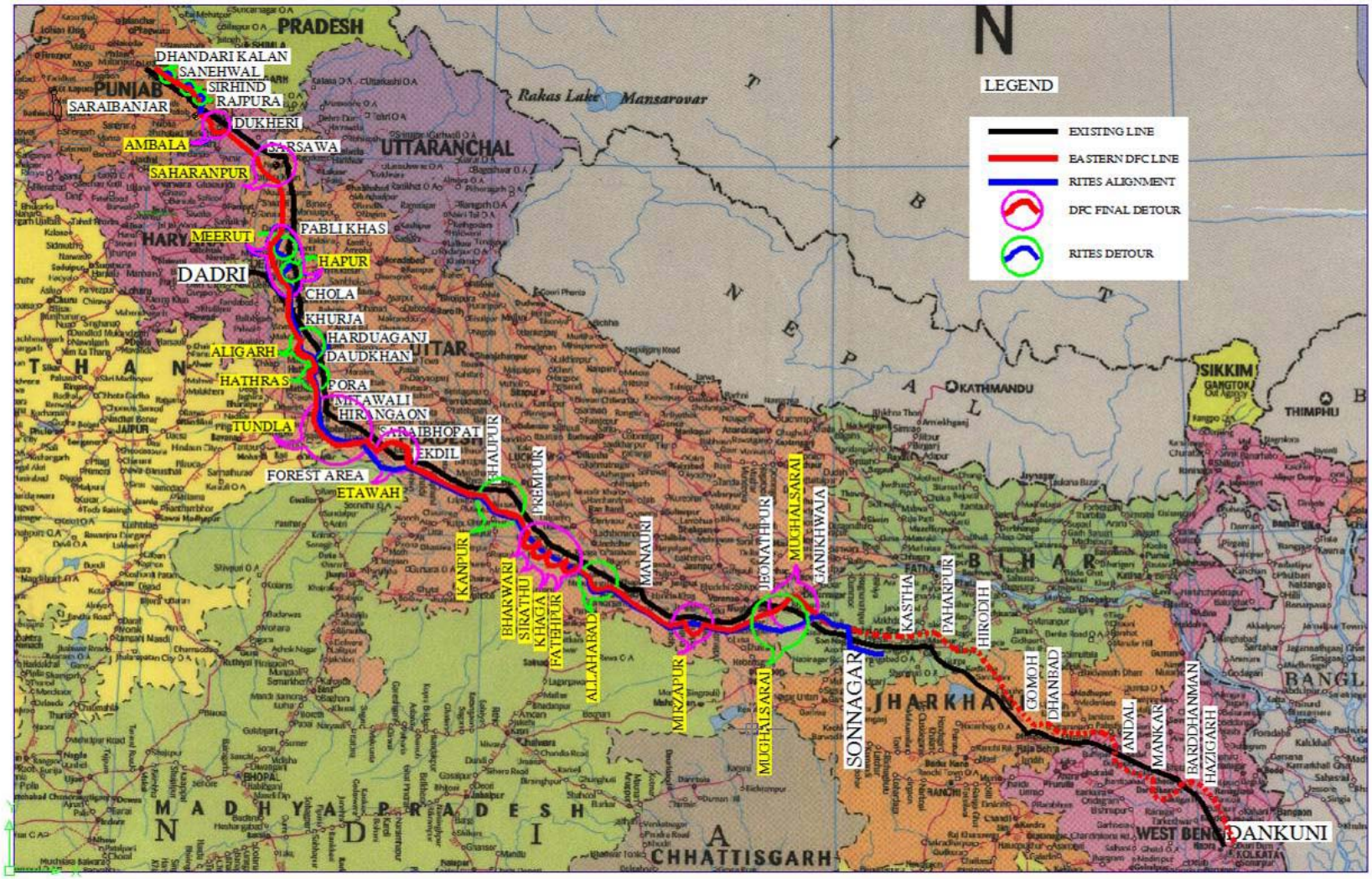


Figure 2.1: EDFC Project Map

2.1.1 EDFC-1: (Bhaupur-Khurja Section of EDFC)

EDFC-1 section, i.e. Bhaupur (Kanpur) to Khurja-Dadri is divided into three sub-sections, i.e. Khurja to Bhaupur, and Kaurara to Chamrola for study purpose. Stretch from Bhaupur to Khurja (272 km) passes through eight districts of Uttar Pradesh i.e. Kanpur dehat, Auraiya, Etawah, Firozabad, Hathras (Mahamaya Nagar), Agra, Aligarh and Bulandshahar. The project stretch from Kaurara to Chamrola (72.16 km) passes through two districts of Uttar Pradesh i.e. Agra and Ferozabad. For the EDFC-1, the loan agreement for US $ 975 million to cover the first package of 343 km from Khurja to Kanpur was signed in October 2011.

Total length of the EDFC-1 Corridor is 344.16 Kms (Double line); out of which 107.56 Kms are in detour section & balance 236.6 Kms are in parallel to the existing North Central IR track. There are 6 junction stations and 5 crossing stations in this section. ROW width is considered majorly around 20-40 m in the parallel section and 40-60 m in detour. The alignment of Bhaupur-Khurja corridor of EDFC (EDFC-1) is shown in **Figure 2.2 a, b & c**.

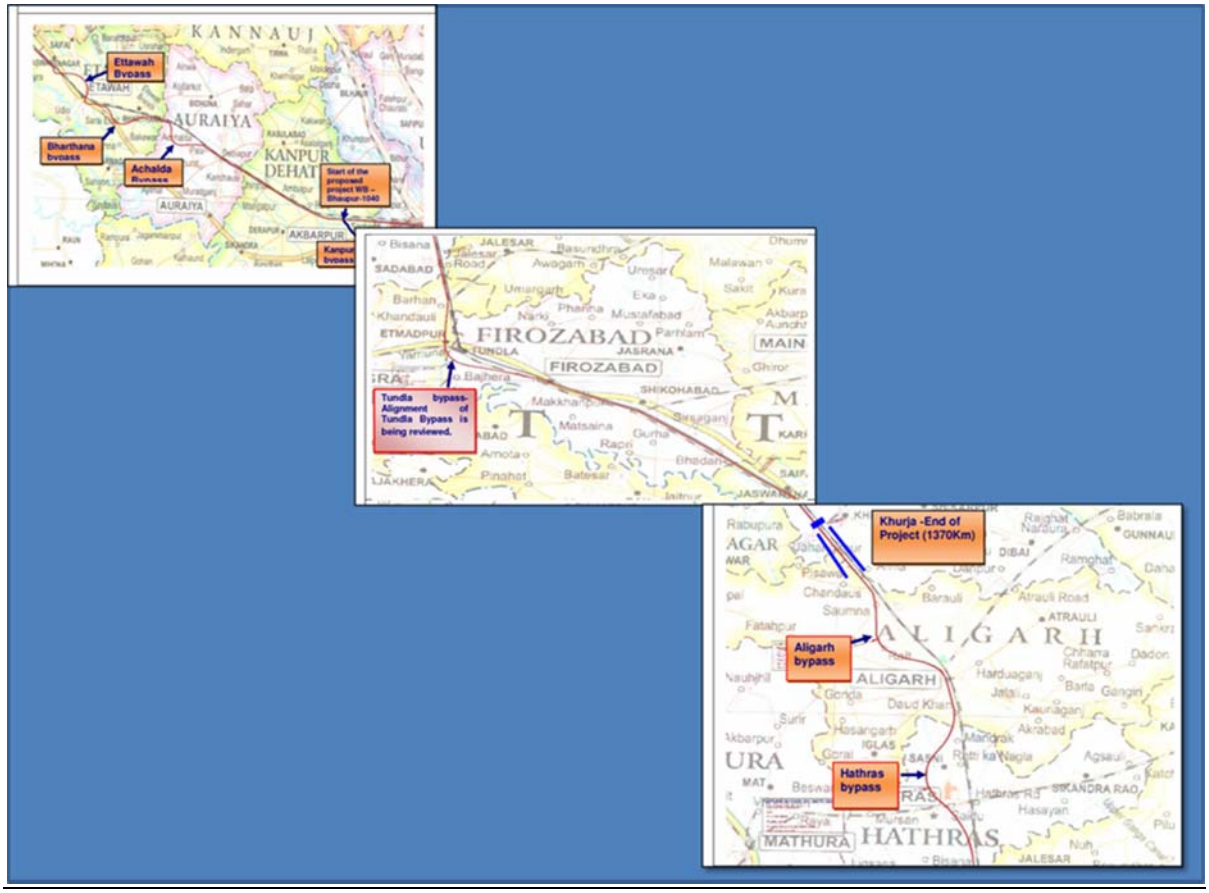


Figure 2.2 (a): Alignment of Bhaupur-Khurja Section of EDFC 1

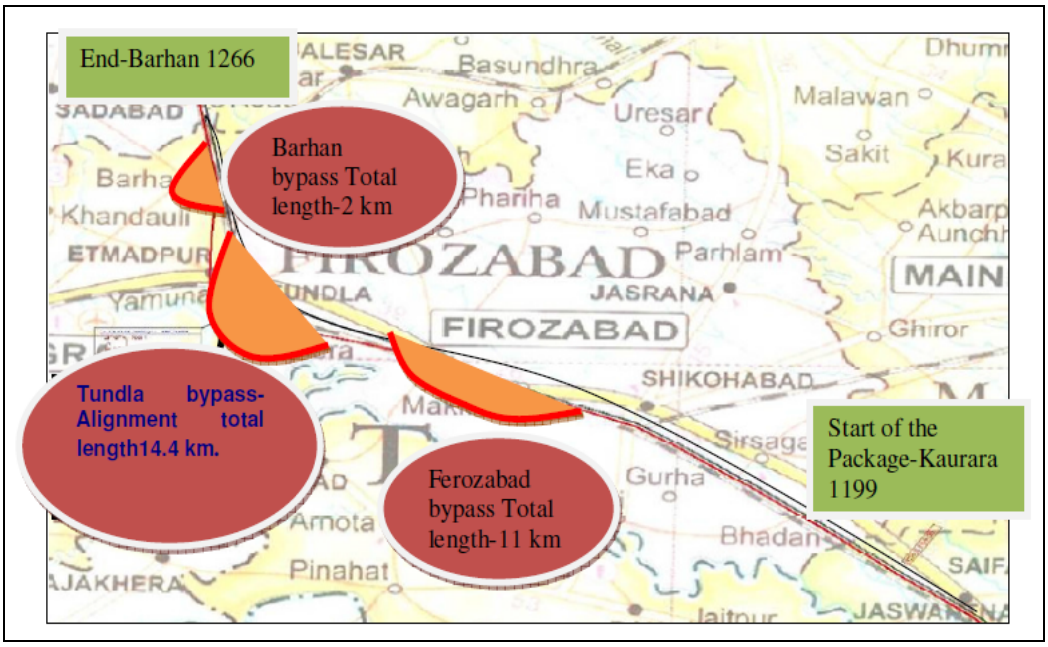


Figure 2.2 (b): Alignment of Kaurara to Chamrola Sub-Section

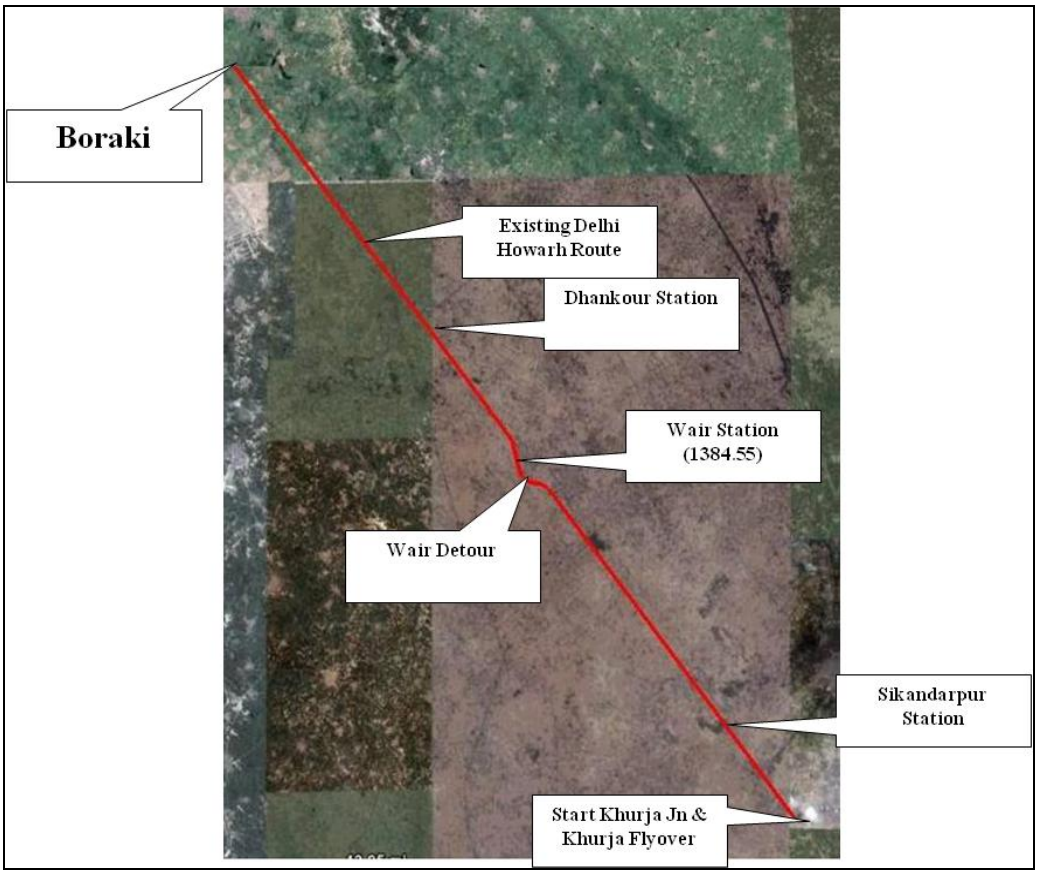


Figure 2.2 (c): Alignment of Khurja to Dadri Sub-Section

2.1.2 EDFC-2 (Kanpur- Mughal Sarai section of EDFC)

The entire stretch from Bhaupur to Mugalsarai passes through nine districts of Uttar Pradesh i.e. Kanpur Dehat, Kanpur Nagar, Fathepur, Kaushambi, Allahabad, Mirzapur and Chanduli. Total length of the Mughalsarai-Bhaupur Corridor is 448.51 Kms (Double line); out of which 191.41 Kms are in detour section & balance 257.5 Kms are in parallel to the existing North Central Railway track. ROW width is around 20-40 m in the parallel section and 40-60 m in detour. The loan of US $ 1100 million was signed in December 2014 for the second package of 402 km from Kanpur to Mughalsarai (EDFC-2). The alignment of Kanpur- Mughal Sarai corridor of EDFC is shown in **Figure 2.3**.

Figure 2.3: Alignment of Kanpur- Mughal Sarai section of EDFC 2

2.1.3 EDFC-3 (Ludhiana- Khurja-Dadri Section of EDFC)

EDFC-3 corridor, i.e. from Sahnewal to Khurja – Dadri (445.71 km) is divided into three sub-sections, i.e. Khurja to Pilkhani (220.710 km) and Pilkhani to Sahnewal (175.0 km) and Khurja to Dadri (50 kms) for study purpose. The stretch from Khurja to Pilkhani passes through six districts of Uttar Pradesh i.e. Bulandshahr, Ghaziabad, Hapur, Meerut, Muzaffarnagar and Saharanpur. The entire stretch from Pilkhani (Uttar Pradesh) to Sahnewal (Ludhiana) passes through six districts namely Saharanpur (Uttar Pradesh), Yamunanagar, Ambala (Haryana), Fatehgarh Sahib, Patiala and Ludhiana (Punjab) and the project stretch from Khurja to Dadari (49.69 km) passes through two districts of Uttar Pradesh i.e. Bullandshahar and Gautam Budh Nagar.

Out of total length of 445.71 kms, 136.775 kms is under detour and remaining 308.825 kms is parallel to existing IR track. World Bank was finalized for a loan of US$ 650 million for the third

package covering the 446 km Dadri-Khurja-Ludhiana section, The alignment of Ludhiana- Khurja corridor of EDFC is shown in **Figure 2.4 a&b**.

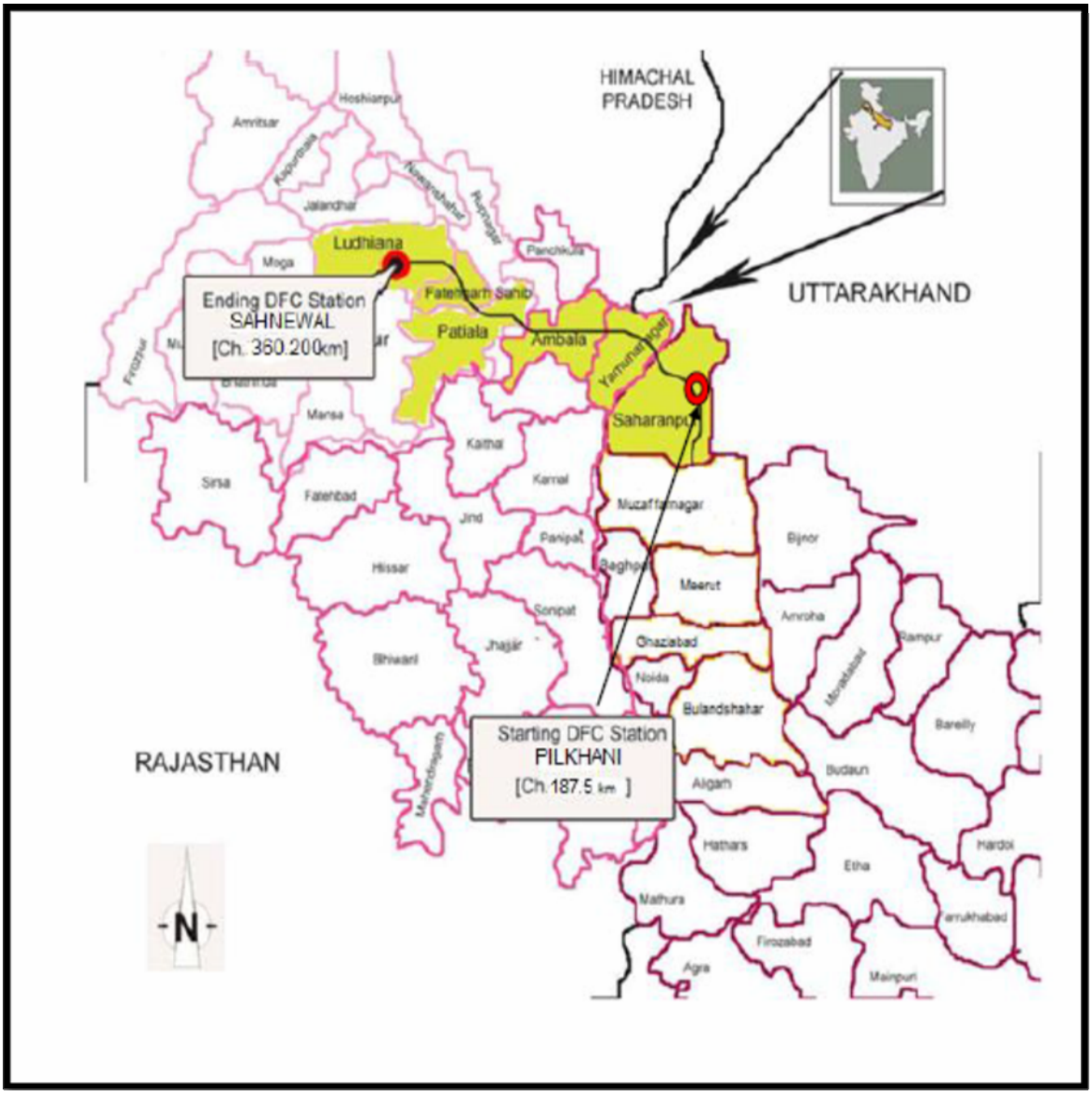


Figure 2.4 (a): Alignment of Sanehwal (Ludhiana) -Pilkhani Corridor of EDFC 3

Figure 2.4 (b): Alignment of Khurja-Pilkhani Corridor of EDFC 3

2.2 Components of the Project

Salient features of the project (EDFC 1, EDFC 2 & EDFC 3) describing project components have been summarized in **Table 2.1**. These project components include route (parallel & detour), gradient, standard of construction, formation, curves, track centres, bridges, road crossings, stations and additional land requirements.

Table 2.1: Salient Features of EDFC Project

Sr. No.	Description	Details						
		EDFC-2 Mugalsarai to Bhaupur		EDFC-1 (Bhaupur to Khurja)		EDFC-3 (Sahnewal-Khurja-Dadri)		
		Bhaupur-Prempur	Prempur-Karchana-Mugalsarai	Bhaupur to Khurja	Detour Kaurara to Chamrola	Khurja to Dadri	Khurja to Pilkhani	Pilkhani to Sahnewal
1	Route Length (km)	56.51	392	272	72.16[1]	49.69 km, say 50 km	220.710	175
2	Parallel (km)	8.50	249	194	42.6	36.42 km	110.195	162.21
3	Detour (km)	48.41	143	78	29.56	13.27 km	110.515 (+0.2) Excludes Khurja Flyover	12.79
4	No. of Detour	1	7	5	3	1	2	3
5	**Gradient**							
a	Ruling Gradient	1 in 200 (Compensated)	1 in 200 (Compensated)	1 in 200 (compensated)	1 in 200 (Compensated)	1 in 200 (Compensated)	1 in 200 (Compensated)	1 in 200 (Compensated)
b	Steepest Gradient in yards	1 in 1200, 1 in 400 in exceptional cases	1 in 1200, 1 in 400 in exceptional cases	Normally 1 in 1200, 1 in 400 in exceptional cases	1 in 1200, 1 in 400 in exceptional cases	1 in 1200, 1 in 400 in exceptional cases	1 in 1200 (1 in 400 in Exceptional cases)	1 in 1200 (1 in 400 in Exceptional Cases)
6	**Standard of Construction**							
a	Gauge	1676 mm	1676 mm	1676 mm	1676 mm	1676 mm	1676 mm	1676 mm
b	Rails	60 Kg 90 UTS rails	60 Kg 90 UTS rails	60 Kg 90 UTS rails	60 Kg 90 UTS rails	60 Kg 90 UTS rails	60 Kg 90 UTS rails	60 Kg 90 UTS rails
c	Sleeper	PSC, 1660 Nos./km for main line & 1540 Nos./km for loop line & sidings	PSC, 1660 Nos./km for main line & 1540 Nos./km for loop line & sidings	PSC, 1660 No./km for main line & 1540 Nos./km for loop line & sidings	PSC, 1660 Nos./km for main line & 1540 Nos./km for loop line & sidings	PSC, 1660 Nos./km for main line & 1540 Nos./km for loop line & sidings	PSC, 1660 Nos./km for main line & 1540 Nos./km for loop line & sidings	PSC, 1660 Nos./km for main line & 1540 Nos./km for loop line & sidings

[1] 76 Km falls under Taj Trapezium Zone (TTZ). TTZ is defined for the protection of TAJ protected monument. There are restriction for certain emissions in this zone.

		Details						
		EDFC-2 Mugalsarai to Bhaupur		EDFC-1 (Bhaupur to Khurja)		EDFC-3 (Sahnewal-Khurja-Dadri)		
d	Points & Crossings	60 kg rail, 1 in 12 curved switches with CMS crossings on Fan shaped PSC sleepers layouts.	60 kg rail, 1 in 12 curved switches with CMS crossings on Fan shaped PSC sleepers layouts.	60 kg rail, 1 in 12 with CMS crossing on PSC Sleepers Layouts.	60 kg rail, 1 in 12 curved switches with CMS crossings on Fan shaped PSC sleepers layouts	60 kg rail, 1 in 12 curved switches with CMS crossings on Fan shaped PSC sleepers layouts	60 kg rail, 1 in 12 curved switches with CMS crossings on Fan shaped PSC sleepers layouts.	60 kg rail, 1 in 12 curved switches with CMS crossings on Fan shaped PSC sleepers layouts.
e	Ballast	350 mm cushion	350mm cushion	350mm cushion	350mm cushion	350mm cushion	350 machine crushed	350mm Machine crushed
f	Design Speeds	100 kmph	100 kmph	100 kmph	100 kmph	100 kmph	100 kmph	100 kmph
g	Design Axle load	Freight Traffic with 32.5 tonne axle load	Freight Traffic with 32.5 tonne axle load	Freight Traffic with 32.5 tone axle load	Freight Traffic with 32.5 tone axle load	Freight Traffic with 32.5 tone axle load	Freight Traffic with 32.5 tone axle load	Freight Traffic with 25 tonnes axle load on formation of 32.5 tonnes
7	**Formation**							
a	Bank width for Single line	13.5m.	13.5 m.	13.5 m	13.5 m	13.5 m	7.6m.	8.10 m.
b	Slop on Embankment	2H:1V	2H:1V	2H:1V	2H:1V	2H:1V	2H:1V	2H:1V
c	Cutting width for Single line	19.25 m	19.25 m	19.25 m	19.25 m	19.25 m	7.5 m	7.5 m (Excluding side drains)
d	Cutting	49.52 m^3		33.69 m^3		Nil		
e	Earthwork	C.B.R. > 5	C.B.R.>5	C.B.R.>5	C.B.R.>5	C.B.R.>5	C.B.R. > 5	C.B.R. > 5
f	Earthwork for Top 1m.	C.B.R. > 8	C.B.R.>8	C.B.R.>8	C.B.R.>8	C.B.R.>8	C.B.R. > 8	C.B.R. > 8
G	Earthwork Formation	317.03 lakh m^3		227.55 lakh m^3		531 lakh m^3		
h	Slope of cutting (ordinary Soil)	1 : 1	1 : 1	1 : 1	1 : 1	1 : 1	1 : 1	1 : 1
i	Blanketing thickness	0.60 m	0.60 m	0.60 m	0.60 m	0.60 m	0.60 m	0.60 m
j	Blanketing	38.67 lakh m^3		31.90 lakh m^3		38.52 lakh m^3		

		Details						
		EDFC-2 Mugalsarai to Bhaupur		EDFC-1 (Bhaupur to Khurja)		EDFC-3 (Sahnewal-Khurja-Dadri)		
8	**Curves**							
a	Maximum degree of curvature	2.5 degree	2.5 degree	2.5 degree	2.5 degree	2.0 degree	2.5 degree	2.5 degree
b	Grade compensation on curves	at the rate of 0.04 % per degree of curvature	at the rate of 0.04 % per degree of curvature	at the rate of 0.04 % per degree of curvature	at the rate of 0.04 % per degree of curvature	at the rate of 0.04 % per degree of curvature	at the rate of 0.04 % per degree of curvature	at the rate of 0.04 % per degree of curvature
9	**Track Centres (Minimum)**							
A	Track centres (Minimum) Between Two Tracks of DFC	6 m / 6.25 m	6 m / 6.25 m	6 m / 6.25 m	6 m / 6.25 m	6 m / 6.25 m	6 m / 6.25 m	6 m / 6.25 m
b	Between Existing track and DFC	15.0 m	13-15.0 m (Minimum 7 m at thickly populated locations to avoid displacement of inhabitants)	13 to 15 m normally 13-15m but places including yard it is less than 6m due to space constraints	13 to 15 m	13-15 m	12-33 m	6.0 m minimum and 7.925 m recommended and in general.
10	**Bridges**							
a	Standard of Loading	32.5 tonne axle load, 15 tone/m trailing load (DFC Loading)	32.5 tonne axle load	32.5 tonnes axle load,15 tonnes/m trailing load (DFC loading)	32.5 tonne axle load, 15 tonnes/m trailing load (DFC Loading)	32.5 tonne axle load, 15 tonnes/m trailing load (DFC Loading)	32.5 tonne axle load, 15 tonnes/m trailing load (DFC Loading)	25 tonnes axle load on formation of 32.5 tonnes, 15 tonnes/m trailing load (DFC Loading)
b	Number of Important Bridges	Nil	2	Nil	Nil	Nil	Nil	2
c	Number of Major Bridges	4	53	5	5	4	42	44
d	Number of	2- major	89	4- major	1- major	15	407	27

		Details						
		EDFC-2 Mugalsarai to Bhaupur		**EDFC-1 (Bhaupur to Khurja)**		**EDFC-3 (Sahnewal-Khurja-Dadri)**		
	RUBs	40-minor		82-minor	35-minor			
f	Number of Minor Bridges	50	321	197	32	49	295	133
g	Number of Rail Flyovers	1	3	6	1	Nil	4	3
h	No. of ROBs	Nil	2	8	Nil	1	22	50
11	**Road Crossings**							
a	Number of level crossings	2	72	74	19	18	58	77
12	**Stations**							
a	Junction Stations	3	4	3	2	1	0	5
b	Crossing Stations	-	8	4	1	0	21	14
13	**Additional Land required**	**249 hectares**	**1151 ha**	**1182 ha**	**258.87 ha.**	**211.67 ha**	**829.08 ha.**	**355.34 ha.**

The construction material (ballast) is sourced from licensed quarries in the nearby region and earth for formation is sourced from local areas following predefined borrow earth management plan and with due permission from regulatory authorities concerned.

2.3 Applicable Legislation and World Bank Operational Policies

There are four World Bank operational policies applicable to EDFC Ludhiana to Mugalsarai corridor. These are listed at **Table 2.2** Required mitigation measures have been incorporated in project design/Environmental management plans.

Table 2.2: Salient World Bank Safeguard Policies

Sr. No.	Safeguard Policy	Subject Category	Triggered	Triggered By	Mitigation Measures
1.	OP 4.01	Environment Assessment	Yes	Sensitive areas and impacts on environmental and social components	Mitigation measures incorporated
2.	OP 4.04	Natural Habitats	Yes	Protected forests issues	Incorporated
3.	OP 4.11	Physical Cultural Resources	Yes	Risk to cultural properties	Adequate mitigation measures if affected
4.	OP 4.36	Forestry	Yes	Diversion of protected forest land	To be carried out as per Forest (conservation) Act, 1980

India has well defined environmental and social legislation framework. Applicability of these regulations depends on nature of project and activities. The summary of various Laws and Regulation applicable to EDFC project is summarized at **Table 2.3**.

Table 2.3: Summary of Clearances & NOCs

Sr. No	Act/Rules and Type of clearance	Purpose and Type of clearance	Applicability	Project stage
1	Environment Protection Act-1986	To protect and improve overall environment, Prior Environmental Clearance, Environment Clearance for opening new quarries and borrow areas, NOC for water extraction for construction and allied works EIA Notification 2006 (Also applicable for Critically Polluted Areas / CEPI)	Applicable	Pre construction
2	Ancient Monuments and Archaeological Sites and Remains(Amendment & Validation	Conservation of cultural and historical remains found in India ,	Applicable	Pre construction

Sr. No	Act/Rules and Type of clearance	Purpose and Type of clearance	Applicability	Project stage
	Act , 2010	Permission for Activities near archaeological protected area		
3	Wild Life Protection Act under, 1972	Protection of Wild Life Clearance for working / diversion of sanctuary land	Not applicable	Pre construction
4	The Forest (Conservation) Act 1927 The Forest (Conservation) Act. 1980 The Forest (conversion) Rules 1981	To check deforestation by restricting conversion of forested areas into non-forested areas Forest Clearance	Diversion of Protected Forest land	Pre construction
5	MoEFCC circular (1998) on linear Plantation on roadside, canals and railway lines modifying the applicability of provisions of forest (Conversation) Act, to linear Plantation	Protection / planting roadside strip as avenue/strip plantations as these are declared protected forest areas. Tree felling permission	Applicable for Felling of trees	Pre construction
6	Air (Prevention and Control of Pollution) Act, 1981 Under Air ,	To control air pollution by specifying the emission standards NOC And Consents for setting up air polluting plants	Applicable , For operating Hot mix plants, Crushers and batching plants (Also applicable for Critically Polluted Areas / CEPI)	Construction (Prior to work initiation)
7	Noise Pollution (Regulation and Control Act), 2000	Control of Ambient noise levels through adherence of prescribed day and night standards	Provision of acoustics enclosures. For DG sets and other noise sources (Also applicable for Critically Polluted Areas / CEPI)	Construction (Prior to work initiation)
8	Water Prevention and Control of Pollution) Act, 1974	To control water pollution by controlling discharge of pollutants as per the prescribed standards	Applicable For discharge of effluents from construction sites and workshop (Also applicable for Critically Polluted Areas / CEPI)	Construction (Prior to work initiation)
9	Hazardous waste (Management, Handling & Transboundry) Rules, 2008	Management and storage of hazardous waste. Permission to store Hazardous Materials	Applicable For storage and Transportation Of Hazardous Materials (Like waste oils) and Explosives (Also applicable for Critically Polluted	Construction (Prior to work initiation)

Sr. No	Act/Rules and Type of clearance	Purpose and Type of clearance	Applicability	Project stage
			Areas / CEPI)	
10	MSW (Management & Handling) Rules 2000	Collection, Transportation, Management & Disposal of MSW	All the projects having potential to generate MSW	Construction & Operation
11	Explosive Act 1984 & the Explosives Rules, 2008	Safe transportation, storage and use of explosive material Explosive license	Applicable Storage of explosive materials(Diesel Fuel)	Construction (Prior to work initiation)
12	Central Motor Vehicle Act 1988 and Central Motor Vehicle Rules 1989 & Amendment Rules, 1999	To check vehicular air and noise pollution PUC certificate for use of vehicles for construction	Applicable For all construction vehicles	Construction (Prior to work initiation)
13	Minor Mineral and concession Rules	For opening new quarry or borrow areas Permission for opening new Quarry lease deeds and license	Applicable for Quarrying and borrowing operations	Construction (Prior to work initiation)

Other applicable regulatory compliances which may be applicable if DFCCIL is developing infrastructure are summarized in **Table 2.4**.

Table 2.4: Other Applicable Regulatory Compliance

Sr. No.	Type	Application
1.	CRZ	Not Applicable
2.	SEZ	NOC from SPCB / CPCB as per SEZ Act 2006 / EPA Act 1986
3.	Building & Land Development	Master Plans, Building By laws, Energy Conservation Building Codes, City Development Plans
4.	Railways Development & Associated Infrastructure	Railway Act 1989

2.4 Conclusion

The report focuses on the EDFC stretch from Mugalsarai to Ludhiana. Total length of this section is 1237.46 kms. The entire EDFC alignment runs through U.P., Punjab & Haryana. EDFC runs majorly parallel to existing IR track but detours are proposed at the busy/highly populated area like Meerut, Muzaffarnagar, Allahabad etc to minimize the displacement of the population and loss of livelihood. The concept behind EDFC development is to shift the freight traffic from IR to EDFC so as to reduce the load of IR and increase efficiency of the freight transportation. Entire EDFC is electrified. EDFC majorly traverse through the agricultural land but also crosses cities, towns, water bodies etc. EDFC alignment does not runs through any of the environmental sensitive area except TTZ at Ferozabad District, U.P. Project development requires raw material like earth, ballast, steel, sleepers etc. Obtaining all these raw materials have certain impact on the environment e.g. earth may be obtained from the agricultural land which will lead to loss of productivity of the area, ballast requires stone quarrying & crushing which have significant impact on geology, land form and air quality of the area. Similarly the project development is ought to have various associated environmental impacts. But the project in operational stage will have minimum impacts as

the project does not involve any huge discharges/emissions. However apart from all above the project is highly beneficial in terms of economic development of the area and reduction in GHG emissions. These impacts are described in later chapter of the reports. Also detailed baseline has been collected for the project area which has helped to identify the current status of VECs condition in the area and the significance of the anticipated impacts in that area.

CHAPTER 3: DELINEATION OF CIA BOUNDARY AND VECs

3.0 Introduction

Proposed EDFC is expected to enhance the economic development of the country by increasing the freight transportation substancially. The EDFC will provide the accessibility to the areas through which it traverses and the nearby areas and this activity will lead to development and growth of these areas. This necessitates that study area size should be based on the extent of the area where accessibility improvements could occur and may require some judgments about the extent of the influence of the project. Therefore, Cumulative Impact Assessment (CIA) requires fixation of spatial and temporal boundaries in order to assess the impacts of direct, indirect and induced activities due to proposed project. Process of delineation of boundary largely depends upon the type of development & its potential to exhibit direct & indirect impacts on the surrounding environment. The following sections describe the CIA boundary, the rationale & basis of its delineation, VECs within the delineated boundaries, and hot spots identified.

3.1 Delineation of the CIA Boundary

Important factors which need to be considered for proposed assessment of indirect and cumulative impacts and impact interactions is the setting of the geographical or 'spatial' boundary and the temporal or 'time frame' boundary. Indirect and direct impacts as well as impact interactions may well extend beyond the geographical site boundaries of the project. Therefore preferred methodology for detailed analysis is a combination of collaborative judgment and allocation mode as described in chapter 1. Allocation models allows the analyst to distribute a defined amount of indirect land use changes at a disaggregate level typically through GIS based spatial datasets. Hence, mapping the geographical and time boundaries can be a useful tool to show areas of potential overlap and therefore where indirect and cumulative impacts as well as impact interactions may occur.

The boundary delineation exercise identifies the potential impacts considered to be significant and which require further assessment. ***In this study all the natural as well as manmade features have been taken into account and plotted spatially to delineate the boundary of the CIA. The natural and manmade features mapped are as follows:***

- Forests;
- National parks;
- Wild Life Sanctuaries;
- Tiger Reserves;
- Birds Areas;
- Archaeological sites;

- Water bodies;
- Wetlands;
- Roads;
- Railways;
- Urban Agglomerations;
- Industrial Areas;
- Critically Polluted Areas (w.r.t air & water quality);

To conduct the detailed study of the project, three buffer boundaries have been considered; i.e. 100 mtrs, 300 mtrs and 10 kms.

- **100 mtrs buffer** – This area includes EDFC alignment, freight stations, TSS, SP, SSP, other allied proposed developments and the 100 m area from centre line of proposed alignment. This boundary has been taken according to the EIA study conducted for the entire stretch of EDFC. Under this buffer, strip maps have been provided which shows roads, nalas / ponds, trees, wells / tube wells / hand pumps, temples / schools / hospitals / structures, high tension lines, stations / chainage and forests if any. ***This area will be the direct influence zone as this will experience the maximum stress in terms of physiographic, biological & social change. (Refer Annexure - 6.1)***

- **300 mtrs buffer** – According to IFC codes and applicable Indian regulations, for archeological and cultural sites a maximum distance of 300 mtrs is considered to study the impact of any upcoming developmental project. Therefore using this boundary all the cultural and archaeological sites has been located to study the influenced locations on the site.

- **10 kms buffer** – It is being considered that the extent of area of influence of the project may not go upto 10 kms as per the expert's and stakeholder's consultations. Therefore the farthest distance covered in the CIA boundary is 10 kms. List of the existing & upcoming projects identified in the study area through stakeholder consultation is given in chapter stakeholder consultation (Collaborative Judgment).

Hence the spatial boundary has been demarcated considering all the above given features and buffer areas within the range of 10 kms. **Areas beyond 10 kms areas are also considered for purpose of CIA study if they involve and have potential to undergo significant change/development due to EDFC corridor or vice versa. This delineation of study area not only covers project where only localized effects are expected but also effects, which are regional in scale.**

3.2 Valuable Environmental and Social Components

VECs are environmental and social attributes that are considered to be important in assessing risks. While VECs may be directly or indirectly affected by a specific development, they often are also affected by the cumulative effects of several developments. VECs are the ultimate recipient of impacts because they tend to be at the ends of ecological pathways. VECs in general refer to sensitive or valued receptors of impact whose desired future condition determines the assessment end points to be used in the CIA process.

The selection of biophysical and socio-economic Valued Environmental Components (VECs) is a process that reflects a balanced and knowledgeable synthesis of a wide range of information regarding the Project, the environmental setting where the Project is located and an understanding of concerns and issues associated with the responsible development of the Project. The identification of VECs is important because the detailed environmental effects analysis, as laid out in the environmental assessment methodology, is conducted only on those VECs.

It has generally been recognized since the early 1980s (Beanlands and Duinker, 1983) that there is a need to somehow focus the environmental effects analysis and the statement of significance for residual adverse environmental effects on those components of the environment that have the most relevance to the decision-making process. It simply isn't practical or achievable to conduct a detailed environmental effects analysis on every aspect of an ecosystem. However, the exclusion of some environmental components from being elevated to the status of VECs isn't intended to exclude their consideration in the environmental effects analysis.

3.2.1 Approaches for Identification of VECs

To identify the VECs for CIA study, it is possible to largely obtain cumulative opinions of various stakeholders which are directly & indirectly impacted due to proposed development, and extensive review of the existing environmental and social impact assessment studies of the proposed project. Approach followed to identify VECs for purpose of CIA study is shown in **Figure 3.1**.

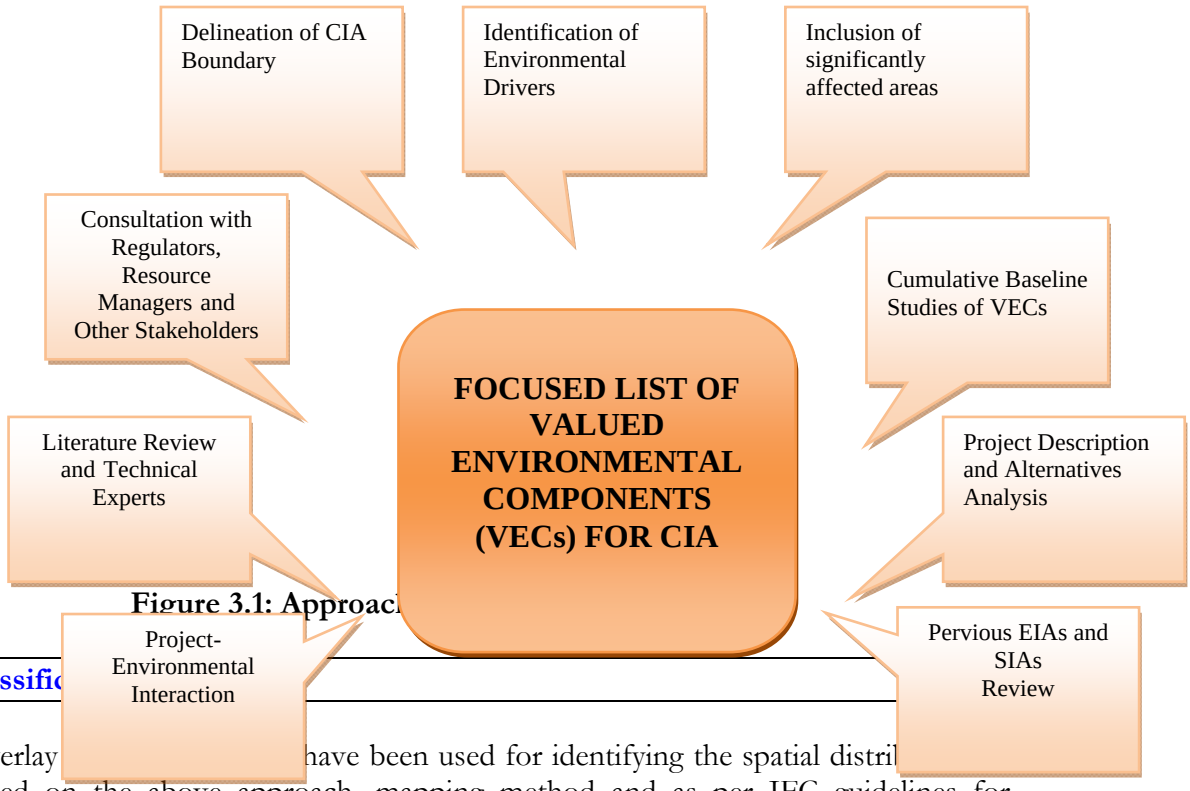


Figure 3.1: Approac

3.2.2 Classifi

Further, overlay have been used for identifying the spatial distri VECs. Based on the above approach, mapping method and as per IFC guidelines for Cumulative Impact Assessment and Management, **VECs have been classified** as given below.

• Physical features,

- Urban Agglomerations / Centers
- Land Resources

• Ecological Profile,

- Bio Diversity (Wildlife Sanctuaries/ National Parks/Tiger Reserves/Bird Areas / Wetlands)
- Agriculture

• Physical Environmental Profile (e.g. water and nutrient cycles, microclimate),

- Air
- Noise
- Water
- Climate change

• Socio Economic (e.g., health, economics), or

- Infrastructure

- Industry
- Power Plants

• Cultural aspects

- Archaeological / Heritage Sites

3.2.3 Identification of Indicators to Assess Conditions of VECs

To analyze the conditions and impact on identified VECs various indicators have been identified & analyzed. These indicators will help to identify the extent of impact on the identified VECs and assist in defining "Cause & Effect" relationship.

3.3 Assessment of Status of Identified VECs

An extensive study including the site visits, study of the project alignment through topographic maps & Google maps, review of existing studies and literature was carried out to assess the status of identified VECs within the CIA boundary of EDFC 1, 2 & 3. Details are given in **Table 3.2, 3.3 & 3.4** respectively for EDFC-1, EDFC-2 & EDFC-3.

Table 3.1: Indicators of VECs

Sr. No.	Valuable Environmental Components		Indicators	References / Basis
1	**Physical Features / Habitats**	**Urban Centers / Agglomerations**	Population	PCA U.P., Punjab, Haryana.
2			Literacy	PCA U.P., Punjab, Haryana.
3			WFPR	PCA U.P., Punjab, Haryana.
4			GDP	PCA U.P., Punjab, Haryana / Experts consultation
5			Standard of living	PCA U.P., Punjab, Haryana / Experts consultation
6			Pressure on existing resources	Experts consultation
7		**Land Resources**	Soil Erosion	Experts / Stakeholders consultation
8			Soil Quality	Experts / Stakeholders consultation
9			Land Use Change	EIA / SIA (EDFC - 1, 2, 3)
10	**Ecological Profile**	**Bio Diversity**	Impact on flora & fauna	EIA / SIA (EDFC - 1, 2, 3), DFCC
11		**Agriculture**	Agricultural production	Experts / Stakeholders consultation
12	**Physical Environmental Profile**	**Air**	Air Quality Index	Experts / Stakeholders consultation
13		**Noise**	Noise Levels	Experts / Stakeholders consultation
14		**Water**	Water quality	Experts / Stakeholders consultation
15			Ground Water Resources	Experts / Stakeholders consultation
16		**Climate change**	GHG	Experts / Stakeholders consultation
17			Erratic Rainfall	Experts / Stakeholders consultation

Sr. No.	Valuable Environmental Components		Indicators	References / Basis
18			Flash Flooding	Experts / Stakeholders consultation
19			Temperature Change	Experts / Stakeholders consultation
20	**Socio Economic**	**Infrastructure**	Roads	Experts / Stakeholders consultation
21			Traffic Congestion (Main Routes)	Traffic Projections, Stakeholders consultation
22			Traffic Congestion (Feeder Routes)	Traffic Projections, Stakeholders consultation
23			Rails	DFCC
24			Air Connectivity	Experts / Stakeholders consultation
25			Health Facilities (Number)	Experts / Stakeholders consultation
26			Education Facilities (Number)	Experts / Stakeholders consultation
27		**Industry**	Number of Industries	UPSIDC, PSIDC, HSIDC
28		**Power Plants**	Power production (Number)	CEAI, CERC, BEE (Websites)
29	**Cultural Aspects**	**Archaeological Sites / Heritage Sites**	Impact on archeological Monuments	DFCC

Table 3.2: Details of VECs and their Status within the CIA boundary (EDFC – 1)

Sr. No.	VECs		0 - 100 mtrs / ROW	100 - 300 mtrs	300 mtrs - 10 kms & Beyond	Remarks
1	**Physical Features**	Urban Agglomerations / Centers	Khurja		Agra, Aligarh, Hathras, Tundla, Firozabad, Shikohabad, Sirsaganj, Jaswant Nagar, Etawah, Bakewar, Phaphund, Dibiyapur, Panki, Bhaupur, Bhimsen	Landuse is varying constantly throughout the stretch.

Sr. No.	VECs		0 - 100 mtrs / ROW	100 - 300 mtrs	300 mtrs - 10 kms & Beyond	Remarks
		Land Resources (landuse)	Agricultural, habitation, Encroachment, Industrial	Agricultural, habitation, Encroachment, Industrial	Agricultural, habitation, Encroachment, Industrial	
2	**Ecological Profile**	Agriculture (yield)	Moderate	Good to moderate	Good to moderate	Agricultural yield may decrease, as a result of change in landuse.
		Bio Diversity (Wildlife Sanctuaries/ National Parks / Tiger Reserves / Bird Areas / Wetlands)	None	None	Sheikha Jheel	Taken NOC from ASI as the alignment was crossing through Budhia Ka Taal Site.
3	**Physical Environmental Profile (**Micro Climate)	Air Quality	Good to moderate	Moderate	Moderate / Critical	CEPI Index is higher in Firozabad, but moratarium has been lifted.
		Noise Pollution	Critical (except detours)	Critical	Critical	
		Vibrations	Critical (except detours)	Moderate	No impact	
		Water Quality	Good to moderate	Moderate	Moderate / Critical	
4	**Social Economic**	Infrastructure (Education, Health, Connectivity)	Improved social and physical infrastructure	Improved social and physical infrastructure	Improved social and physical infrastructure	Widening of NH 2 (4 Lane to 6 Lane), Improvement of NH 58, NH 91 and AH 1. The list of existing and proposed power plants along the districts through which EDFC crosses has been provided in Chapter – 3.
		Industrial Corridor (Proposed / Planned)	None	None	Raina, Concor Depot near Raina	
		Power Plants (Existing & Proposed)	None	None	Exist	
5	**Cultural Aspects**	Archaeological Sites	Budhia Ka Taal	None	Fort of Aligarh and its boundary	Area important due to archaeological perspective

Table 3.3: Details of VECs and their Status within the CIA boundary (EDFC – 2)

Sr. No.	VECs		0 - 100 mtrs / ROW	100 - 300 mtrs	300 mtrs - 10 kms	Remarks
1	**Physical Features**	Urban Agglomerations / Centers	Chunar, Khaga	Allahabad, Mughal Sarai, Fatehpur, Sirathu, Bharwari,	Kanpur, Varanasi, Prempur, Chakmohiuddinpur, Malwan, Pahur, Mirzapur, Bharwari,	Landuse is varying constantly throughout the stretch.

Sr. No.	VECs		0 - 100 mtrs / ROW	100 - 300 mtrs	300 mtrs - 10 kms	Remarks
					Sirathu	
		Land Resources (landuse)	Agricultural, habitation, Encroachment, Industrial	Agricultural, habitation, Encroachment, Industrial	Agricultural, habitation, Encroachment, Industrial	
2	**Ecological Profile**	Agriculture (yield)	Moderate	Good to moderate	Good to moderate	Agricultural yield may be decreased as a result of landuse change.
		Bio Diversity (Wildlife Sanctuaries/ National Parks / Tiger Reserves / Bird Areas / Wetlands)	None	None	Kachhua Sanctuary, Wetland – Tanks (Near Fatehpur)	Both the sites are not getting affected by the project and no NOC required.
3	**Physical Environmental Profile** (Micro Climate)	Air Quality	Good to moderate	Moderate	Moderate / Critical	CEPI Index is higher in Kanpur and Varanasi - Mirzapur, but moratorium has been lifted.
		Noise Pollution	Critical (except detours)	Critical	Moderate / Critical	
		Vibrations	Critical (except detours)	Moderate	No impact	
		Water Quality	Good to moderate	Moderate	Moderate / Critical	
4	**Social Conditions**	Infrastructure (Education, Health, Connectivity)	Local roads and rail network	Local roads and rail network	Well-developed rail and road network	The list of existing and proposed power plants along the districts through which EDFC crosses has been provided in Chapter – 3.
		Industrial Corridor (Proposed / Planned)	None	None	None	
		Power Plants (Existing & Proposed)	None	None	Exist	
5	**Cultural Aspects**	Archaeological Sites	None	None	Rania – 2, Lekhania Painted Rockshelter, Lekhnia Pahar, Megalithic Remains, Chunar Fort	Area important due to archaeological perspective

Table 3.4: Details of VECs and their Status within the CIA boundary (EDFC – 3)

Sr. No.	VECs		0 - 100 mtrs / ROW	100 - 300 mtrs	300 mtrs - 10 kms	Remarks
1	**Physical Features**	Urban Agglomerations / Centers	Bodaki, Dadri	Ambala City, Khanna, Sirhind, Saha, Hapur,	Ludhiana, Kos Minar, Dukheri, Muzaffarnagar, Sardhana, Pratappur, Meerut City, Kaili, GT Road, Bulandshehar	Landuse is varying constantly throughout the stretch.
		Land Resources (landuse)	Agricultural, habitation, Encroachment, Industrial	Agricultural, habitation, Encroachment, Industrial	Agricultural, habitation, Encroachment, Industrial	
2	**Ecological Profile**	Agriculture (yield)	Moderate	Good to moderate	Good to moderate	Agricultural yield may be decreased as a result of landuse change.
		Bio Diversity (Wildlife Sanctuaries/ National Parks / Tiger Reserves / Bird Areas / Wetlands)			Wetlands of Yamuna River	The given site will not be affected and no NOC required.
3	**Physical Environmental Profile (**Micro Climate)	Air Quality	Good to moderate	Critical	Critical	CEPI Index is higher in Ludhiana and Mandi Gobind Grah, but moratorium has been lifted.
		Noise Pollution	Critical (except detours)	Critical	Critical	
		Vibrations	Critical (except detours)	Moderate	No impact	
		Water Quality	Good to moderate	Moderate	Moderate / Critical	
4	**Social Conditions**	Infrastructure (Education, Health, Connectivity)	Local roads and rail network	Local roads and rail network	Well-developed rail and road network	GNDA and DMIC are planning to develop Bodaki as industrial hub.
		Industrial Corridor (Proposed / Planned)	Bodaki	None	None	
		Power Plants (Existing & Proposed)	None	None	Exist	
5	**Cultural Aspects**	Archaeological Sites			Kos Minar, AamKhas Bagh, Sunamiy Gate, Ancient Mount Sugh, Buddhist Stupa, Mausoleum of Baba Garibnath, Begum Samru Mahal	Area important due to archaeological perspective

3.4 Preliminary Identification of Hotspots

On the basis of the identified VECs, spatial analysis, literature review and study of the EIA & SIA Reports of the EDFC 1, 2 & 3, hotspots are identified. Hotspots are defined as the zones which have potential for expansion and can accommodate the developmental pressure. These hotspots are identified on the basis of primary study. These will be further enhanced after addition of input from stakeholder consultation and baseline study of the VECs. From the primary desktop study, it is obvious that these areas are significantly going to be impacted and this has helped focusing on these areas while carrying out stakeholder consultation. Hotspots identified are given in **Table 3.5** below and are also marked on the topographic maps given in **Figure 3.2-3.4**.

Table 3.5: Identified Major Hotspots

Sr. No.	Locations	VECs identified to be impacted majorly	Reasons for declaring Hotspot
1.	**Khurja**	· Air Quality · Roads & infrastructure · Ecology & habitat · Noise levels · Land Use · Water Resources & Water Quality · Employment opportunity · Roads · Archeological features	Unloading & loading yard & connecting point with WDFC.
2	**Agra TTZ Area (Distt. Firozabad)**		Sensitive location w.r.t Taj Mahal therefore any further industry in nearby areas may affect the Taj Mahal Area significantly. High potential for orange & green category gas based industry/service industry
3	**Kanpur**		Large industrial areas and also loading & unloading yard proposed at Bhaupur.
4	**Mugalsarai**		Existing industrial areas and also scope for future development as an industrial cluster. Varanasi could also be considered to be impacted, though located at a distance from 10 kms boundary of EDFC as a result of interaction of various development proposals in the region.
5	**Ludhiana**		Potential for expansion of industrial estates at regional level though located outside the periphery of 10 Kms boundary of EDFC.

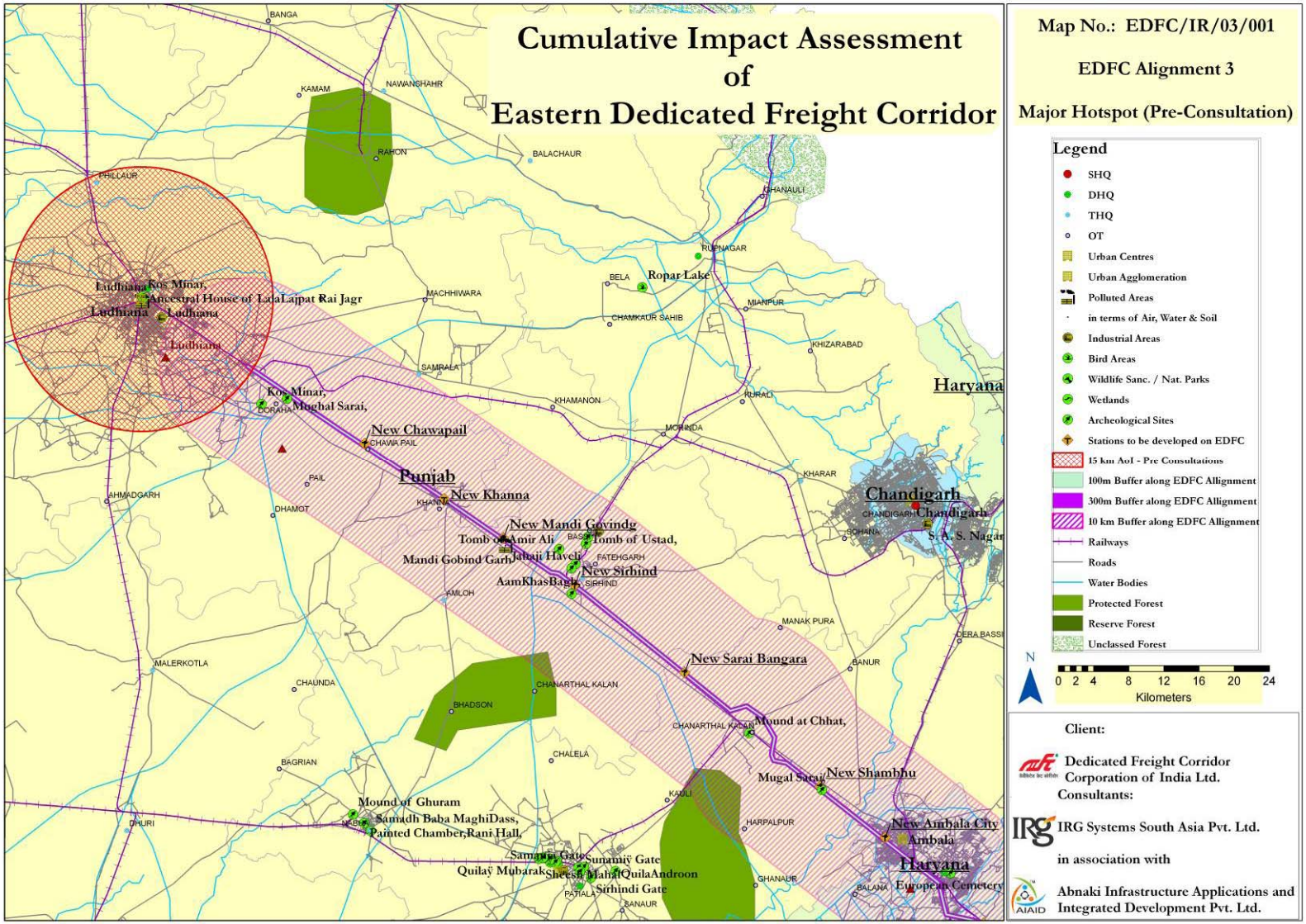


Figure 3.2: VECs and Hotspots in EDFC 3

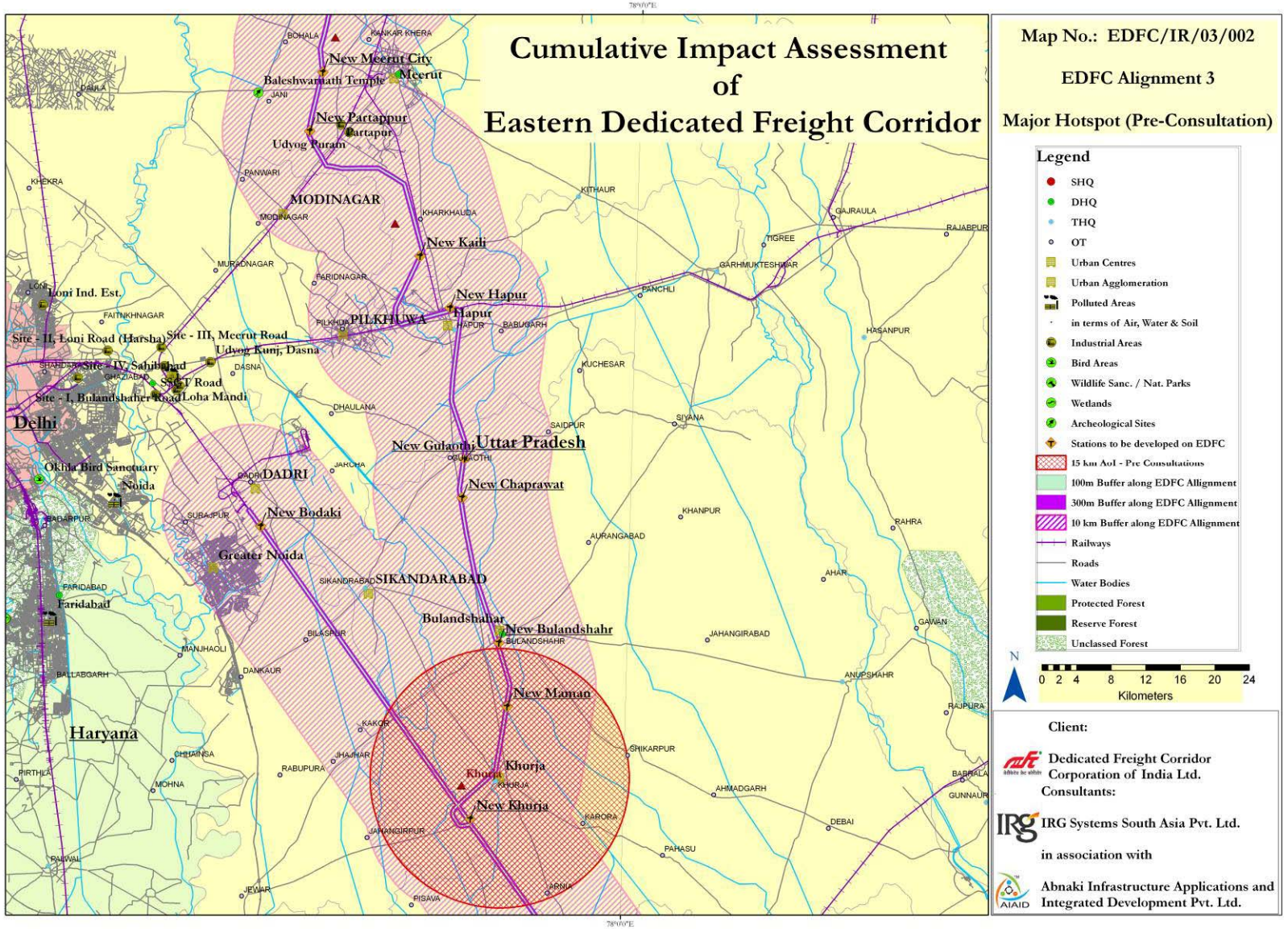


Figure 3.3: VECs and Hotspots in EDFC 3

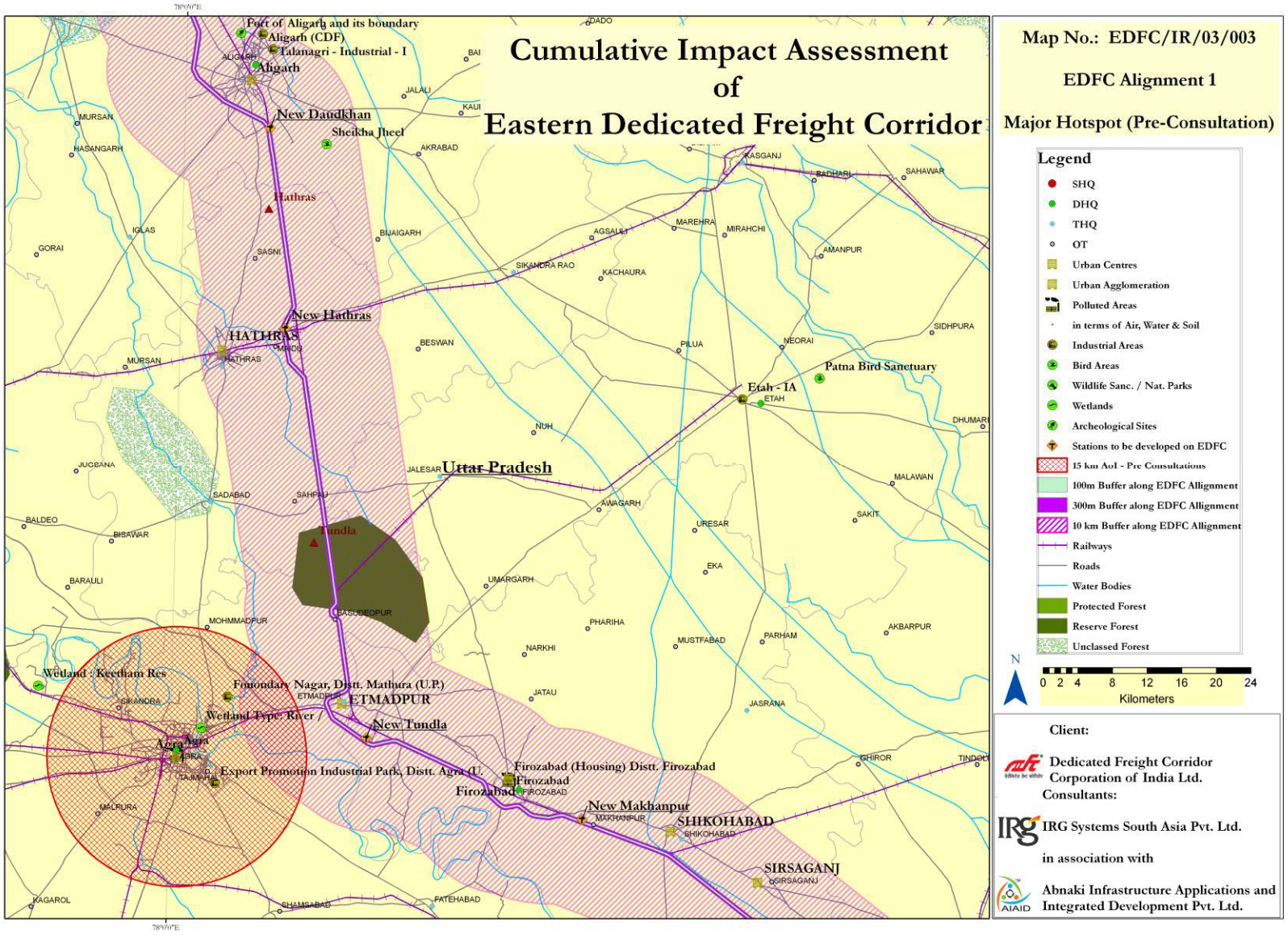


Figure 3.4: VECs and Hotspots in EDFC 1

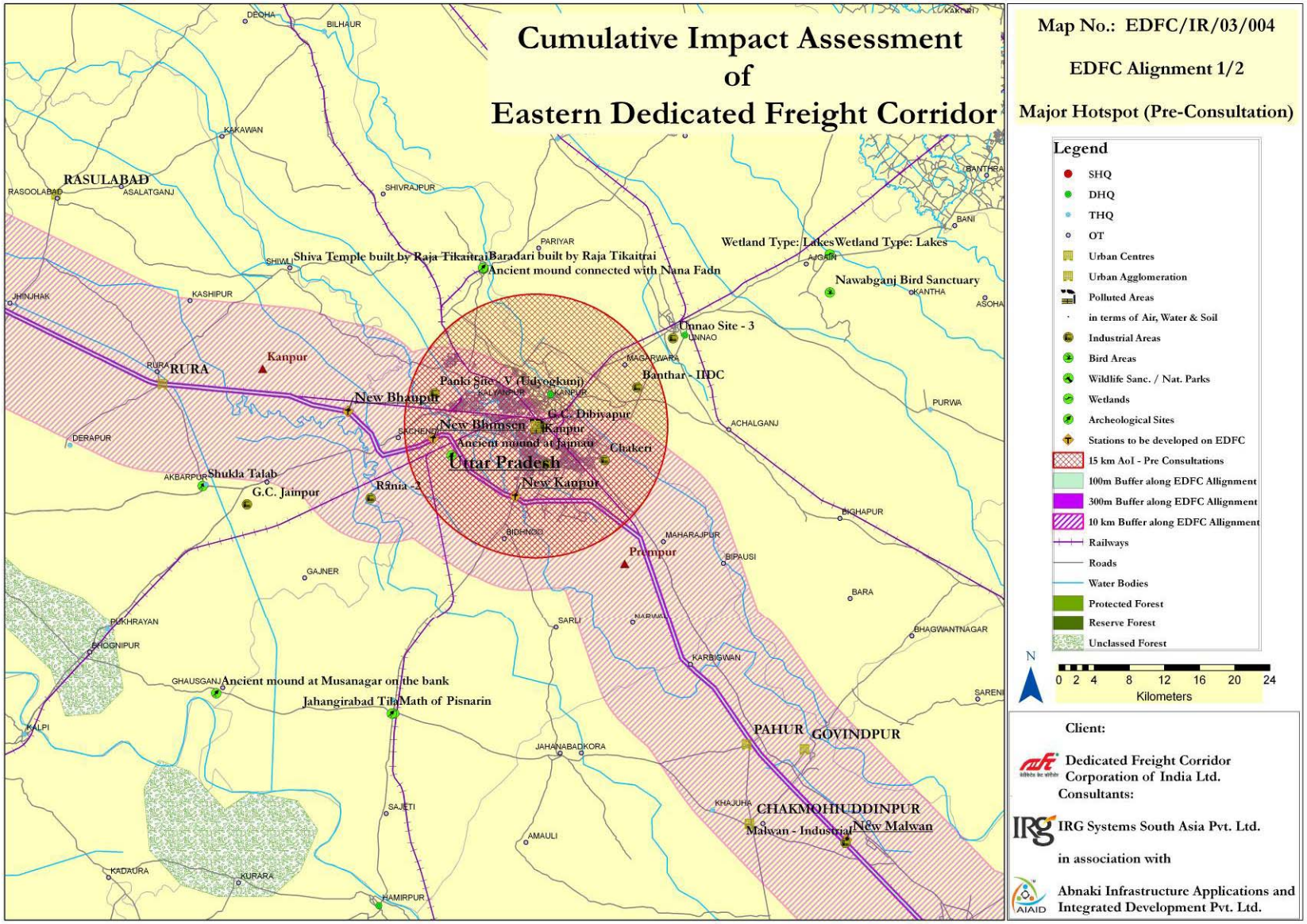


Figure 3.5: VECs and Hotspots in EDFC 1 & EDFC 2

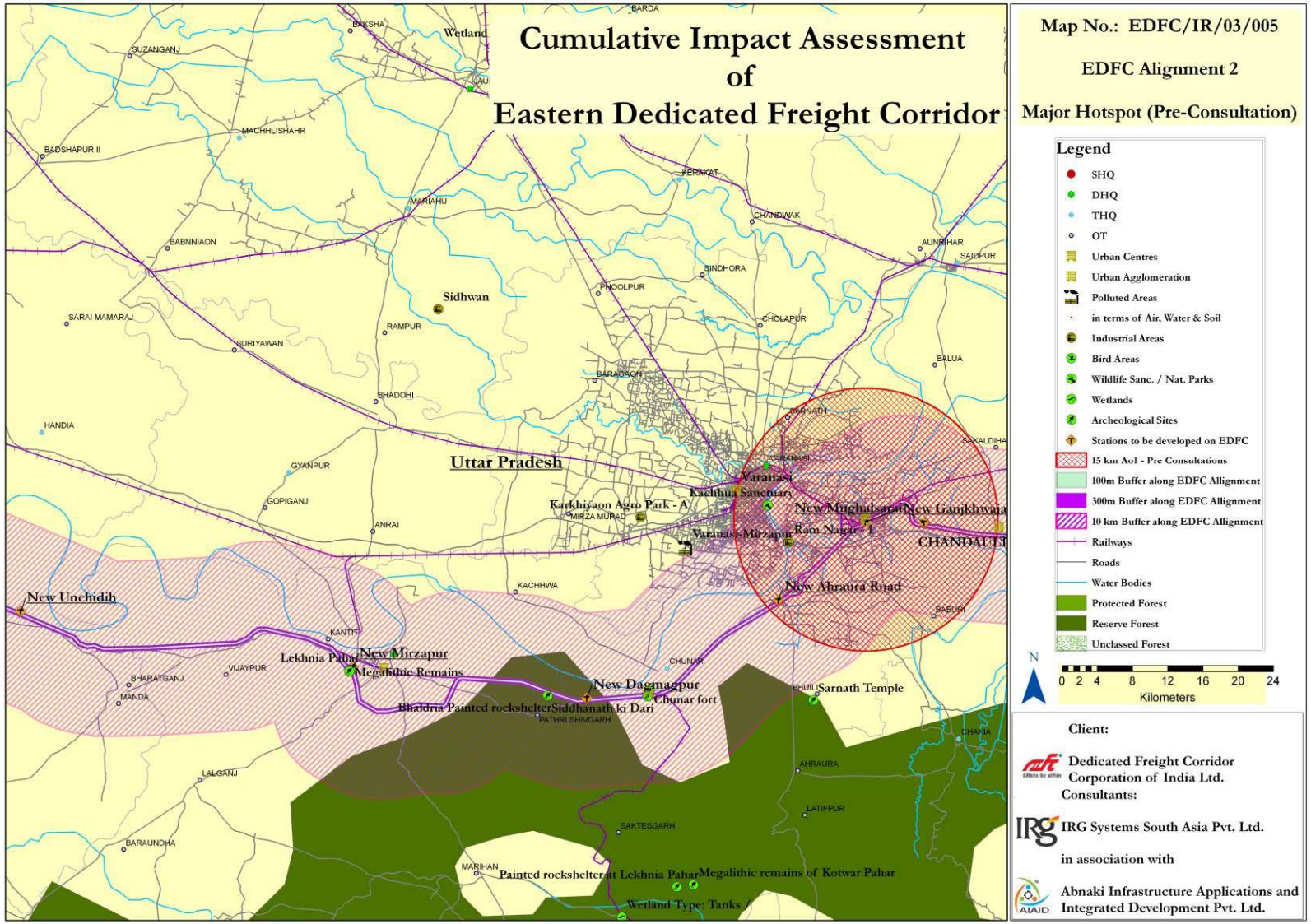


Figure 3.6: VECs and Hotspots in EDFC 2

3.5 Conclusion

Delineation of CIA boundaries has been carried out along with identification of VECs, their current status and hotspots in the EDFC study area. These VECs are the ultimate recipient of impacts because they tend to be at the ends of ecological pathways. Therefore, these VECs may be directly or indirectly affected by a specific development or by the cumulative effects of several developments. Therefore, it is essential to carry out the stakeholders consultations (a kind of collaborative judgement) considering other proposed developmental work within the CIA boundary. This will give insight into type and extent of impacts and after finalization of hotspots, further baseline assessments of the VECs can be done.

CHAPTER 4: STAKEHOLDERS CONSULTATIONS, OTHER DEVELOPMENTAL PROJECTS AND FINALIZATION OF VECs

4.1 Introduction

Collaborative judgement methods build on individual planning judgement by incorporating input from other people knowledgeable of the study area to inform conclusions about future land use and developments in the study area. Literature cites that this approach offers a robust way of incorporating multiple viewpoints into the impact assessment process. Further, this approach can be used in combination with other methods. The current study has used the outcome of GIS based mapping to confirm, validate and identify additional hotspots and VEC in the study area through collaborative judgement. In this context, a number of stakeholders including public, line departments, infrastructure, service providers and experts have been consulted. The basis, strategy and the steps used for consultations have been described below.

4.2 Basis and Strategy of Stakeholder's Selection

Stakeholders are defined as any individual, agency or organization that may directly or indirectly be impacted by the project. Stakeholder consultations can add valuable input to the study by providing the actual information of the site. Idea behind the stakeholder consultation for this project is to identify the major existing, proposed, planned and anticipated developments in the study area, which in future will interact and will result into cumulative impacts.

Stakeholders are selected with the help of expert's advice and discussion with DFCCIL. As per discussion with DFCCIL & experts, stakeholders which will be directly & indirectly impacted due to EDFC development are identified. The list of the stakeholders identified & consulted is attached as **Annexure – 4.1**.

4.2.1 Methodology and the Tools Used

Literature review also indicate that collaborative judgement involves usage of survey techniques like informal conversations, formal inquiry following an instrument administered by mail, phone, or interview or discussions or meetings. Such type of survey can be invaluable in developing assumptions and assessing future conditions. Therefore, the step by step, methodology adopted for the stakeholder's consultation has been explained below.

Step 1: Conducted telephonic conversation and given a brief of the project and asked for the slots for face to face meeting.
Step 2: Preparation of the Questionnaire.
Step 3: Discussions with the stakeholders and filling up of questionnaire.
Step 4: Compilation and analysis of the discussions.

To follow this methodology, a questionnaire has been prepared and during the consultation, the questionnaires were filled. The proceedings of the stakeholder's consultations including public consultations and its outcome have been explained in a summary table. The questionnaire has been attached as **Annexure 4.2**.

4.3 Proceedings of Stakeholder Consultations

Consultations have been done in the various districts, considering EDFC alignment and the relevant development projects carried out in those districts. The proceeding of stakeholder consultations is given in **Table 4.1** and photographs of the consultations have been also attached as **Annexure 4.3**.

4.4 Public Consultations

The public directly affected from the commencement of the project have also been consulted. The most impacted areas along the corridor are the villages from which land has been acquired for providing ROW to the EDFC. There are 334 villages of EDFC – 1, 372 villages of EDFC – 2 and 260 villages of EDFC – 3, in total 996 villages through which the corridor passes as given in EIA reports. The public consultations have been done with the individuals belonging to these villages whose land has been acquired. Further, details of the public consultations are explained in the **Table 4.2**.

4.5 Summary of Output of the Stakeholders Consultation

On the basis of the consultations conducted, various development projects along EDFC have been identified and their direct, indirect and induced change of VECs has been explained in **Table 4.3**. These developmental proposals identified along the stretch have also been listed. The tentative locations of these developmental proposals according to stakeholders have been marked in the **Figures 4.1, 4.2, 4.3, 4.4, 4.5** and **4.6**.

4.6 Identification of Hotspots / Pressure Points based on Consultations

In the earlier section of Chapter – 3, five major hotspots were identified on the basis of the desktop study and their background supporting accommodation of further developmental pressure. Further information gathered from Stakeholder consultation has added information about the hotspots which have potential to experience developments in future. List of hotspots on basis of the stakeholder consultation is given in **Table 4.4**.

Table 4.1: Proceedings of Stakeholders Consultation

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
1.	Irrigation Dept. PACT Office Lucknow 6/07/2015	Mr. Manohar Lal, PA, C. E 9918002143	▪ The Project Background, Environmental, Social issues and benefit from the project were explained to the Stakeholders. ▪ He advised to meet C.E. Ramganga Command at Kanpur. EDFC 1 is coming in the Jurisdiction of Ramganga Command Kanpur.	**Nil**
2.	PWD, Lucknow 6/07/2015	Mr. Salil Yadev, Project Manager PWD 9451283252	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders.	▪ The proposal of connectivity from DFCC track to state highway, MDR & ORDs is under process and also provided a list of selected roads under the project.
3.	DFCCIL, Kanpur 7/07/2015	Mr. Jariyal Dy. CPM, Mr. Sarang & Mr. Anurag 0512 2225124	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The Project Background, basic information and current status of the project were shared by them.	**Nil**
4.	UPSIDC, Kanpur 7/07/2015	Mr. Rakesh Jha, Regional Manager, UPSIDC, Kanpur 7080120005	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the UPSIDC along the EDFC 1 were also Investigated	▪ Three industrial clusters will be developed along the corridor at Allahabad, Auraiya / Etawah and Aligarh. Industrial corridor will be notified in 5 km radius at major stations of the EDFC 1.
5.	DIC, Kanpur 7/07/2015	Mr. Ashok Yadav, GM DIC Kanpur 9839163990	▪ The Project Background, basic information and current status of the project, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the DIC along the EDFC 1 were also Investigated ▪ The proposal of projects along the EDFC 1 is under process and will be shared soon with concerned departments.	**Nil**
6.	UPSIDC, Kanpur 8/07/2015	Mr. BK Nanda, Project Director 99354441764	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders.	▪ MMEZ and Logistic parks will be developed at EDFC stations. **Logistic hub proposed by AKIC at Kanpur**. Road Connectivity will be

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
			▪ The existing and proposed projects of the UPSIDC along the EDFC 1 were also investigated.	improved from NH 2 to EDFC stations.
7.	NHAI, Kanpur 8/07/2015	Mr. Naveen Mishra, Project director 0512 2580274	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the NHAI along the EDFC 1 were also Investigated	▪ **The proposal for improvement of road connectivity from NH 2 to EDFC stations is under progress**. DFCC should have a mitigation management plan for negative impacts on Natural resources, ecological impacts, Air pollution, and waste management due the project.
8.	Irrigation department, Kanpur 9/07/2015	RK Singh Yadev E.E. Auraiya	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the Irrigation department along the EDFC 1 were also Investigated	▪ Due to construction of DFCC track their canals are being damaged between Fafund and Samoh stations & some other locations. ▪ Proper mitigation measures should be taken up
9.	GM DIC, Raniya Kanpur 9/07/2015	Mr. Ashok Yadev, 9839163990	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the DIC along the EDFC 1 were also Investigated	▪ Road connectivity should be improved between DFCC stations and NH 2 and state highways also. Logistic parks, Ware houses freight depots will be required for industries convenience.
10.	Warehouse SAIL, Kanpur 10/07/2015	Mr. Rajaram, Manager	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the SAIL along the EDFC 1 were also investigated.	▪ Faster Transportation will be better and it will reduce time and cost. They will also plan to receive their goods by DFCC services.
11.	Industrial Association Raniya Kanpur and other industrialist	Mr. Hardeep Singh, Chairman 9336213421	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the Industrial Association along the EDFC 1 were also Investigated	▪ Industrial development will be better due to the project. Employment opportunities will be increased due to industrial development. Time and cost will be reduced due to faster transportation. Logistic parks and ware houses should be provided. Road connectivity from the DFCC stations should be improved. Dust, Air and Noise pollution will be increased due to

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
				construction of the project. Natural resources, water, Air, environment and ecology will be negatively impacted due to the project.
12.	Hind Lamps Shikohabad 14/07/2015	Mr. H O Sharma Asst. GM Mr. Shashikant CSR expert 9760007362	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders.	▪ Socio-cultural impacts will be negatively increased. Barren land should be acquired for logistic parks and other industrial developments instead of agriculture land. Environmental guidelines must be followed.
13.	DIC, Firozabad 14/07/2015	Mr. Sudhirl Srivastava GM 9839253111	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders.	▪ Industrial area will be positively impacted due to DFCC such as development of industries, transportation cost and time. Employment generation, environment safety, industrial development, revenue generation, economic growth will increase due to logistic parks & industrial hubs. More improvement of glass industries**. DIC is planning for glass expo and glass trade fare in Firozabad**. Industries are using green gas for their production since 1996.
14.	U.P. P.C.B. Firozabad 14/07/2015	Mr. Rajendra Prasad, Regional Officer U.P. P.C.B. Firozabad 9412130003	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders	▪ All kind of pollution will be increased due to industrial development and transportation. New Industrial corridor cannot be established due to TTZ area. **UPSIDC has acquired land near Lucknow – Agra expressway for industrial development.**
15.	Shramik Bharati (an NGO working in the affected villages of Kanpur Dehat)	Mr. Rakesh Pandey, Manage-CSR	▪ Mr. Rakesh Pandey was explained about the DFCCIL corridor and the purpose of Cumulative Impact Assessment.	▪ Mr. Pandey shared that there are few villages of Akbarpur Tehsil where the land acquisition has already taken place. He shared that the villagers of the area are largely engaged in agriculture and it is the only source of livelihoods for them. He pointed out that the development projects that are proposed to come up after the DFCCIL corridor are likely to agricultural lands around the DFCCIL tracks. The indiscriminate acquisition of agriculture land holdings in the Akbarpur, Phaphund and Bharthna areas in future for development projects such as Industrial cluster or/and logistics parks may

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
				adversely affect the livelihoods of the villagers. ▪ With regard to the impacts of the EDFC-I, Mr. Pandey shared following points: ▪ The villagers are not capable of identifying alternative livelihoods (do not have much exposure to perceive the kinds of livelihoods they can switch to) in case of loss of agriculture land holdings. This may generate negative impacts on the villagers in case they do not use/ invest the amount received as compensation for their land holdings. ▪ The proposed development projects along the EDFC would create growth centres around the villages and attract a good numbers of outsiders including labourers. This influx of the outsiders would pose burden on the resource base and also create pollution such as land, water, indiscriminate defecation by the outsiders around villages. It is necessary that the agencies that are likely to develop the projects should generate awareness so as to facilitate villagers to evolve suitable coping mechanisms to adapt with the proposed development. ▪ The GoUP seems to be apathetic towards the famers as the proposed development projects are likely to take these villagers away from the traditional livelihoods (as agriculture and agro based activities are the main livelihoods of these villages). The agriculture land holdings are very fertile in this area and the villagers have been dependent on the agriculture from generations. ▪ The proposed development projects in the area are likely to generate employment opportunities to the youth of the neighboring villages. The skilled workforce that is working outside the villages (migrated earlier for wage employment in other cities) might come back to these projects in future.

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
				▪ In absence of the skilled labor force in the villages around the proposed development projects, the local youth may only get wage labor. In order to mitigate this impact, the Industries association may start some skill development courses so that the potential for employability for these youth may increase. ▪ With the influx of outsiders, there are positive impacts likely to be observed in the form of the reduction in the social evils like untouchability, orthodox practices; illiteracy etc will be observed in the villages. There would be change in socio-culture practices, peer learning of safe practices resulting in decline in water-wash diseases in the area, reduction in rigid conservatism and improvement in literacy profile of these villages. ▪ Some suggestions that have been given in order to minimize the negative impacts of the development projects in various districts along the DFCCIL corridor are: o The Industries associations in the proposed project area may plan skill development initiatives from their CSR funds so that the villagers in the working age-groups could be given skill trainings that may subsequently increase their prospects of employability in upcoming development projects. o The construction activities that are being done by DFCCIL should be monitored in a way that indiscriminate extraction of mud/ top soil from the agricultural fields and leaving behind pits of 15-20 meters depth could be prevented. o The proposed industrial development projects by UPSIDC in and around the villages should be systematically planned from socio-cultural perspective and

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
				suitable mechanisms be brought in place prior to the land acquisition so that the community is prepared for the heavy traffic of trucks carrying construction materials. There have been some accidents due to heavy trucks movements in the village roads (that are congested and not fit for such traffic) during the construction activities on DFCCIL corridor. o The suitable emphasis should be laid on the construction of ground water recharge structure along the DFCCIL corridor and the areas where the proposed development projects are coming up. The over-extraction of ground water during the construction activities and operating these development projects may have detrimental effect on the ground water resources. o The agencies that are involved in the development projects may have to take cognizance of the potential threats to the environment in the form of diverse pollutions such as land, vehicular, solid, noise and air. Suitable mechanisms to regulate the developmental activities to prevent the externalities should also be planned in the proposed projects.
16.	Society for Conservation of Nature, Etawah (SCON)	Dr. Rajeev Chauhan	The Project Background, Environmental, Social issue and benefit from the project were explained	▪ DFCCIL should develop wetlands sites as natural habitats for the endangered bird due to the construction of EDFC. ▪ In view of the proposed development projects along the DFCCIL corridor, Dr. Chauhan asserted that sufficient care to prevent excessive damages to the micro climate and over extraction of the resources such as ground water and top soil from agriculture fields be taken at the planning level. He also cautioned that these

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
				development projects are likely to create diverse pollutions that would in times to come effect the world's heritage monument-Taj Mahal due to the proximity to the TTZ area. ▪ He also mentioned about the socio-cultural negative impacts that are likely to emerge with these proposed development projects at the community level. He predicted the possibilities of the wage employment for the local workforce but there need to sufficient skill development programmes as majority of the community members do not possess any kind of skills and have been dependent on agriculture as their livelihoods.
17.	Hind lamps	Mr. Shashikant Pandey, Manager-CSR	▪ The Project Background, Environmental, Social issue and benefit from the project were explained	▪ High Possibilities of employment opportunities and that would also attract the migrated workforce in future. He mentioned that there need to some efforts from the GoUP to develop the villagers of the working age-group so that they could take up the opportunities for employment in these development projects. ▪ Transformation in the socio-cultural beliefs and religious system of the villages where the proposed projects are likely to come up. Suitable NGOs should be hired to generate awareness and facilitate the communities to evolve coping mechanisms to adapt to these changes.
18.	Hind lamps	Mr. H O Sharma, Assistant General Manager	▪ The Project Background, Environmental, Social issue and benefit from the project were explained	▪ The DFCCIL corridor is certainly likely to create positive impacts on the industrial growth of the region. The small and medium industries in the region will be benefitted not only by way of procuring machinery, equipments and semi-finished but also using the freight corridor for sending their produce. He said that the upcoming proposed development projects in the region would also generate high potential for employment generation, development of growth centres and improve the infrastructural facilities

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Consultation Details	Consultation Outcome
				in the region. ▪ High possibilities of over burdening of resources, degeneration of micro-climates if suitable mechanisms and planning to prevent negative impacts are not taken in advance. The development projects that are likely to come up in the region should also plan sufficient environmental management safeguards so that the habitats of the endangered species and fragile ecosystem are not negatively impacted.
19.	GAIL	Mr. Rubin Panicker, Chief Manager-Marketing, GAIL	▪ The Project Background, Environmental, Social issue and benefit from the project were explained	▪ The DFCCIL corridor would bring tremendous possibilities for industrial growth in the region. There are high potential for the locals to get employment opportunities. The Gail also would use the corridor for porting out the products from GAIL.

Table 4.2: Summary of the Public Consultation

Sr. No	Name of village and District	Points Discussed in consultation
	EDFC – 1	
1.	Rahipalpur village between Bhaupur & Maitha stations 10/07/15	**Issues Discussed:** The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. The Main Issue of villagers during public consultation were discussed. Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Residual land is not useful for agriculture purpose. Court cases filled for revision of compensation rates. Loss of land again due to shifting of electric lines. Railway department has given an oral commitment to villagers for employment will be provided to PAFs. Compensation is still not paid to some land owners. Dust & air pollution will be increased due to construction activities. Irrigation drains blocked due to construction. Employment should be provided to land less former. Accident cases will be increased due to movement of heavy vehicles. **Suggestions**: Underpass or RoB should be provided for village road crossing and to access agriculture fields. Employment opportunities may be increase due to industrial developments. Compensation should be given on market rate.
2.	Lakhanpur village near Plastic City Auraiya 11/07/15	**Issues Discussed:** Improvement of employment opportunities due to plastic city and industrial developments. Loss of agriculture land. Business opportunities may be increased due to development projects.

Sr. No	Name of village and District	Points Discussed in consultation
		Suggestions: Compensation should be provided at market rate.
3.	Consultation with villagers in Bijhari village 11/07/15	**Issues Discussed:** Loss of village road due to construction of railway track. Loss of agricultural land. **Suggestions:** Underpass or RoB should be provided for village road crossing and to access agriculture fields. Compensation should be given on market rate.
4.	Consultation with villagers in Kanjari village 11/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Loss of land again due to shifting of electric lines. Compensation is still not paid to some land owners. **Suggestions:** Compensation should be given on market rate. Underpass or RoB should be provided for village road crossing and to access agriculture fields. Employment opportunities may be increase due to industrial developments.
5.	Consultation with villagers in Kanno village 11/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Loss of land again due to shifting of electric lines. Residual land is not useful for agriculture purpose. Court cases filled for revision of compensation rates. **Suggestions:** Underpass or RoB should be provided for village road crossing and to access agriculture fields. Employment opportunities may be increase due to industrial developments. Compensation should be given on market rate.
6.	Consultation with villagers in Samoh village 12/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Loss of land again due to shifting of electric lines. Compensation is still not paid to some land owners. **Suggestions:** Compensation should be given on market rate. Underpass or RoB should be provided for village road crossing and to access agriculture fields. Employment opportunities may be increase due to industrial developments. The existing drain has been closed down thus creating threat of water-logging that may lead to crop failure.
7.	Consultation with villagers in Pali Khurd /Pali	**Issues Discussed:**

Sr. No	Name of village and District	Points Discussed in consultation
	Kala village 12/07/15	The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. The Main Issues of villagers during public consultation were discussed. Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Residual land is not useful for agriculture purpose. Court cases filled for revision of compensation rates. Loss of land again due to shifting of electric lines. Railway department has given an oral commitment to villagers for employment will be provided to PAFs. Compensation is still not paid to some land owners. Dust & air pollution will be increased due to construction activities. Irrigation drains blocked due to construction. Accident cases will be increased due to movement of heavy vehicles. **Suggestions:** Underpass or RoB should be provided for village road crossing and to access agriculture fields. Employment opportunities may be increase due to industrial developments. Compensation should be given on market rate
8.	Consultation with villagers in Hirangaon 14/07/15	**Issues Discussed:** The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Loss of land again due to shifting of electric lines. Compensation is still not paid to some land owners. **Suggestions:** Compensation should be given on market rate. Underpass or RoB should be provided for village road crossing and to access agriculture fields. Employment opportunities may be increase due to industrial developments.
9.	Consultation with villagers in Rasulpur 14/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Compensation paid at lowest rates. **Suggestions:** Underpass or RoB should be provided for village road crossing and to access agriculture fields. Compensation should be given on market rate. Drain crossing provisions to be taken at the construction stage.
10.	Consultation with villagers in Goval Village (Nagla Goal) 14/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Compensation paid at lowest rates. **Suggestions:**

Sr. No	Name of village and District	Points Discussed in consultation
		Employment opportunities may be increased due to development of industrial corridor. Compensation should be given on market rate. Underpass or RoB should be provided for village road crossing and to access agriculture fields.
11.	Consultation with villagers in Nagla Pachauri Village 14/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Compensation paid at lowest rates. **Suggestions:** Underpass or RoB should be provided for village road crossing and to access agriculture fields. Compensation should be given on market rate. Drain crossing provisions to be taken at the construction stage.
12.	Consultation with villagers in Samai Village 14/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Compensation paid at lowest rates. **Suggestions:** Underpass or RoB should be provided for village road crossing and to access agriculture fields. Compensation should be given on market rate. Drain crossing provisions to be taken at the construction stage.
13.	Consultation with villagers in Jampur Village 15/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Villagers had refused to take compensation at the circle rate and filled a case against DFCC and district land acquisition authority. **Suggestions:** Compensation should be given on market rate. Employment should be provided to PAFs. Impacted structures and CPRs should be rehabilitated properly before started of construction. Compensation against structures should be provided at current market cost.
14.	Consultation with villagers in Limrai Village 16/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Compensation paid at lowest rates. **Suggestions:** Underpass or RoB should be provided for village road crossing and to access agriculture fields. Compensation should be given on market rate. Drain crossing provisions to be taken at the construction stage.
15.	Consultation with villagers in Jaimai Village 16/07/15	**Issues Discussed:** Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Compensation paid at lowest rates.

Sr. No	Name of village and District	Points Discussed in consultation
		Suggestions: Employment opportunities may be increased due to development of industrial corridor. Compensation should be given on market rate. Underpass or RoB should be provided for village road crossing and to access agriculture fields.
		EDFC – 2
16.	Jafarpur village, district Chandauli 08/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land several times for various types of infrastructural developments works. • Lost village road connectivity to NH-2 • Oral commitment of employment announced by the authority to PAFs • Compensation is still pending with the PAFs. • Previous compensation is also pending with the PAFs. • Existing industries are polluting the environment by releasing smoke and ash. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Previous outstanding compensation should be disbursed soon. • Local labourers should be absorbed in proposed industrial corridor.
17.	Singhitali village, district Chandauli 08/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land several times for various types of infrastructural developments works. • Lost village road connectivity to National Highways. • Oral commitment of employment announced by the authority to PAFs • Compensation is still pending with the PAFs. • Previous compensation is also pending with the PAFs. • Existing industries are polluting the environment by releasing smoke and ash. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Previous outstanding compensation should be disbursed soon.

Sr. No	Name of village and District	Points Discussed in consultation
		• Local laborers should be absorbed in proposed industrial corridor.
18.	Shivpur Koiran village District: Mirzapur 09/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to land acquisition. • Oral commitment of employment announced by the authority to PAFs. • Some of the PAFs got the compensation. • Compensation is still pending with rest PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
19.	Birohi village, district Mirzapur 09/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to land acquisition. • Notification was not sent to PAFs for land acquisition. • Oral commitment of employment announced by the authority to PAFs. • Ninety percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
20.	Bibhani Hetar village, district Allahabad 09/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to land acquisition. • Notification was not sent to PAFs for land acquisition. • Oral commitment of employment announced by the authority to PAFs. • Fifty percent of the PAFs got the compensation.

Sr. No	Name of village and District	Points Discussed in consultation
		• Compensation is still pending with some PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor. • A camp should be arranged by the block officers for the distribution of cheque in village.
21.	Maska village, district Allahabad 09/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to land acquisition. • Oral commitment of employment announced by the authority to PAFs. • Eighty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. • Existing industries are polluting the environment. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
22.	Asadullapur Rohi village, district Kaushambi 10/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land and houses due to land acquisition. • Oral commitment of employment announced by the authority to PAFs. • Fifty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
23.	Kanwar village, district Kaushambi 10/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public

Sr. No	Name of village and District	Points Discussed in consultation
		consultation are as follows: • Lost agriculture land and houses due to land acquisition. • Fifty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. **Suggestions**: • Villagers suggested that one over bridge should be on railway crossing. • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
24.	Haswa village, district Fatehpur 11/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to land acquisition. • Fifty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
25.	Sikrodhi village, district Fatehpur 11/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to various types of land acquisition. • Fifty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
26.	Badagaon village, district Kanpur Nagar 11/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public

Sr. No	Name of village and District	Points Discussed in consultation
		consultation are as follows: • Lost agriculture land due to land acquisition. • Fifty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. • Villagers informed that proposal of a rail over bridge in the village. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
27.	Hathipurgaon village, district Kanpur Nagar 12/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to various types of land acquisition. • Fifty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
28.	Singhpur Debni village, district Ramabai Nagar (Kanpur Dehat) 13/07/15	**Issues Discussed:** Disseminated the Project background, Project benefits, issues pertaining to Environmental and Social with the Stakeholders. The Project specific main Issues and concerns were discussed with the villagers during public consultation are as follows: • Lost agriculture land due to land acquisition. • Fifty percent of the PAFs got the compensation. • Compensation is still pending with some PAFs. **Suggestions**: • Compensation should be disbursed on prevailing market rate. • Employment should be awarded to aggrieved PAFs. • Local labourers should be absorbed in proposed industrial corridor.
		EDFC – 3
29.	Village: Rupaloo Tehsil: Samrala District:: Ludhiana (Punjab)	**Issues Discussed** ▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders.

Sr. No	Name of village and District	Points Discussed in consultation
	Date: 14 .7 2015	▪ Loss of Livelihood due to less in agriculture activities Loss of agriculture land due to the project. Loss of village road connectivity due to construction. Some residential area is near the track and should not be affected due to project activities **Solutions** ▪ Widening of the roads in village and outside the village area roads ▪ Provision of employment in the terminal work for the villagers ▪ Employment generation schemes should be started in the village by the PIA ▪ Development works in the village ▪ Opening of new Education centers in the village in which preference may be given to the village children. ▪ Some residential area near the proposed terminal and track that should not be polluted and affected. ▪ Provision of medical facilities in the village. ▪ Insurance of the affected families and if the villagers has to be suffered from health issues and problems they must be insured and provision of the financial help ▪ Construction of approach roads up to village. ▪ Provision of the jobs for the affected families. ▪ Provision of free travel in railway for affected families.
30.	Village: Fareed pur Gujra Tehsil: Rajpura District: Patiala (Punjab) Date:15.7.2015	**Issues discussed** ▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ Loss of agriculture land due to the project. Loss of village road connectivity due to construction and proper system for drainage along with the corridor. **Solutions** ▪ The first point raised by the community was to provide job for each member who lost their land in the project area as per their ability and qualification. ▪ Many farmers who lost or whose land is acquired have a small part of the land in remaining that must be acquired or compensated because that is not sufficient for the agriculture. ▪ Proper drainage system along the corridor with the help of consultation along with the villagers. ▪ Construction of new and old roads in the village. ▪ Construction of road to cremation yard at village. ▪ Provision of ROB/RUB along the corridor ▪ Health and insurance facilities against any miss happening due to project in the village
31.	Village: Harbanspur Tehsil: Mandi gobindgarh District: Fathegarh sahib Date: 16.7.2015	**Issues discussed** ▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ Loss of agriculture land due to the project. Loss of village road connectivity due to construction Many farmers who lost or whose land is acquired have a small part of the land in remaining that

Sr. No	Name of village and District	Points Discussed in consultation
		must be acquired or compensated because that is not sufficient for the agriculture **Solutions** ▪ Roads are affected due to project it should be newly constructed for daily use ▪ Agriculture land is at both side of the new track so accessibility for the land is directly impacted and should be provision of accessibility for daily use. ▪ In acquired land animals /cattle's are gathering for grazing and also damaging the crops ▪ Road construction for school from crossing no. 148c ▪ As the project is traversing from the middle of agricultural land and dividing the village into 2 parts, Provision of Irrigation for both the sides of track for agriculture- land and accessibility to be provided to cross over to other side. ▪ Health and insurance facilities against any miss happening due to project in the village ▪ Provision of job for the farmers who have lost the land ▪ Development works in the village ▪ The land is not acquired as per the actual circle rates ▪ Due to widening of GT road accessibility is affected to reach village. ▪ This village has been affected by multiple developmental projects and has now confined the village in the middle and surround by Bhakra canal, GT road, Amritsar-Delhi railway line and now the DFCC project. Villagers need proper road connectivity out of the village.
32.	Village: Nahera Tehsil: Burada, Shahbad District: Ambala (Haryana) Date: 17.7.2015	**Issues Discussed** ▪ Briefly discussed about the project activities .The main issue was that villagers had not got not got payment from actual circle rates ▪ Tube wells and tree cutting compensation is paid very less Unemployment has increased in the village due to the land acquisition **Solutions** ▪ Provision of job for those who have lost land ▪ Provision of ROB/RUB ▪ Demanding money as royalty every year whose land is acquired ▪ Development works in the village ▪ GAYLE India had paid one crore for each who lost land up to one acre for pipeline project and the land is with farmers and doing agriculture.

Table 4.3: Details of the Existing and Proposed Projects near EDFC

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	Proposed/Planned		
			EDFC – 1		
1	**Industries**	Plastic city, Auraiya (Plastic cities are the areas which have all the facilities like manufacturing, allied product manufacturing, common enabling assets, proto-typing, non-destructive material testing, incubation, training, warehousing and plastic recycling within the area. Plastic city Auraiya is planned to be developed in area of 314 acres out of which app. 225 acres will be developed as industrial area and remaining for residential, commercial and other support facilities.)	• **Logistic park** on important EDFC stations like Bhaupur, Ekdil, • **MMEZ proposed between Auriaya and Etwah** • **Industrial belts proposed near every major junction of DFCCIL** (proposal for notify 5 km strip near EDFC-1 sent to GoUP from UPSIDC to ensure organized industrial development and to prevent haphazard LA for development by private parties) • **Rail side Warehousing Complexes** - In order to augment the utilization of railway transportation system and facilitate cost-effective and efficient operation for freight distribution, the Central Warehousing Corporation of India (CWC) in association with Ministry of Railways have evolved the concept of Rail side warehousing facilities so as to ensure value added services viz. provision of total logistics solutions, avoiding of multiple handling of goods, curtailing of handling cost and offering hassle free efficient operation, to the users of rail transport system. Accordingly, the CWC and Railway Ministry have identified 22 strategic locations for development rail side warehousing complexes. One of them is to be located at Shakur Basti and Ghaziabad in Northern Railway Region, the NCR of Delhi. • National Manufacturing Investment Zone being planned each in Jhansi and Auraiya • Shortlisted Projects Dadri – Noida – Ghaziabad Investment Region • Meerut – Muzaffarnagar Manufacturing Zone • Multimodal Logistic Hub at Dadri	• Air • Water • Land • Noise	• Degradation of air quality • Degradation of water quality and increase in consumption. • Change of landuse and degradation in quality of top soil. • Depending on the nature of industry, noise level may increase.

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	Proposed/Planned		
			• High tech Industrial Township • Major transport companies of Kanpur are proposed to establish their units near **Rania**. • Lucknow-Agra Express way (LA already started) • **Free Trade Warehousing Zones** - Foreign Trade Policy 2004, has announced development of Free Trade Warehousing Zones (FTWZs) to increase the percentage share of global merchandise trade in India. Free Trade Warehousing Zones are proposed to be located in six locations across India including, Greater NOIDA. • **Integrated Logistics Hub** - Expansion of the existing Inland Container Depot at Dadri and establishment of a Logistic Park have been proposed • **Meerut-Muzaffarnagar Industrial Area** - The proposed Meerut-Muzaffarnagar Industrial Area would be located at a distance of 100 to 150km from Delhi, the National Capital. This region has good connectivity by road (NH-58 and other State Highways) and rail (Delhi-Meerut-Lucknow/Saharanpur) to rest of the State and India.		
2	**Transportation sector**	• 43 National Highways connect it with 9 neighboring states and other parts of India • 6 Domestic Airports at Agra, Allahabad, Gorakhpur, Kanpur, Lucknow and Varanasi and 1 international airport at Lucknow.	**AIRPORTS:** • **Taj International Airport:** GoUP has planned to develop an airport of international level to meet out the urgent need to cater domestic and foreign tourists. Department of Tourism is acting as nodal agency. The said airport is proposed to be developed Public Private Partnership mode on DBFOT basis. The consultant for the project has been selected. • UPPWD has sent a proposal to CM's office, GoUP of six state highways under UP state	• Air • Water • Land • Noise • Vibrations	• Degradation of air quality due to increase in traffic load on improved roads. • Degradation of surface water quality and decrease ground water recharge • Change in landuse and degradation of top soil cover • Noise pollution will be increased due to increase in traffic load on improved roads. • Increase in vibrations due to EDFC on the nearby areas.

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	Proposed/Planned		
		• The existing road network map is attached in the below given **Figure 4.7**.	sub-road project to GoUP to link the EDFC-I stations to National highways with the support of the World Bank under road project. • High speed connectivity between Investment Region and New Delhi • **Boraki Integrated Transport Hub** • **Modern Rail Terminal at Boraki-** Government of Uttar Pradesh has proposed development of Boraki Railway Station as the major passenger and goods based rail terminal with state-of-the-art infrastructure through public private partnership. It is expected to serve as convenient location for evacuation of goods from Delhi/Ghaziabad region and help in decongesting the rail terminals. Boraki Railway Station is close to the proposed 2500 Acre SEZ, 1000 Acre Handicraft SEZ, Container Depot at Dadri. Moreover, Boraki Rail Terminal is proposed to be connected to the Container Depot at Tughlakabad with a new alignment that connects with Noida as well. The state government has already received in-principle approval from the Ministry of Railways • Investment worth INR 23000 crore planned for 2500 km of state highway projects • 6730 km identified as core network by World Bank , of which 2466 km has been developed by UPPWD • Concession agreement signed for 4 roads of 463 km , costing INR 3867 crore • Feasibility study has been completed and proposals for VGF are being sent to GoI for 11 roads of 977 km , costing about INR 7129 crore. • Buddh International Circuit in Greater		

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	Proposed/Planned		

			Noida with 5.14 Km length spread across an area of 875 acres is India's only circuit for F1 motor racing
			• Providing linkage to NH-24 and NH-58.
			  • Augmentation of State Highway connecting Ghaziabad-Aligarh-Agra.
			  • Connectivity to Greater Noida/Delhi and Faridabad/NH2 and to Faridabad-Noida-Ghaziabad and Kundli-Ghaziabad Expressways.		

3	**Real estate sector (housing)**	• Private Housing colonies near Plastic cities • Affordable housing policy has been developed by the State of Uttar Pradesh which would enable to promote affordable housing projects in the region	NA	NA	NA
4	**Sub – Stations, T&D lines**	NA	Power sub-station proposed near Nitawali station	• Land	• Change in landuse if govt land is not available.
5	**Other department projects**	NA	**A proposal has sent to CM's office, GoUP by UPPWD to link the EDFC-I stations to six SH (state highways)**with the support of the World Bank under road project highways under UP state sub-road project, GoUP.(A study by the World Bank on feasibility of these state highways have already been undertaken)	• Air • Water • Land • Noise	• Degradation of air quality due to increase in traffic load on the new proposed roads. • Degradation of surface water quality and decrease ground water recharge • Change in landuse and degradation of top soil cover • Noise pollution will be increased due to increase in traffic load on improved roads.
6	**Other projects**	CONCOR has acquired land near **Maitha** station to establish Container Depot (proposal already	NA	• Land • Air • Water • Social	• Change in landuse • Air quality will be degraded due to increase in traffic load in nearby areas. • Water quality may be degraded due to

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	Proposed/Planned		
		sent from UPSIDC)			spillage. • Crime in the nearby areas will be increased.
			EDFC – 2		
1	**Industries**	**Existing Industries in Chandauli** • Flour Mills, Chandauli • Coal Mills, Chandauli • Rice Mills, Chandauli • Plastic bag manufacturing industries **Existing Industries in Kaushambi** • Vivek brick Sheld (Bhatta), Dhuayan • Flour Mill, Bharwari **Ongoing Industries in Chandauli** • Matrix Roller Mill-Jivnathpur, Rampur • Coke Industries, • S.A. Iron-Junadpur, • M.K. Biscuits-B-18, • Alaknanda Cement Pvt. Ltd.-Industrial Corridor, • Swastic Cement Products-Industrial Area-Patnva Ramnagar. **Ongoing Industrial Projects in Mirzapur:** • - Mini Industrial Estate in Pathrayya • - Mini Industrial Estate in Chunar	**SPECIAL ECONOMIC ZONES** • Name of Company: UPSIDC Sector: Textile Area: 103.72 Hectare Formal Approval: 19.06.2007 Address: A-1/4, Lakhanpur, Kanpur-208 024 • Name of Company: UPSIDC Sector: Leather Area: 103.85 Hectare Formal Approval: 19.06.2007 Address: A-1/4, Lakhanpur, Kanpur-208 024 • Name of Company: UPSIDC Sector: Engineering goods Area: 102.75 Hectare Formal Approval: 19.06.2007 Address: A-1/4, Lakhanpur, Kanpur-208 024 • Name of Company: M/s Jhunjhunwala Vanaspati Ltd. Area: 103.63 Hectare Sector: Multiservice SEZ with FTWZ Formal Approval: 02.01.2008 Address: Sahupuri, Chandauli • Name of Company: M/s. Proto Developers & Technology Ltd. District: Chandauli/Varanasi Sector: IT/ITES Formal Approval: Recommendation sent by GoUP for In-Principle approval to GoI on 14.03.08 **LOGISTIC PARK**	• Air • Water • Land • Noise	• Degradation of air quality due to high emissions from various industries. • Degradation of water quality and increase in consumption. • Change of landuse and degradation in quality of top soil. • Depending on the nature of industry, noise level may increase.

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	Proposed/Planned		
		• - Mini Industrial Estate in Khimaipur • - Mini Industrial Estate in Ghatampur • - Mini Industrial Estate in Rajgarh • - Mini Industrial Estate in Marhyan • - Mini Industrial Estate in Ram Nagar • - Mini Industrial Estate in Sikri • - Mini Industrial Estate in Sadar **Ongoing Industrial Projects in Kaushambi:** • Shiv Rice Mill, Sirathu - Ongoing • New Shiv Rice Mill, Sirathu - Ongoing **Ruma Industrial Area, Kanpur** • Textile **& Hosiery Park at Ruma**: UPSIDC has set up Textile & Hosiery Park at Ruma in district Kanpur with industry specific infrastructure, textile training centre, fashion design centre, and quality control laboratory.	• Dedicated Freight Corridor Corporation has proposed to provide rail connectivity to a **Logistic Park** proposed at **Kanpur**, which is to be built in PPP mode. **INDUSTRIAL CORRIDOR** Amritsar - Delhi - Kolkata Industrial Corridor (ADKIC) • Mughalsari-Varansai-Mirjapur Investment Zone (3000 hectares) • Allahabad-Naini-Bara Investment Zone (3000 hectares) • Kanpur Logistics hub (6000 hectares) **Miscellaneous Proposed Industries in Chandauli** • D.K. Engineering Works, Phase-II Industrial Area • Ganesh Plastic Udyog, Patanwa • Shanda Punj Fuel Coke Pvt. Ltd., Patanwa. **Proposed Industrial Projects in Mirzapur:** • South Vidhyanchal Industrial Area to be developed but it is yet not finalized. **Proposed Industrial Projects in Kaushambi:** • Raj Cold storage, Sayara, Mithapur (Permission has not been given by the railway) • Kaushambi Rice Mill, Rosulpur, Girsa-Proposed		
2	**Transportation sector**	**HIGHWAYS** **Ongoing Projects in**	**HIGHWAYS**: **Chandauli District:**	• Air • Water	• Degradation of air quality due to increase in traffic load on improved

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	**Proposed/Planned**		
		Chandauli District: 1. Six laning of NH-2, Client: NHAI 2. Widening of Sayyed Raza Jamnia road, Client: NH Division, Banaras **Ongoing Projects in Allahabad District:** 1. Yamuna bridge new section starts from 4.878 to 458.000 in Allahabad. 2. 2-lane with paved shoulder (both side widening each 1.5m). • The existing road network map is attached in the below given **Figure 4.8**.	• Strengthening of Chandauli-Sakaldiha-Saidpur road SH-69. • Widening works of ROB Bichhyya crossing, CDO office to Sakaldiha road. **Kanpur District:** • 6-lane of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687 • 2-lane with paved shoulder of Kanpur-Kabrai of NH-86. (PCOD issued on 5 May) • 6-lane of Chakeri to Allahabad of NH-2 from km 483.687 to 628.753. • Widening of Sayyed Raza Jamnia road, Client: NH Division, Banaras • Ongoing Projects in Allahabad District: • Yamuna bridge new section starts from 4.878 to 458.000 in Allahabad. • 2-lane with paved shoulder (both side widening each 1.5m) of other roads in this district. **WATERWAYS**: ESIA/EMP/RAP for "Capacity augmentation of navigational infrastructure of NW-1 (Jal Vikas Marg) **RAILWAYS:** • Providing rail connectivity to the proposed ADKIC logistic hub in Kanpur by DFCCIL.	• Land • Noise • Vibrations	roads. • Degradation of surface water quality and decrease ground water recharge due to road projects • Degradation of river water quality in case of accidental discharge of the transported commodities in water, due to IWT project • Change in landuse and degradation of top soil cover • Noise pollution will be increased due to increase in traffic load on improved roads. • Increase in vibrations due to EDFC and the rail connectivity provided to the logistic hub of ADKIC, on the nearby areas.
4	**Irrigation projects**	**Dams in Chandauli:** 1. Naugarh Dam 2. Mushakhard Dam 3. Chandraprabha Dam 4. Latifshah Dam 5. Bhaisoda Dam **Dams in Mirzapur:**	Ongoing Dam: • Banjari Kalan Dam, Allahabad • Dam project in Khesampur village	Biodiversity Water	• Aquatic and terrestrial flora and fauna will be disturbed • Water quality will be degraded and natural flow of the river will be affected

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	**Proposed/Planned**		
		• Adwa Dam, 1978 • Ahraura Dam, 1955 **Dams in Allahabad:** • Bachara Dam, Meja, 1980 **CANAL:** 1. Chandraprabha Canal, Chandauli 2. Mushakhad Canal, Chandauli 3. Narayanpur Lift Canal, Chandauli			
B	**Power projects – sub-stations, T&D lines**	**EXISTING PROJECTS** • 132 KV Power Substations, Near Vikas Bhawan, Chandauli. • 25 MW Captive Power Plant at Sahupuri in Chandauli **IMPLEMENTATION STAGE** • Mirzapur Thermal Power Plant in implementation stage. • Kanpur Thermal Power Plant in implementation stage. • Lalitpur Kanpur Dehat Thermal Power Plant in implementation stage.	• **Meja Thermal Power Station (3x660 MW), Allahabad: -** is an upcoming coal-based Thermal Power Plant located in Meja Tehsil in Allahabad district, Uttar Pradesh. The power plant is owned by the Meja Urja Nigam Private Limited (MUNPL) a joint venture between NTPC Limited and Uttar Pradesh Rajya Vidyut Utpadan Nigam. • **Karchana Thermal Power Station (2x660 MW), Allahabad:-**is a proposed coal-based Thermal Power Plant located in Bara Tehsil in Allahabad district, Uttar Pradesh. The power plant will be owned and operated by Uttar Pradesh Rajya Vidyut Utpadan Nigam. • **Bara Thermal Power Station (3X660 MW), Allahabad:** is an upcoming coal-based thermal power plant located in Bara Tehsil in Allahabad district, Uttar Pradesh. The power plant is owned by Prayagraj Power Generation, a subsidiary of the Jaypee Group. The estimated cost of the project is INR 12,000 crores. • **Anpara D Thermal Power Station (2x500 MW):-** Under State government's flagship power-generation company UPRVUNL, a	• Air • Water • Land • Noise	• Degradation of air quality due to increase in traffic load on improved roads. • Degradation ground water quality • Change in landuse and degradation of top soil cover • Nearby agricultural lands quality gets degraded • Noise pollution will be increased due to the new upcoming power plant projects.

Sr. No.	Stakeholders	Development projects Existing	Development projects Proposed/Planned	VECs	Impacts on Identified VECs
			new unit Anpara D is under construction in full swing. Units are configured for generating 2x500 MW and are manufactured by BHEL. Anpara Thermal Power Station is located at Anpara in Sonbhadra district in the Indian state of Uttar Pradesh, about 200 km (120 mi) from Varanasi on the Varanasi - Shakti Nagar route.		
			EDFC - 3		
1.	**Ludhiana grain association Sahnewal**	Grain market in Sahnewal	NA	**Nil**	**No Impacts on VECS**
2.	**FCI**	FCI Storage in Sahnewal	NA	**Nil**	**No Impacts on VECS**
3.	**DIC**	Registered Micro & Small Unit No. 39091 2. Registered Medium & Large Unit No. 116 6 Industrial zones	Duraha: Industrial Textile Park near existing industrial point Tanansu : Industrial Focal Point where 350 ha land is acquired	• Air • Water • Land • Noise	• Degradation of air quality due to high emissions from various industries. • Degradation of water quality and increase in consumption. • Change of landuse and degradation in quality of top soil. • Depending on the nature of industry, noise level may increase.
4.	**Irrigation**	Three canals	Lining of two canals, Sirhind canal Sitma canal	• Water • Soil	• No water logging in the adjoining areas • No water loss • No soil erosion will occur therefore soil fertility will be maintained,
5.	**PWD**	Patiala One road connecting to villages Fategarh Sahib (One existing road connecting to village) Kotla pai pind road is affected and should be constructed by the project implementing agency	3 ROB on Existing road is proposed 6 RUB are proposed along the DFCC corridor. 1 ROB is proposed at Madapur, Fatehgarh Saheb	• Air • Water • Land • Noise	• Degradation of air quality due to higher traffic load on roads. • Degradation of water quality due to increase in surface runoff. • Change of landuse and degradation in quality of top soil. • Increase in traffic load will tend to increase in noise pollution.
6.	**Agriculture**	Agriculture research	NA	**Nil**	**No Impacts on VECS**

Sr. No.	Stakeholders	Development projects		VECs	Impacts on Identified VECs
		Existing	Proposed/Planned		
		center near the proposed corridor			
7.	**Town Planning**	Current master plan is for 10 years. DFCC corridor has already been taken into the current master plan	No proposed town planning near the corridor and **mix land use up to 200 m**	**Nil**	**No Impacts on VECS**
8.	**Transportation Sector**	NH-1 • The existing road network map is given in **Figure 4.9**.	NH-1 Road widening from Jalandhar to Ambala	• Air • Water • Land • Noise	• Degradation of air quality due to increase in traffic load on improved roads. • Degradation of surface water quality and decrease ground water recharge due to road projects • Degradation of river water quality in case of accidental discharge of the transported commodities in water, due to IWT project • Change in landuse and degradation of top soil cover • Noise pollution will be increased due to increase in traffic load on improved roads.
9.	**Industries**	•Registered Micro & Small Units No. 39091 •2. Registered Medium & Large Units No. 116 •6 – Industrial zones •Pristine Inland Container Depot, Ludhiana (in the final stage)	•**Duraha: Industrial Textil**e Park near existing industrial point •**Tanansu: Industrial Focal Point** where 350 ha land is acquired •**Proposed Initiatives of Haryana State Government** - As part of development of the proposed Western Peripheral Expressway (Kundli- Manesar-Palwal Expressway), the Government of Haryana has proposed development of Dry Port in the vicinity of Palwal over an area of 2 Sq km (200 Ha). In addition, the state government is also contemplating setting up Logistics Park at Rewari/ Bawal to cater to the region's requirements.	•	•

Table 4.4: Hotspots Identified as Per Consultation

S. No.	Hotspots	Reason for Selection of Hotspots
1.	EDFC-1 (Khurja to Bodaki)	This zone can experience high industrial growth and urbanization in future as land resources are available in plenty and connectivity will be improved due to development of EDFC and existing road infrastructure. Zone is **foreseeable as industrial hub/belt in future**
2.	EDFC-1 (Agra)	Proposed development of Airport. May lead to large scale development in nearby area
3.	EDFC-1 (Kanpur Dehat, Auraiya & Etwah)	Zone caters varied kind of industries. As per stakeholder consultation, **Kanpur Dehat, Auraiya and Etawah are zones identified for major developments like new industrial areas, plastic cities, townships, logistic hubs etc.**
4.	EDFC-2 (Kanpur Nagar)	Kanpur Nagar is major industrialized area in Uttar Pradesh known for tanneries/leather producing industries. Zone has potential to further undergo the developments as per consultation with stakeholders
5.	EDFC-2 (Allahabad)	Allahabad is zone for high industrial and residential activities. In lieu of large area of the district, large land resources are available in the area. **This zone has high potential for catering large industrial and residential developments**.
6.	EDFC-2 (Mirzapur)	Area has various industrial areas and also various industrial areas are under implementation. Also zone has potential to receive various developments.
7.	EDFC-2 (Kasuhambi)	It is anticipated with development of EDFC, **immediate industrial & infrastructural growth is expected in this region due to availability of land resources**. Also residential developments may come up within study area but in period of 4-5 years
8.	EDFC-3 (Ludhiana Region)	Ludhiana & Patiala supports large nos. of industries and both of polluting and non polluting types. Also various mega projects are under proposal in this zone.

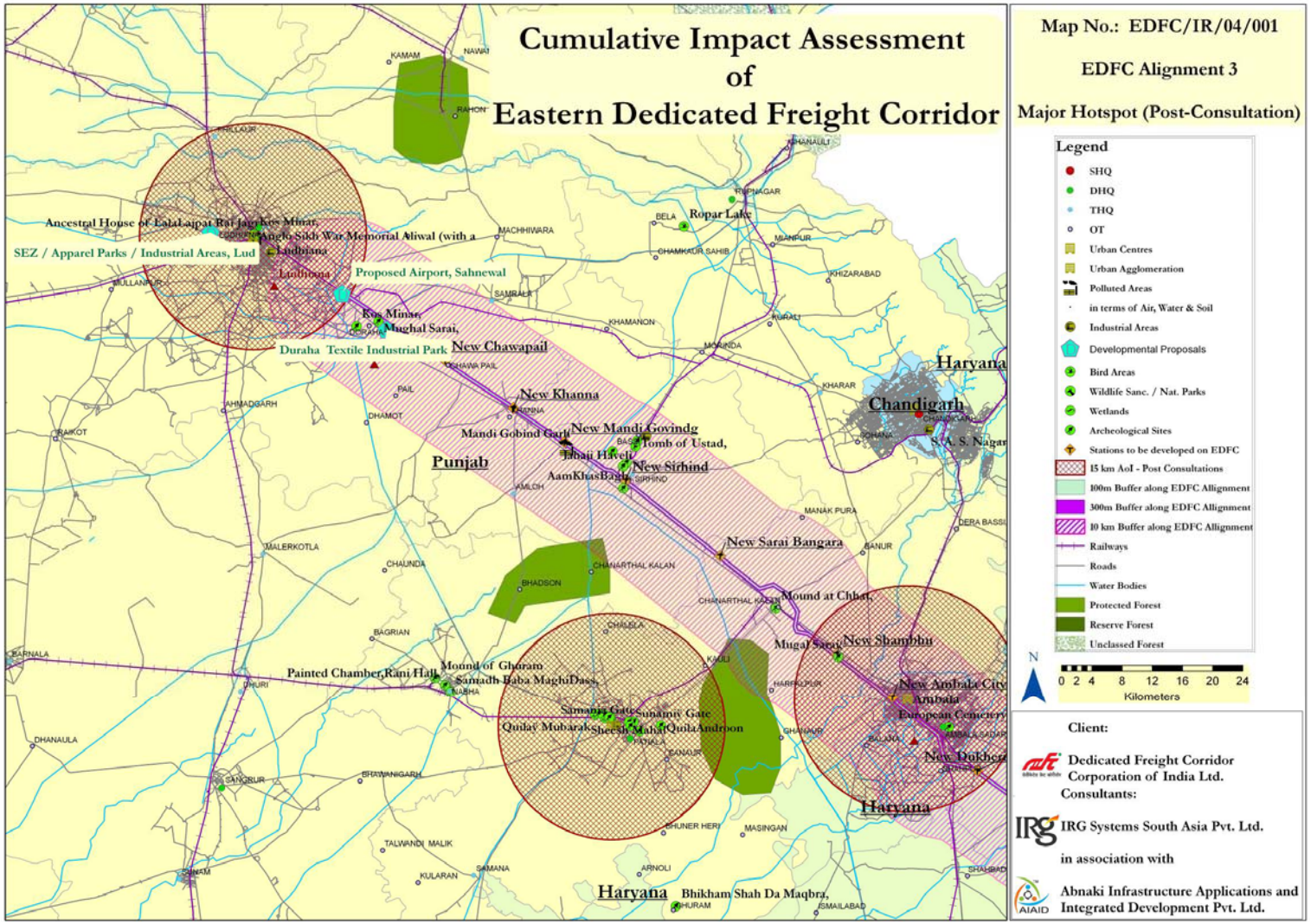


Figure 4.1: Map showing development proposal marked in Ludhiana Hotspot

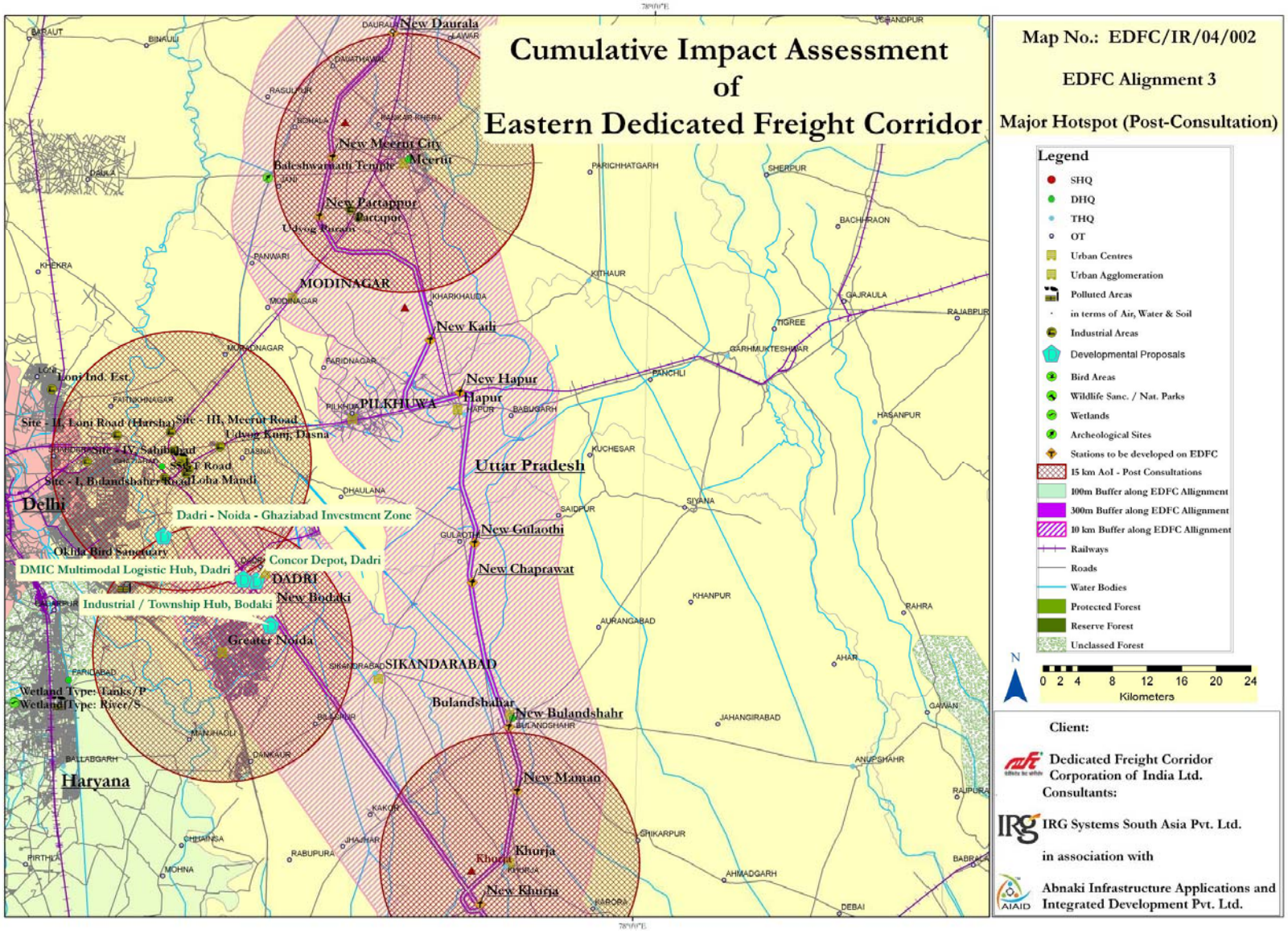


Figure 4.2: Map Showing Development Proposal marked in Khurja to Bodaki Region

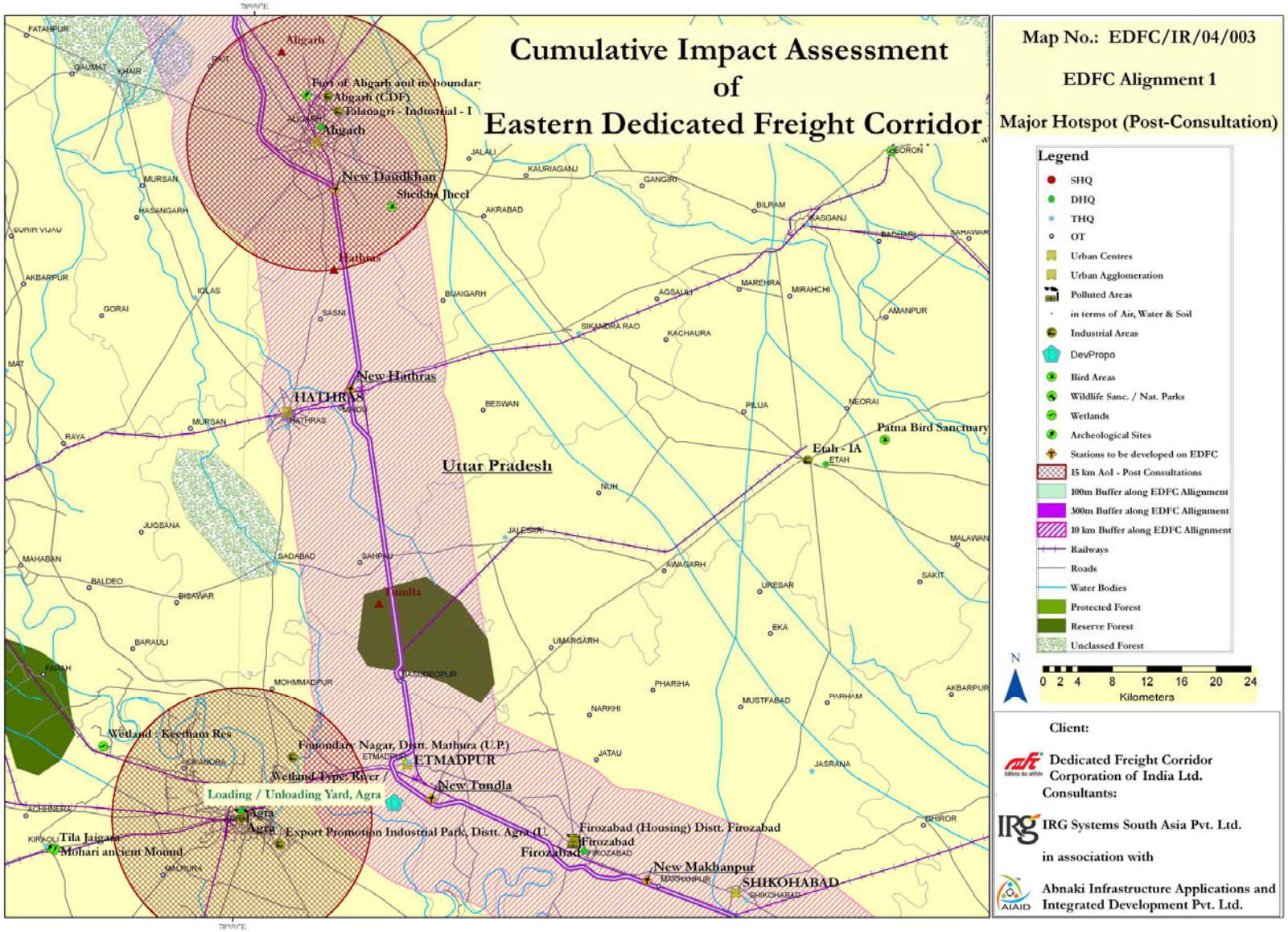


Figure 4.3: Map Showing Developmental Proposal Marked in Hotspot Agra

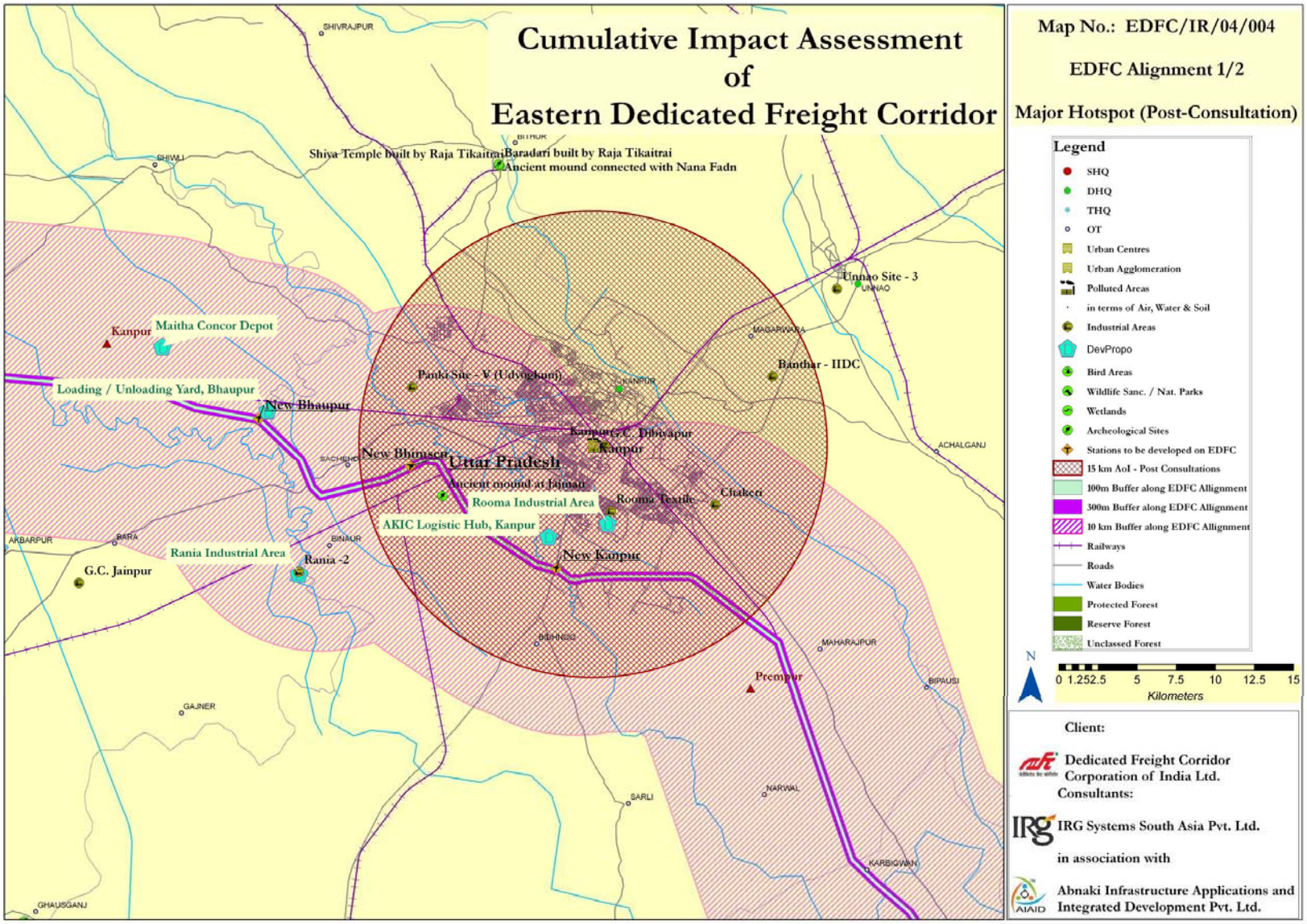


Figure 4.4: Map showing Developmental Proposal Marked in Hotspots Kanpur Nagar & Kanpur Dehat

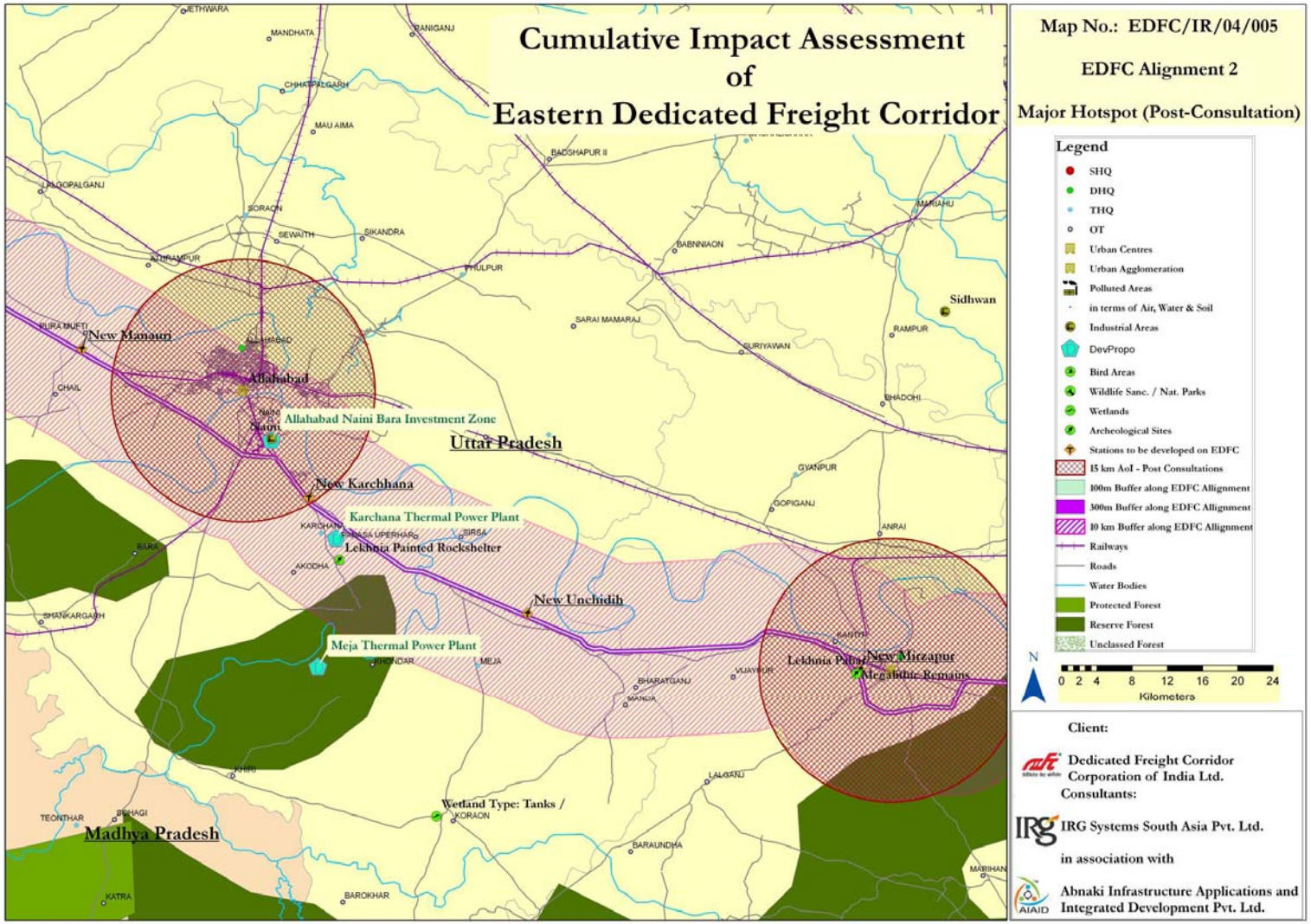


Figure 4.5: Map showing development Proposal Marked in hotspot Allahabad

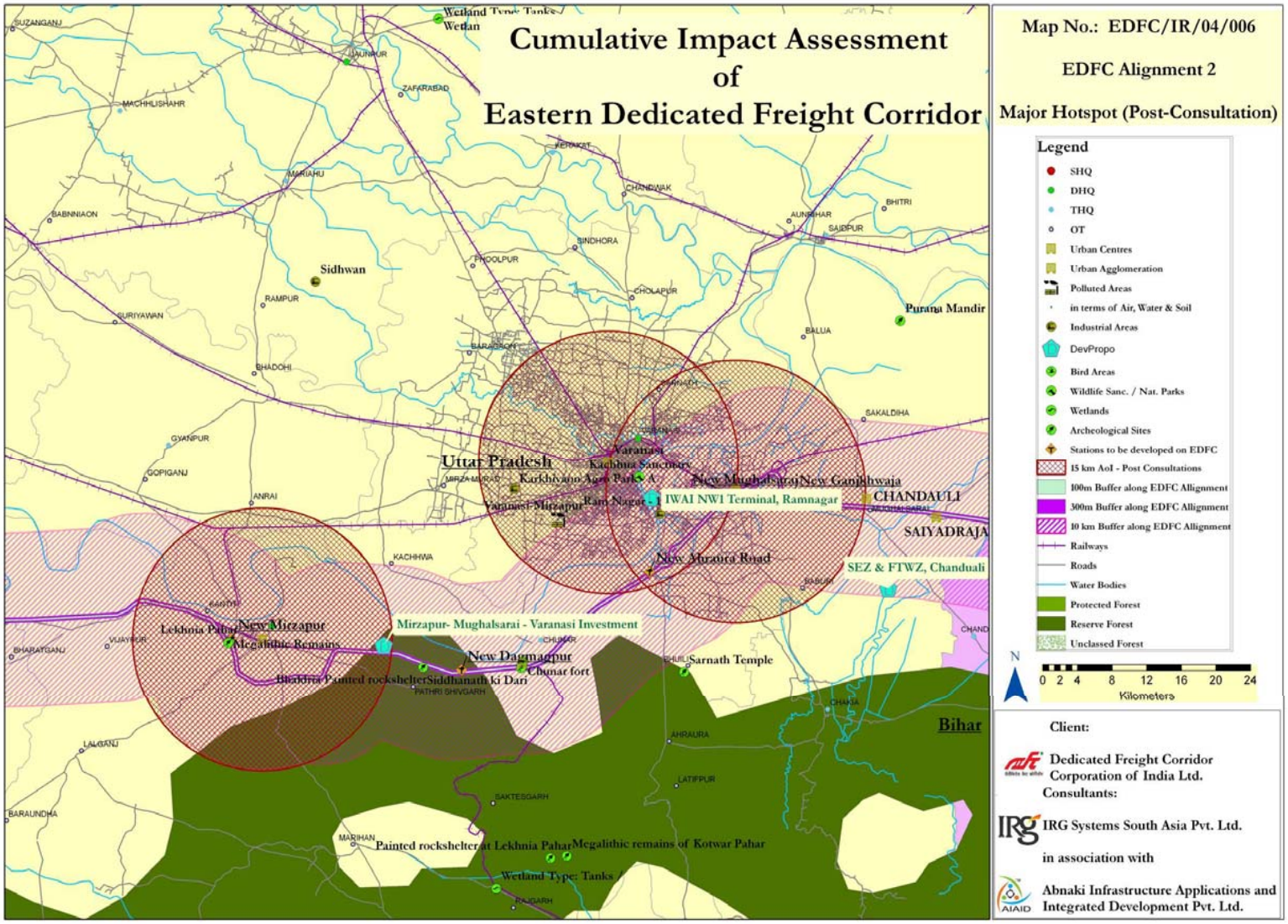


Figure 4 6: Map showing developmental proposal Marked in Hotspots Mugalsarai & Mirzapur Region

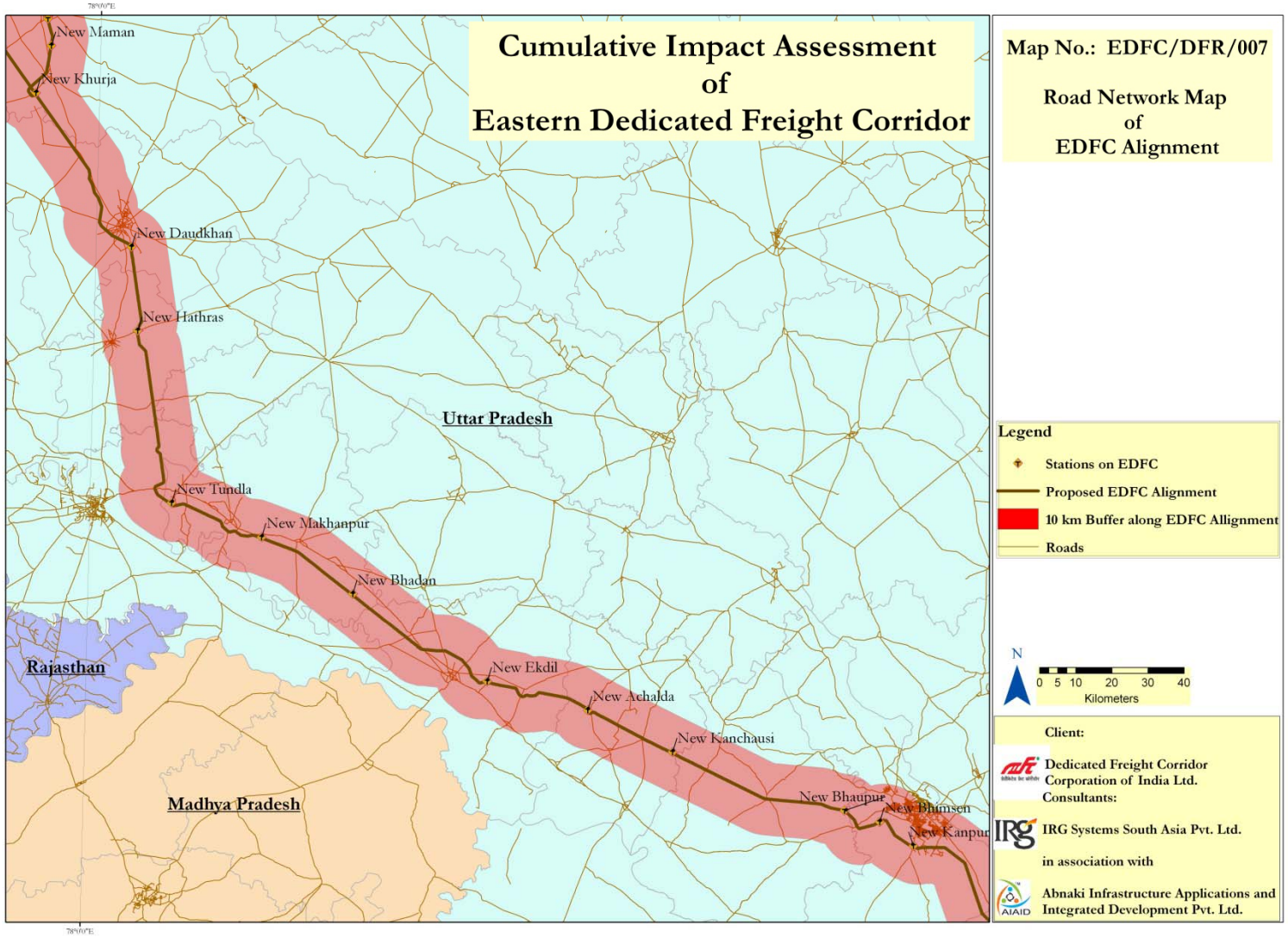


Figure 4.7: Map showing road networks along EDFC 1

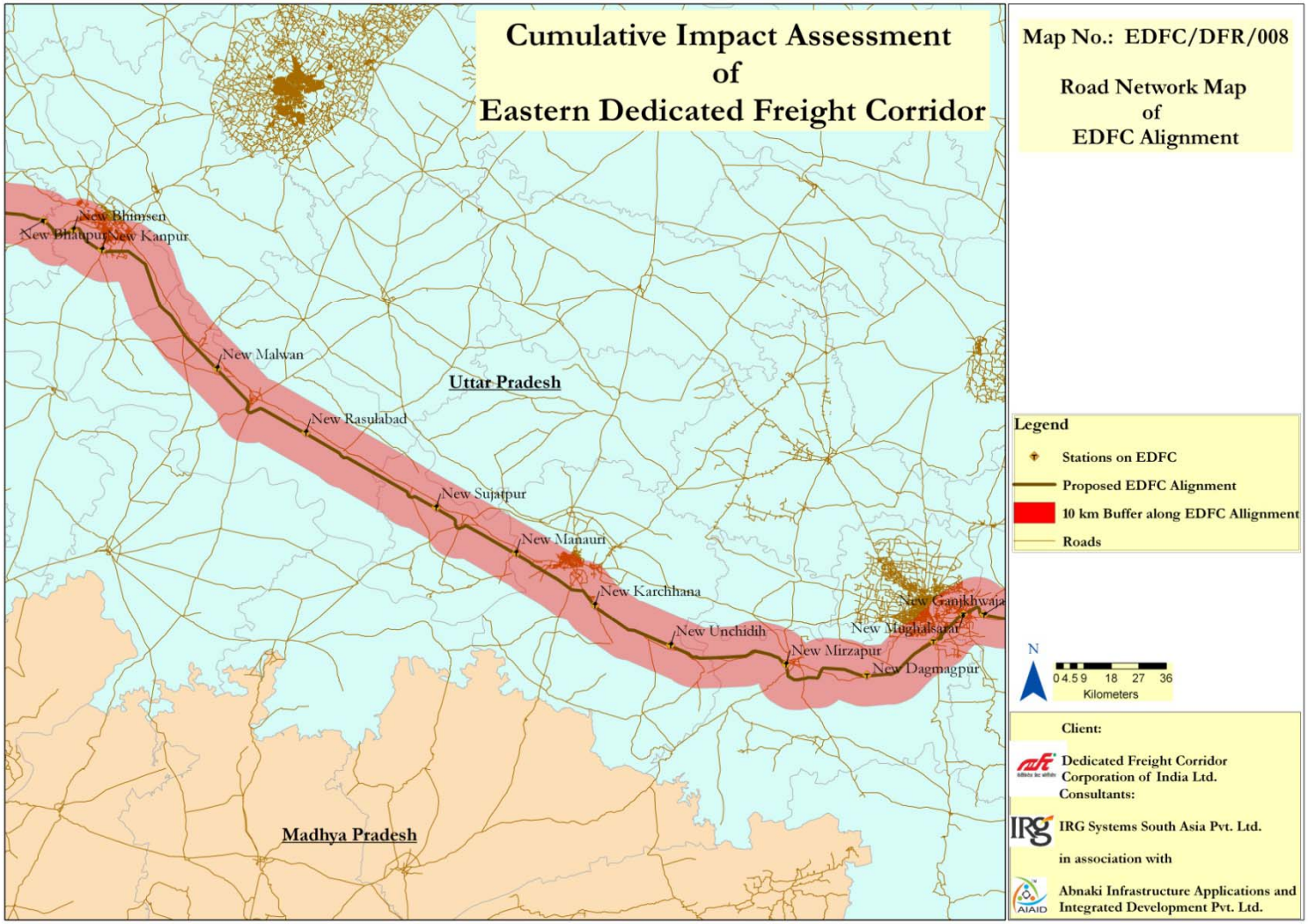


Figure 4.8: Map showing road networks along EDFC 2

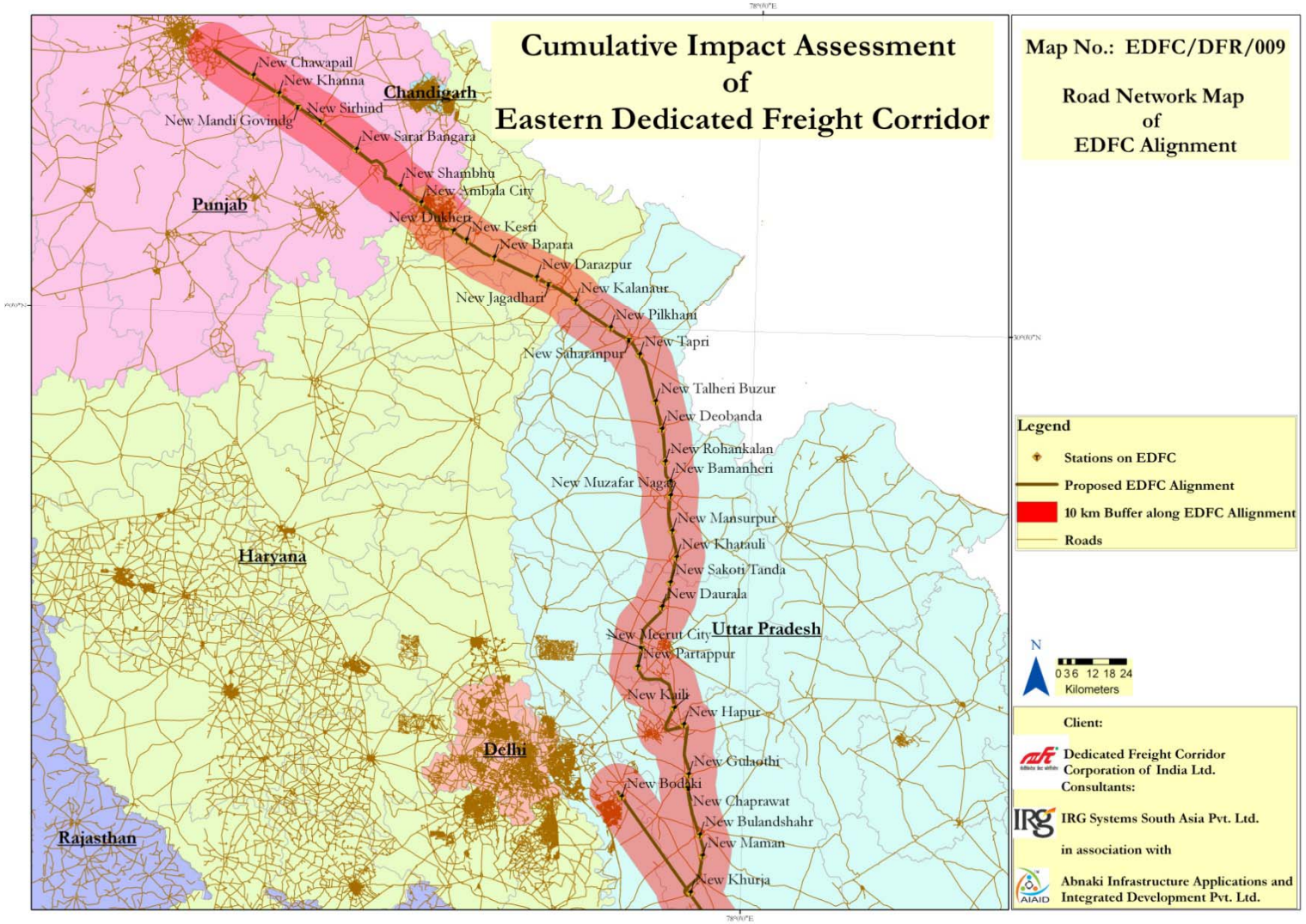


Figure 4.9: Map showing road networks along EDFC 3

4.7 Conclusions

The outcome of stakeholder consultations not only confirmed the identified VECs but also indicated their anticipated change as well perception about cumulative social & environmental impacts. The hotspots identified in the Chapter – 3 are further strengthened with the help of stakeholder's consultation at various districts along the alignment. The next chapter defines the baseline of the identified VECs and will further help in adding the hotspots for EIA study on the basis of the condition of VECs.

CHAPTER 5: BASELINE ENVIRONMENTAL PROFILE OF THE CUMULATIVE IMPACT INFLUENCE AREA

5.0 Introduction

Baseline study is an essential component of cumulative impact assessment of any project. Baseline study aims at collecting & collating the data on the VECs and their indicators. This data provides the basis on which an impact assessment can be carried out. It not only helps to determine the existing scenario of the study area in terms of environment and social conditions but also helps in identification of external environment and social drivers (such as flood, droughts, migrations etc) which may have an impact on the identified VECs due to future developments within the area. Baseline study also provides an insight into both existing & future condition of the area within the boundary for which CIA study has to be carried out.

5.1 Area Coverage

Baseline study area coverage includes EDFC alignment (ROW for EDFC Track) & area within 100 m on either side of EDFC Alignment; Area within 300 m on either side of EDFC Alignment- to study the sites declared by ASI as heritage & cultural sites; Area Within 10 kms on either side of EDFC Alignment- to study eco-sensitive areas like national park, wild life sanctuaries, bird migratory routes etc. and Major development area / critical zone beyond 10 kms having potential to be impacted by EDFC corridor which may further impact the surrounding environment. Map showing the study area for baseline study of the EDFC corridors is given below in **Figure 5.1, 5.2 & 5.3.** List of the districts through which EDFC passes is given in **Table 5.1** below

Table 5.1: State and Districts through which the EDFC corridor is traversing

No.	Name of the Districts	State
I	**EDFC 1 districts – Bhaupur to Khurja**	
1	Kanpur Dehat	Uttar Pradesh
2	Auraiya	
3	Etawah	
4	Firozabad	
5	Hathras	
6	Agra	
7	Aligarh	
8	Bulandshehar	
II	**EDFC 2 districts – Kanpur – Mughalsarai**	
1	Kanpur Nagar	Uttar Pradesh
2	Kanpur Dehat	
3	Fathepur	
4	Kaushambi	
5	Allahabad	
6	Mirzapur	
7	Chanduli	

No.	Name of the Districts	State
III	**EDFC 3 - Ludhiana – Khurja – Dadri**	
1	Ghaziabad	Uttar Pradesh
2	Meerut	
3	Hapur	
4	Muzzaffarnagar	
5	Bulandshahr	
6	Saharanpur	
7	Yamunanagar	Haryana
8	Ambala	
9	Fatehgarh Sahib	Punjab
10	Patiala	
11	Ludhiana	

It may be noted that since the study area boundaries extend beyond hundred meters of alignment up to 10 Kms and beyond for major development area/critical zone, the baseline data collection & collation gives a range observed near vicinity of alignment up to observations at district level.

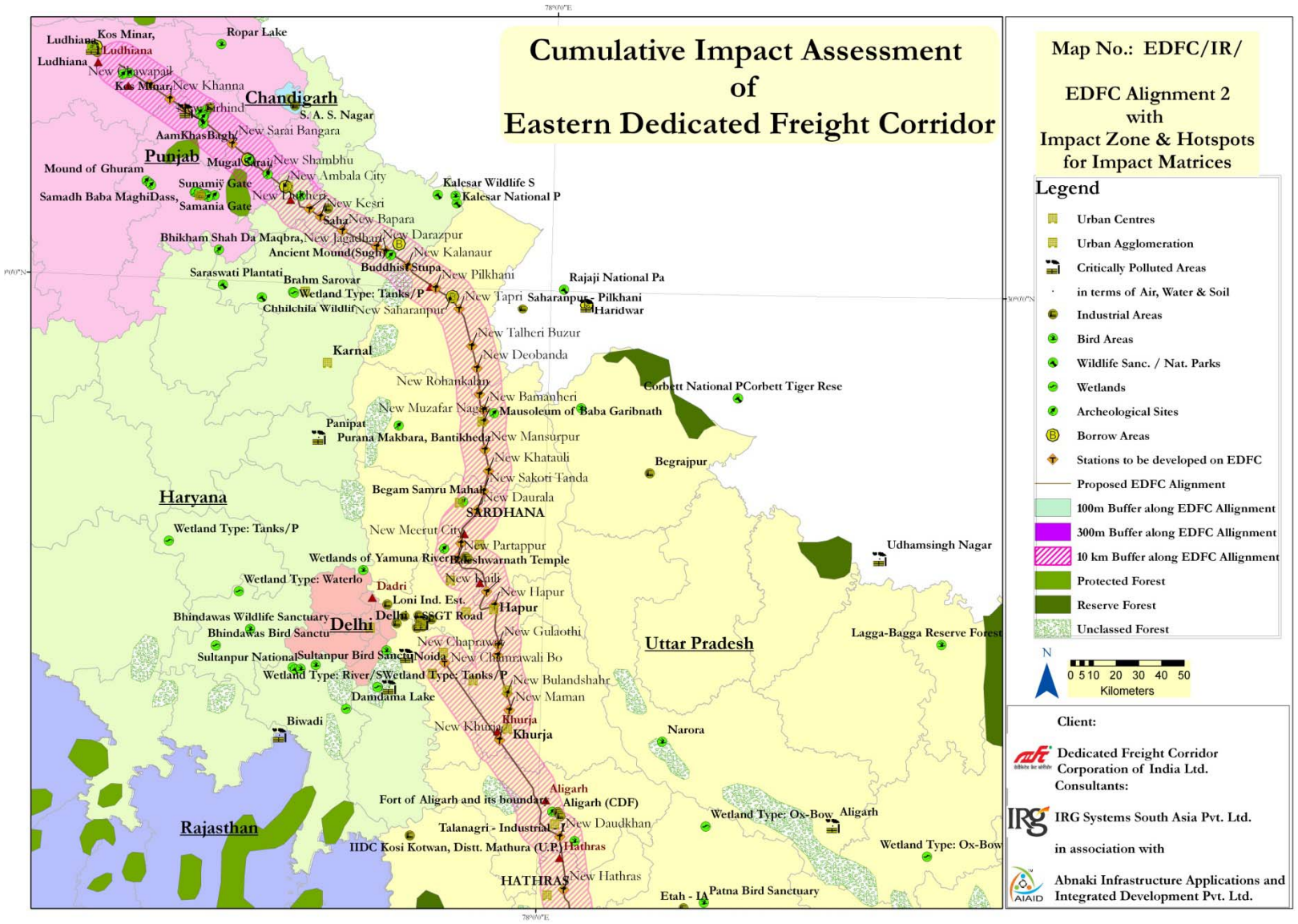


Figure 5.1: Map Showing Baseline Study Area for EDFC-3

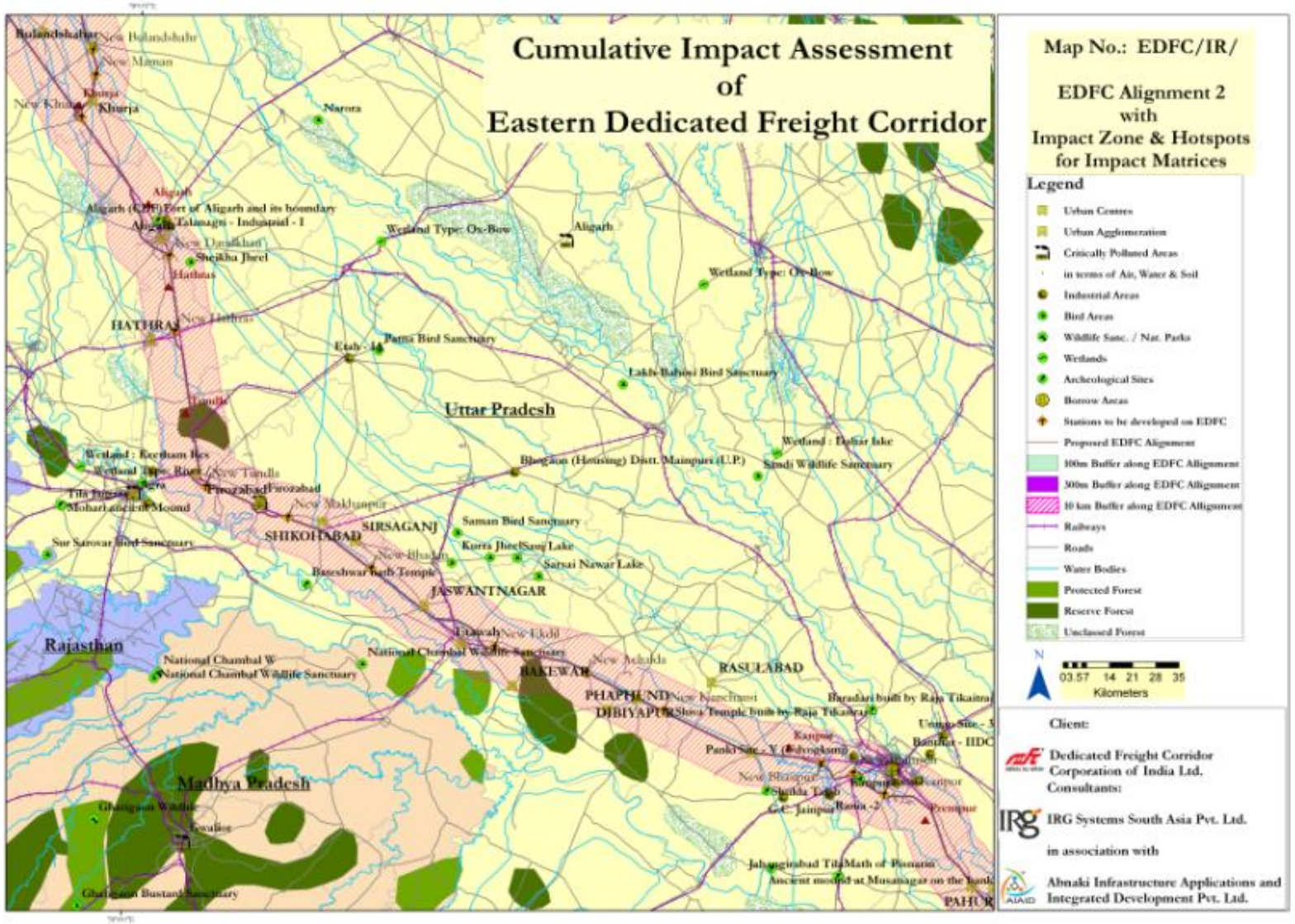


Figure 5.2: Map Showing Baseline Study Area for EDFC-1

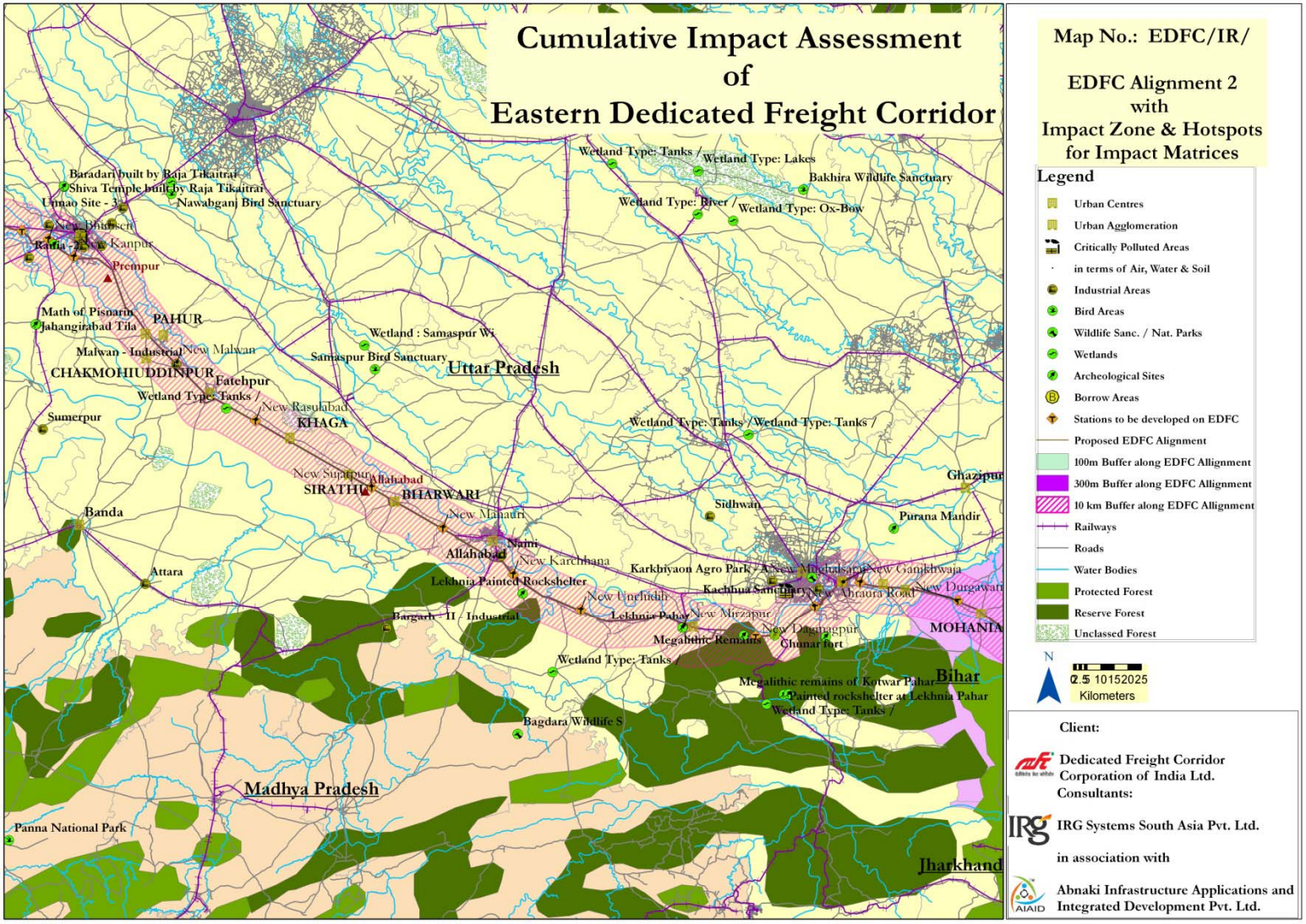


Figure 5.3: Map Showing Baseline Study Area for EDFC-2

5.2 Baseline Data

Baseline data has been collected from Secondary sources like existing studies, reports, and consultation with Government Departments etc. Detail of sources of the baseline study for the CIA study is listed in the **Table 5.2** below:

Table 5.2: Sources of Data for Baseline Study for the CIA Study

Source of the Baseline Data	Data Collected
Existing ESIA Reports	• **Physiographic Environment:** o Meteorology: temperature, rainfall, rainfall, humidity, atmospheric pressure, wind direction and wind speed o Air Environment o Water Environment-ground & surface water quality, ground & surface water resources, Hydrology & Drainage o Soil Quality o Noise level o Vibrations o Land Resources: Soil quality, Archaeological resources • **Biological Environment**: o Flora: Existing flora of the study area & nos. of trees to be fell o Fauna o Data on existence of Eco-sensitive locations like National Parks, Wild life sanctuaries, migratory routes of birds, bird sanctuaries within 10 km zone of EDFC boundary • **Socio-Economic Environment:** o Land use o Affected districts o Topography & Geology o Archaeology o Sensitivity o Seismicity o Transport infrastructure o Medical facility o Area acquired o PAFs/PAPs & CPRs
Consultation with Government Departments • National Highway Authority of India • District Industry Centre • State Industrial Development Corporations (HSIDC, PSIDC, PSIDC, Udyog Sahayak-Punjab, PSIEC) • Directorate of Town & Country Planning, Punjab, Haryana & Uttar Pradesh • Urban Development Authority (PUDA & HUDA) • State Pollution Control Boards (PPCB, HSPCB, UPPCB) • Municipal Corporations	• Existing Highways & Roads, Improvement road & highway projects • Type & Nos. of industries • List of existing & upcoming industrial areas/focal points/industrial estates/mega projects/SEZs/Growth centres etc and type & Nos. of industrial units • Developmental plans of affected cities/districts • Data on air, noise and water quality and critically polluted areas • Populations • Views on identified VECs

Source of the Baseline Data	Data Collected
Data from Websites • MoEFCC • CPCB • SPCBs • IMD • CGWB • Census of India • SIDC • DTP	• Applicable laws & regulations • CEPI Areas, Environmental Standards, Environmental Monitoring Reports • Environmental Profiles of the district • Meteorology of the affected districts • Ground water profile and list of notified areas • Demography & Amenities • Industrial Profile of the district • Developmental Plans
Existing Studies & Reports • Economic Analysis Study of three Sub-Region Growth Centres of Uttar Pradesh by Deloiitte (World Bank Project) • Economic Growth Projections of three Sub-Region Growth Centres of Uttar Pradesh by Deloiitte (World Bank Project) • Profile of Kanpur Region (CRISIL) • Profile of Varanasi Region (CRISIL) • Profile of Agra Region (CRISIL)	• Industrial Profile & Cluster Identification • Cluster Growth Projections • Existing Infrastructure of the district

5.3 Cumulative Environmental Baseline

Cumulative Environmental Baseline has been described below in terms of identified VECs, Physical features, Ecological Profile, Physical Environmental Profile, Socio-economic & Archaeological / Heritage sites.

5.3.1 Baseline of Physical Features

Baseline of VEC, physical features has been described in terms of land resources, urban agglomeration / centres soil quality & land use.

Land environment has been described in terms of topography, geology, land use, soil type, soil quality and agriculture resources.

Geology & Topography: Area through which EDFC runs have flat terrain and geologically formed of younger alluvium of Ganga Basin. Geology of the districts through which EDFC pass is given in the **Table 5.3** below

Land Use: Land use of the area through which EDFC crosses is mainly agricultural except the major cities, towns and junctions like Pilkhani, Khurja, Khatoli, Kanpur etc. Detours are proposed mainly to avoid the congested areas and highly populated towns/cities to minimize disturbance to social environment. Land use of the affected districts is given in **Table 5.3** below.

Soil Type: Since the project is situated in the younger alluvium of Ganga Basin, the soil is prone to erosion. The entire alluvial plain along the alignment can be divided into three sub-regions. These include, the eastern tract know as scarcity areas with highest population density and lower per capita land, the central tract and western tract comprising well developed irrigation system. However,

being alluvial the land is very fertile and cultivation of rice, wheat, millets, gram, barley and sugar cane, etc are the chief crops of the region. Soil type of the affected districts is briefed in **Table 5.3** below.

Seismology: Districts through which the EDFC corridor will cross will fall in Zone III or Zone IV as per BIS classification. Zone III indicates moderate seismic hazard whereas Zone IV indicates high seismic hazard.

Archaeology: No archaeological structure is found to be present within 300 m distance all along the EDFC corridor except Budiya ka Taal at Agra.

Table 5.3: Geology & Topography of Affected Districts

District	Topography	Geology	Soil type	Land Use
Aligarh	Physiographically the district forms a part of Yamuna-Ganga Doab. The upper Ganga canal which flows roughly over the water divide from NW to SE direction divides the district into two unequal parts. Topographically, the area is almost open plain, sloping gently from north to south in the western side & north west to west in the eastern side. The highest elevation of the district is 195.072 mamsl and the lowest is 173.76 mamsl. The average gradient of land surface is 2 cm/km. District is grouped into three geomorphic units, i.e. recent flood plain of stream, terrace zone & older alluvial plains	Aligarh district falling in Central Ganga Plain lies in the interfluvial tract of Ganga and Yamuna. Hydro-geological data indicates that the area is underlain by moderately thick pile of quaternary sediments, which comprises of sand of various grades clays & kankar. Alluvial sediments overlies Vindhyan group of rocks in an unconformable way. The of thickness of deposits varies from 287 to 380 metres	Major soil types: Bhur, Matiyar & Domat	Total area: 3712.92 sq km, forest: 25.77 sq km, barren cultivable land: 54.22 sq km, present fallow land: 89.22 sq km, other fallow land: 57.65 sq km, barren 7 uncultivable land: 79.19 sq km, non agriculture use: 377.54 sq km, pastures: 17.29 sq km, area under bush forest & garden: 3.34 sq km
Allahabad	The district is mainly characterized with Ganga, Yamuna alluvial plain and Vindhyan Plateau. As per G.S.I. (2001) geomorphic features of district are Active flood plain, Older Alluvial Plains & Rocky Surface (Denudational hills). The master slope of Trans Ganga is towards east or south east, with the altitude ranging from 89.30 mamsl-93.57 masl. Rivers of the district namely Yamuna, Tons, Sai and Varuna belongs to main drainage system of the Ganga. Dendritic drainage pattern is the most common features in the district which is the structurally controlled. Streams upto the fifth order are encountered in the district.	Geologically the district is characterized by Quaternary alluvium and Vindhyan Plateau. The age of these formations range from Protterozoic to Recent. Quartzite of Kaimur group forms the basement in the area which is unconformably overlain by Quaternary alluvium	Clay loam, loam & sandy loam	Total district area 5246 sq km, forest area-198.55 sq km, barren land: 373.38 sq km & 3474.3 sq km cultivable land
Auraiya	The district forms a part of the Central Ganga Alluvial Plain which can be divided in to Upland areas (Banda Alluvium & Varanasi Alluvium) and Low land areas (Older flood plain & Younger flood plain). Generally the area forms an extensively level tract which is intercepted at places by sand ridges particularly in northern parts of	Quaternary Alluvium consisting of mainly sands of various grades, silts, clays and kanka	Bhur, Matiyar, Dumat & Pilia	District statistical data (2006-07) reveal that Auraiya district has utilized 1438.42 sq. km. area for cultivation. The district still has 2.72% land suitable for cultivation. Only

District	Topography	Geology	Soil type	Land Use
	the district whereas in the southern parts ravine land developed extensively in the vicinity of river Yamuna and Chambal. The terrain has gentle slope from north-west to south-east with a gradient of 0.2 m/km			102.83 sq. km area is put under forest cover which much below the state average and environmental standard.
Etawah	The district, a part of doab region of rivers Ganga & Yamuna, is generally plain area with minor undulation which slopes gently towards south-easterly direction. Four distinct physiographic units in the district are: Upland region, Ghar (slightly undulating & covered with loamy sand), Karka (uneven topography & characterized by ravines) and Par (region btw Chambal & Yamuna)	The district occupies a part of Indo-Ganga plain and is underlain by quaternary sediments consisting clays, silt, kankar and sands of different grade. The thickness of these quaternary sediments over the district increases gradually towards north	Bhur, Matiyar, Dumat & Pilia	Total area 2311 sq km, forest area: 301.40 sq km, net sown area: 1470.78 sq km & cultivable area: 2414.38 sq km
Firozabad	Geomorphologically, the area is not fully matured. However, based on existing features the district is divided into five units, i.e. flood plain, younger plain, older alluvial plain, salt encrustation and ravines. The south-western stretch of the district is confined by river Yamuna and is covered by Behar or ravines since the river flows through the winding channel	Firozabad district falling in Central Ganga Plain lies in the interfluvial tract of Ganga and Yamuna.	Soils of Firozabad are typical of those in the Ganga alluvial plain. The diversity is mainly due to the influence of various drainage, canals and partially due to the presence of Yamuna river. Main types of soil are Bhur, Matiyar, Dumat & Pillia.	Total area 2362 sq km, forest area: 86.11 sq km, net sown area: 1815.85 sq km & cultivable area: 2874.20 sq km
Ghaziabad	Gautam Budh Nagar district, a part of Ganga-Yamuna Doab in the vicinity of River Yamuna, forms almost a monotonous plain with occurrence of sand dunes, sandy ridges, ravenous tracts and depressions close to the river system of Yamuna. At places, close to river ravines are developed in the form of narrow gullies on land surface due to excessive erosion by surface runoff. Ravines form a bad land topography along Hindon and Bhuriya Nadi between Bisrakh and Dankaur areas and also in Jhajhar area. Lenses and beds of Kankar are seen exposed and forms mounds or	The district occupies a part of Indo-Ganga plain and is underlain by quaternary sediments consisting clays, silt, kankar and sands of different grade. The thickness of these quaternary sediments over the district increases gradually towards north	The soil ranges from pure sand to stiff clays and including all combination of the two extreme litho units. Main soil types: Bhur, Matiar, Dumat & Several subcategories of Dumat, Reh, Kemp.	Total area 1442 sq km, forest area: 24.0 sq km, net sown area: 1164.86 sq km & cultivable area: 47.75 sq km

District	Topography	Geology	Soil type	Land Use
	pinnacles. Flood plain of river Yamuna with remnants of old meander scars, oxbow lakes and relict drainages is developed along the river in western part of the district. The terrain has gentle slope from northwest to south-east with a gradient of 0.2 m/km.			
Kanpur Nagar	The Kanpur Nagar district is part of Indo Gangetic Plain. The clay, silt, gravel and sands of different grades are main sedimentary constituents.	The older alluvium, alluvial deposit mostly occurring in the central part were deposited during lower to Upper Pleistocene period. The newer alluvium were deposited during Upper Pleistocene to Recent period mostly occurring along the course of rivers.	The soil of the district exhibits a great variety of composition and appearance. The major part of the district consists of ordinary soils known locally as Bhur and Sand on ridges, Matiyar or clay in depressions and Domat or Loam in the Plains. The 'Reh' prevails in the clay dominant areas	Total land area: 2994.35 sq km, forest: 56.56 sq km, agriculture barren land: 175.24 sq km, present fallow land: 307.47 sq km, other fallow land: 73.53 sq km, gross sown area: 2682.72 sq km & gross irrigated area: 1786.74 sq km
Muzzafar Nagar	The entire Muzaffar Nagar district is a flat terrain falling in middle Ganga plain. The highest point in the district is 201.00 mamsl in the north and lowest in the south is 222.00 mamsl giving rise an average slope of about 0.40 m/km. north to south. 5 geographical units of the district are: sand bars, flood plains, ravines, younger alluvial plains & older alluvial plains. Landforms in district are: water logged areas, back swamp, palaeo channels & levee deposits	The entire Muzaffar Nagar district underlains by the quaternary alluvium deposited by Ganga and Yamuna river system. Lithologically the alluvial sediments comprise of sand, silt, clay and kankars in varying proportions.	Fertile sandy loam soil	Total area: 4008 sq km, forest area: 280.20 sq km, net sown area: 3272.66 sq km
Ludhiana	The district area is occupied by Indo-Gangetic alluvium. And there are no surface features worth to mention except that area is plain and major drains are Satluj and its tributaries and Budha nala.	The district area is occupied by Indo-Gangetic alluvium of Quaternary age. The subsurface geological formations of the area comprise of sand, silt, clay and kankar in various proportions.	The soil is sandy loam to clayey with normal reaction (pH from 7.8 to 8.5).	Total area: 3790 sq km, forest area: 100 sq km, net sown area: 3250 sq km & cultivable land: 6080 sq km
Patiala	The district area is occupied by Indo-Gangetic alluvial plain and consists of three types of region viz. the Upland plain, the Cho-infested Foothill Plain and the Floodplain of the Ghaggar river. The	The district is occupied by Indo-Gangetic alluvial plain of Quaternary age, and falls in Ghaggar basin.	Due to arid climate, the soils are light coloured. Tropical arid brown soils exist in the major parts of the district. Here soils are deficient in nitrogen, phosphorus	Total area: 3290 sq km, forest area: 130 sq km, net sown area: 2750 sq km & cultivable land: 2810 sq km

District	Topography	Geology	Soil type	Land Use
	elevation of land ranges from 240 to 278 m amsl		and potassium. In Patran and Samana blocks, soils are arid brown soils occur. These are calcareous in nature and in most cases kankar layers occur	
Ambala	The district area is occupied by Indo-Gangetic alluvium. There are no surface features worth to mention except that the area is traversed and drained by seasonal streams namely Tangri, Beghna and Markanda. Physiographically the area is flat terrain. However a little part in the extreme northeastern area of the district is occupied by Siwalik hills, and falls in the zone of "Dissected Rolling Plain". The area slopes towards southwest with an average gradient of 1.5m/km. The general elevation in the district varies between 245m to 300m above MSL.	The district is occupied by Indo-Gangetic alluvial plain of Quaternary age.	The soils are non-calcareous and sandy loam on the surface, and loam to clayey loam at depth, and placed under the classification of soil as Udipsamments/ Udorthents.	Total area: 1574 sq km, forest area: 45 sq km, net sown area: 1340 sq km & cultivable land: 1350 sq km

Soil Quality: Soil quality of the areas along the proposed EDFC alignment & surrounding areas has been determined during the EIA study and details are summarized in **Table 5.4** below:

Table 5.4: Soil Quality Data of Areas Nearby & Along the EDFC Alignment

Parameters/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)	
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
pH	6.8-7.9	6.1-8.1	7.44-7.8	7.36-7.44	7.12-9.97	5.1-8.2
Nitrogen	0.12-0.98 mg/kg	0.108-0.726 mg/kg	0.02-0.06 mg/kg	0.02-0.06 mg/kg	138-206 kg/ha	0.42-0.71
Phosphate/Phosphorus	0.09-0.36 mg/kg	0.001-0.119 mg/kg	12.8-16.8%	11.6-15.8%	40.4-44.6 kg/ha	0.28-0.45 mg/kg
Potassium	15.1-91.0 kg/ha	12.02-89.53 kg/ha	0.511-0.792 meq/100	0.48-0.62 meq/100	164-194 kg/ha	14-56 kg/ha
Sodium	42.78-150.22 kg/ha	36.9-160.52 kg/ha	--	--	--	13-150.1 kg/ha
Texture	Silty clay	Silty clay	Silty sand	Silty sand	Clay loam	Clay loam

Source: EIA reports of EDFC 1, 2, 3

Land Resources & Land Use: Land has been acquired for construction of EDFC & EDFC infrastructure which has resulted in diversion of land. Details of the land acquired for construction of EDFC corridor is given in **Table 5.5.** Due to construction of EDFC, it is expected that there would be increase in industrial activities & urbanization in the nearby areas. Also new industrial clusters, townships, commercial areas may emerge up in nearby areas which may substantially change the land use of the area. Details of areas where potential developments are expected and which may lead to change in land use substantially are given in **Table 5.6** below:

Table 5.5: Land to be acquired/acquired For Various Sub-Sections/Sections

Nos. of trees to fell/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)	
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
Total Land (ha)	1400	1182	260.25	211.67	802	355.24
Private land (ha)	1250.57	999	225.25	145.59	678.18	330.91
Public Land (ha)	149.44	183	34.90	66.08	123.82	24.43
Protected/Reserve Forest Land acquisition	0.998	7.36	4.1920	3.9	109	175

Table 5.6: Details of Area Which May undergo Significant Change in Land Use

Areas	Expected Developments	Change in Land Use	Sensitivity of Area
Mugalsarai, Chandauli	Mugalsarai-Varanasi-Mirzapur is large industrial corridor of 30 sq km. existing along the EDFC corridor involve large scale industrial activities and will further be	Increase in industrial, commercial & residential land use	Nil

Areas	Expected Developments	Change in Land Use	Sensitivity of Area
	accelerated due to development of EDFC Development of IW terminal at Varanasi and Multiservice SEZ with FTWZ & IT/ITES at Sahupuri, Chandauli are some of proposed developments in the area		
Kanpur Nagar	Major industrialized Area along EDFC alignment. Large logistic Park of 60 sq km existing at Kanpur will be highly benefited by EDFC corridor. Some of proposed development in district are: unloading/loading yard is proposed by DFCCIL, container depot by CONCOR at Maitha, Logistic park (PPP basis), Textile SEZ, Leather I/A, I/A Engineering goods at Lakhanpur	Increase in industrial, commercial & residential land use	Identified as hotspot
Kanpur Dehat	Potential for industrial development provided the infrastructure is improved in the area. Some of proposed development are: expansion of Rania I/A & logistic parks near Bhaupur.	Increase in industrial, commercial & residential land use	Nil
Tundla, Khandauli & Firozabad	Potato yielding belt of state. Potato is exported throughout the country from these areas. DFC corridor will help easy & cost-effective transportation of potato and other crops grown in the area. Proposed unloading/loading yard which may lead to development of industries in nearby areas.	Increase in industrial, commercial & residential land use. Also potential for increased agriculture activities	Identified as hotspot due to TTZ Area
Gautam Budh Nagar	Area has large potential for industrialization & urbanization. Proposed development for the area are: industrial/multi-modal logistic hub by DMIC, 2500 acres SEZ & 100 acres handicraft SEZ at Bodaki, Unloading & loading yard, container depot at Dadri. Existing container depot at Bodaki will be further expanded Dadri-Noida-Ghaziabad region identified as major investment region. Proposal of Dadri to be developed as major passenger and goods based terminal with state of the art infrastructure through public private partnership. Free Ware housing zones are proposed under foreign trade policy, 2004. One of the six such zones is proposed in G. Noida	Increase in industrial, commercial & residential land use	Khurja to Bodaki identified as hotspot
Mandi Gobindgarh	Zone famous for steel re-rolling industries. Most of the industries are closing in the area due to shortage & high transportation cost of raw material. DFC development may facilitate easy access of raw material in this area and further industries may come up to full capacity in this area	Increase in industrial land use	Nil
Ambala	Zone famous for scientific instruments, which are to be exported to all over the country.	Increase in industrial, commercial & residential	Nil

Areas	Expected Developments	Change in Land Use	Sensitivity of Area
	EDFC will facilitate export of such items cost-effectively and timely. A dry port will be developed in Palwal district which will cover area of 2 sq km. Logistic parks are also proposed at Rewari & Bawal areas. All these area are located nearby and will lead to increased industrial activities in Ambala.	land use	
Muzaffarnagar, Meerut, Hapur, Shamli & Modi Nagar	Sugar Cane belt of the state. Cane transportation to other part of the country can be accelerated through proposal of EDFC corridor. Industrial area proposed between Meerut and Muzaffar Nagar. This is located close to Delhi so extensive good transportation from this area to Delhi may take place.	Increase in industrial, commercial & residential land use. Also potential for increased agriculture activities	Nil
Agra	Potential zone for logistic and service based industries. Lucknow Agra Expressway under construction which will improve the connectivity of area and will lead to overall development of area in terms of infrastructure & economic development	Increase in industrial, commercial & residential land use	Identified as hotspot due to TTZ Area
Aligarh	Unloading & loading yard proposed. Slaughter houses exits along the existing track and meat is exported to various place from this area. More similar kind of slaughter houses be proposed in the area	Increase in industrial land use	Nil
Khurja, Bulandshahr	Unloading & loading yard proposed. Khurja to Dadri line will be connecting link of EDFC & WDFC corridor. This zone has high potential for industrialization & urbanization	Increase in industrial, commercial & residential land use	Khurja to Bodaki identified as hotspot
Ludhiana & Patiala	Highly industrialized area. Some of proposed developments are: 9 industrial area/apparel parks/SEZ, Ludhiana, 2 industrial parks, Patiala, Industrial textile park at Duraha, Industrial focal point at Tanansu etc. Various metro cities, urban estates, townships, residential projects, townships, multiplex and hotel projects are proposed in this zone. Additionally Punjab Govt. has 80-20 policy under which land will developed by Industrial department Punjab in lieu of 20% of land. An airport proposed at Sanehwal where EDFC corridor will terminate.	Increase in industrial, commercial & residential land use	Ludhiana identified as hotspot
Ghaziabad & Gautam Budh Nagar	Area with high industrial activities. Large land area available for further industrial and urban areas growth. Coming up of EDFC corridor may further accelerate the rate of industrial growth & urbanization in the district. Dadri-Noida-Ghaziabad region identified as major investment region	Increase in industrial, commercial & residential land use	Nil
Aurayia	Various industrial zones within the district and plastic city exist along the EDFC alignment. Multi modal economic zones proposed between Aurayia & Etawah. National	Increase in industrial, commercial & residential land use	Nil

Areas	Expected Developments	Change in Land Use	Sensitivity of Area
	manufacturing investment zone planned between Jhansi & Auraiya. Residential colonies may also come up near plastic city for the staff.		
Etawah	A large logistic park proposed at Ekdil. Multi modal economic zones proposed between Aurayia & Etawah	Increase in industrial, commercial & residential land use	Nil
Mirzapur	4 Nos. of mini industrial areas are under construction in the district in addition to 5 existing industrial area. These I/As will highly be benefited by EDFC corridor and will lead to increase in industrial activities in the area. South Vindhyachal Industrial area may come up in Mirzapur and the proposal is under scrutiny.	Increase in industrial, commercial & residential land use	Nil
Allahabad	Allahabad_naini-Bara Investment zone measuring 30 sq km will be highly benefited by EDFC corridor and may enhance the industrial activities in the area	Increase in industrial, commercial & residential land use	Nil

Source: PUDA, PSIEC, SIDC, Haryana, DFCCIL, SPCBs

Assessment of land resources indicates land use change particularly diversion of agriculture land for urbanization industries & infrastructure development. Though it is an ongoing phenomenon, any new infrastructure development intervention is expected to accelerate it.

Waste Management in the Area: Solid waste comprises of municipal, hazardous waste, plastic waste and bio-medical waste. As per Regulations of GOI for waste management, all states are liable to manage the waste generated from their respective areas as per the laws to ensure safe air, water, soil, aesthetics & health environment. Data on waste generation & management scenario is given in **Table 5.7** below.

Table 5.7: Waste Generation & Management Scenario

District	Municipal Waste Generation & MSW Management Facility	Bio-Medical Waste Generation & Management Facility	Haz. Waste Generation & Management Facility
Bulandshahr	325 MT/day. No facility for MSW management in the district. Disposal in low-lying areas	6.5 MT/Day Treated, managed and disposed through M/s Synergy Waste Management Pvt. Ltd., Meerut	159.52 MT/Day Sent to TSDF M/s Bharat Oil Waste Management, Kumbhi, Kanpur and U.P. waste management project, Kumbhi, Kanpur
Muzaffar Nagar	150 MT/day Available (3 ha land)	178 kg/day Treated, managed and disposed through M/s Synergy Waste Management Pvt. Ltd., Meerut	50.44 MT/day. No TSDF within the district
Allahabad	300 MT of waste Available- MSW processing unit by MC, Allahabad at Vill. Baswar, Block Chaka, Distt. Allahabad (62 acres & capacity of 600 MT/day)	2 MT/day M/s Ferro Build Hard (I) Pvt. Ltd. at Naini, Allahabad	15 MT/day Sent to TSDF M/s Bharat Oil Waste Management, Kumbhi, Kanpur and U.P. waste management project, Kumbhi, Kanpur
Varanasi	800 MT. Available at Vill. Karsada	3.2276 MT/day. 2 facilities for disposal of Bio-medical waste, i.e. M/s Centre for Pollution Control, Mohansarai (150 kg/hr) and M/s SNG Merchantile Pvt. Ltd., barji, Pindara, Varanasi (100 kg/hr) but this unit closed at present	90 Kg/s day. Sent to TSDF, Varanasi for disposal
Agra	Available with capacity of 750 MT/day at Kuberpur, Agra	5 MT/day Facility available-M/s Datt Enterprise Ltd., Darhera, Atmadpur, Agra	15 operational industries generating Haz. Waste. Waste generated is sent for disposal in TSDF
Kanpur	1100 MT/day. Available- Managed & operated by M/s A2Z Infrastructure Pvt. Ltd., Bhonsi, Panki, Kanpur (capacity-1500 MT/day)	2.454 MT/day. 2 authorized agency for collection, treatment & disposal, i.e. M/s Medical Pollution Control Committee, Bhauti, Kanpur & M/s Willword Environment Enclave, Bithur, Kanpur	7053.537 MT/day CETP sludge from Leather Park, Jajmau sent for disposal through M/s Bharat Oil Waste Management and U.P. waste management project (REEL). TSDF, Rooma reached saturated capacity and hazardous waste is lying areas nearby CETP. This waste is being slowly sent to Haz. Waste management facility at Kumbhi.
Kanpur Dehat	No sanitary landfill. Dumping on open land	0.204 MT/day, disposed, collected & treated through M/s Medical Pollution Control	Managed, treated & disposed M/s Bharat Oil Waste Management,

District	Municipal Waste Generation & MSW Management Facility	Bio-Medical Waste Generation & Management Facility	Haz. Waste Generation & Management Facility
		Committee, Bhauti, Kanpur	Kumbhi, Kanpur and U.P. waste management project, Kumbhi, Kanpur
Firozabad	215.14 MT of MSW-open dumping no sanitary landfill site	0.344 MT/day. Set for treatment to M/s Datt Enterprise, Agra and Bio-medical Waste Disposal Agency, Mathura	21.8 MT/Annum 4 Nos. of industries generating Haz waste.
Ghaziabad & Hapur	944 MT/day- open dumping along low lying areas. Site proposed at Dundahera for disposal of MSW from MC, Ghaziabad	0.66542 MT/day. Collected, treatment, Management & disposal through 2 authorized agencies. 1. M/s Samb Ramky Environmental Management Pvt. Ltd., C-2, Phase-1, Mussourie-Gulohti Road, Ghaziabad (150 kg/hr). This facility also caters waste from Noida, Delhi, Muradabad & Meerut. 2. M/s Synergy Waste management Pvt. Ltd. By Pass Road, Meerut (50 kg/hr). This facility also cater waste from Gautam Budh Nagar, Muzaffar Nagar, Meerut and Saharanpur	11012.50 MT/Annum Sent for disposal to M/s Bharat Oil Company (India), Site 4, Sahibabad, Ghaziabad, M/s U.P. Waste Management Projects, Kanpur and M/s Bharat Oil and Waste Management Ltd. Kanpur
Aligarh	Available (220 TPD) by A2Z Waste management company.	No Data	15.5 MT/day. Sent to TSDF for disposal

5.3.2 Ecological Profile

Ecological profile baseline has been described in terms of biological environment & agriculture baseline related to agriculture has been summarized in the land use section.

Biological environment comprises of details of flora & fauna and eco-sensitive zones within the area. Development of EDFC does not cross any eco-sensitive zones like National Park, Wild life sanctuary, migratory route of birds, Wetland under Ramsar Convention etc. Details of the Eco-Sensitive Zones in Uttar Pradesh, Haryana & Punjab are listed in **Table 5.8** below. The Turtle Sanctuary at Varanasi, Sheikha Jheel bird sanctuary and some non notified Wetland Tanks near Fetehpur and Wetland of Yamuna River falls within 10 km area of EDFC alignment. EDFC development will not have any direct impact on these areas as no or minimal pollutants are expected to generate during the operation phase. Nearest EDFC freight stations to Turtle sanctuary is Mughalsarai and to Shakeela Jheel is New Daudkhan.

Table 5.8: List of the Eco-Sensitive Zones in Uttar Pradesh, Haryana & Punjab

Name	Location	Coordinates	Distance From EDFC (kms)
National Parks			
Valmiki National Park	West Champaran, Bihar	27°23'7.55"N & 84°8'33.66"E	239
Kalesar National Park	Yamunanagar, Haryana	30°20'14.31"N &77°33'24.73"E	35.5
Sultanpur National Park	Gurgaon, Haryana	28°27'50.08"N & 76°53'28.63"E	64
Betla National Park	Palamau, Bihar	23°52'23.72"N & 84°11'17.77"E	126
Panna National Park	Panna, Chatarpur, Madhya Pradesh	24°35'40.26"N & 80°1'4.71"E	180
Dudhwa National Park	Lakhimpur-Kheri, Uttatr Pradesh	28°31'45.42"N & 80°39'4.79"E	265
Rajaji National Park	Haridwar, Dehradun, and Pauri Garhwal, Uttar Pradesh & Uttarakhand	30°0'25.12"N & 78°3'26.84"E	47
Corbett National Park	Nainital and Pauri Garhwal, Uttarakhand	29°35'8.00"N &78°51'43.00"E	113
Tiger Reserves			
Ranthambhore	Sawai Madhopur and Karauli, Rajasthan	26°1'39.46"N &76°28'11.70"E	184
Sariska	Alwar, Rajasthan	27°22'0.33"N & 76°26'20.51"E	170
Corbett	Nainital and Pauri Garhwal, Uttarakhand	29°35'8.00"N &78°51'43.00"E	113
Wildlife sanctuaries			
Kalesar	Yamuna Nagar, Haryana	30°22'5.25"N &77°28'4.24"E	35.5
Chhilchila	Kaithal, Haryana	29°56'17.84"N &76°40'49.74"E	47
Saraswati Plantation	Kurukshetra, Kaithal, Haryana	29°58'58.54"N &76°30'3.47"E	50
Bagdara	Sidhi, Madhya	24°47'5.55"N & 81°55'52.36"E	50

	Pradesh		
Ghatigaon	Gwalior, Madhya Pradesh	26°16'23.91"N & 77°54'39.34"E	117
Ken Gharial	Panna, Chhatarpur, Madhya Pradesh	24°35'40.26"N & 80°1'4.71"E	177
National Chambal	Morena, Bhind, Madhya Pradesh	26°40'58.41"N & 78°5'45.51"E	67
Orcha	Tikamgarh, Madhya Pradesh	25°19'40.65"N & 78°38'36.80"E	177
Turtle Sanctuary	**Varanasi, Uttar Pradesh**		**5**
Birds Area			
Basai wetlands	Gurgaon, Haryana	28°29'N & 76°59'E	33
Bhindawas Wildlife Sanctuary	Jhajjar, Haryana	28°37'N & 76°41'E	98
Kalesar Wildlife Sanctuary	Yamuna Nagar Haryana	30°22'N & 77°33'E	35.5
Sultanpur bird sanctuary	Gurgaon, Haryana	28°28'N & 76°55'E	64
Wetlands of Yamuna River	Haryana	28°52'N & 77°11'E	43
Harike Lake Bird Sanctuary	Nihalpur, Punjab	31°18'N & 75°5'E	64
Kanjli Lake	Kapurthala, Punjab	31°34'N & 75°25'E	52
Ropar Lake	Ropar, Punjab	30°56'N & 76°27'E	38
Bakhira Wildlife Sanctuary	Sant Kabir Nagar District, Uttar Pradesh	26°35'N & 83°0'E	131
Dudwa National Park	Terai, Uttar Pradesh	28°29'N & 80°42'E	265
Hastinapur Wildlife Sanctuary	Meerut, Uttar Pradesh	29°32'N & 78°9'E	28
Katerniaghat Wildlife Sanctuary and Girijapur Barrage	Katerniaghat , Uttar Pradesh	28°15'N & 81°11'E	263
Kishanpur Wildlife Sanctuary	Milani, Uttar Pradesh	28°24'N & 80°22'E	218
Kudaiyya marshland	Manipuri, Uttar Pradesh	27°0'N & 78°59'E	17
Kurra Jheel	Manipuri, Uttar Pradesh	27°1'N & 79°6'E	22
Lagga-Bagga Reserve Forest	Pilibhit, Uttar Pradesh	28°37'N &79°48'E	188
Lakh-Bahosi Bird Sanctuary	Kannauj, Uttar Pradesh	27°30'N & 79°30'E	31
Narora	Bulandshahr, Uttar Pradesh	28°13'N & 78°33'E	62
National Chambal Wildlife Sanctuary	Uttar Pradesh	26°43'N & 78°43'E	61
Nawabganj Bird Sanctuary	Ravanhar, Uttar Pradesh	26°35'N & 80°40'E	36
Parvati Aranga Wildlife Sanctuary	Gonda, Uttar Pradesh	27°25'N & 82°20'E	160
Patna Bird Sanctuary	Etah, Uttar Pradesh	27°35'N & 78°45'E	15
Pyagpur and Sitadwar Jheel	Lucknow, Uttar Pradesh	27°31'N &81°54'E	180
Saman Bird Sanctuary	Manipuri, Uttar	27°5'N & 79°0'E	25

	Pradesh		
Samaspur Bird Sanctuary	Lucknow, Uttar Pradesh	26°0'N & 81°25'E	37
Sandi Wildlife Sanctuary	Mansa, Uttar Pradesh	27°15'N & 79°55'E	77
Sarsai Nawar Lake	Etawah, Uttar Pradesh	26°58'N & 79°15'E	22
Sauj Lake	Mansa, Uttar Pradesh	27°1'N & 79°11'E	24
Sheikha Jheel, Aligarh	**Aligarh, Uttar Pradesh**	**27°49'N & 78°10'E**	**7**
Sohangibarwa Wildlife Sanctuary	Maharajganj, Uttar Pradesh	27°18'N & 83°44'E	230
Soheldev Wildlife Sanctuary	Uttar Pradesh	27°44'N & 82°9'E	241
Sur Sarovar Bird Sanctuary	Agra, Uttar Pradesh	27°0'N & 77°45'E	22
Surha Tal Wildlife Sanctuary	Ramnagar, Uttar Pradesh	25°45'N & 84°20'E	95
Wetlands			
Sultanpur Bird Sanctuary	Gurgaon, Haryana	28° 27' 14" N & 76° 54' 2" E	64
Bhindawas Bird Sanctuary	Gurgaon, Haryana	28° 31' 57" N & 76°34' 10" E	98
Damdama Lake	Gurgaon, Haryana	28° 17' 54" & 77° 08' 09" E	51
Brahm Sarovar	Kurukshetra, Haryana	29°57' 32" N & 76°49' 59" E	41
Wetland Type: Tanks/Ponds	**Fatehpur, Uttar Pradesh**	**28° 57' 18" N & 76°18' 05" E**	**9**
Harike Lake	Nihalpur, Punjab	31° 09' 41" N & 74° 56' 01" E	64
Kanjli Wetland	Kapurthala Punjab	31° 06' 41" N & 75° 22' 33" E	52
Ropar Reservoir	Ropar, Punjab	31° 06'41" N & 75° 22'33" E	38
Dholbaha Reservoir	Dholbaha, Punjab	31° 05' N & 77° 00' E	97
Januari Reservoir	Hoshiarpur, Punjab	31° 05' N & 77° 00' E	97
Wetland : Surha Tal	Ballia, Uttar Pradesh	25°52' 13' N & 84°08'15" E	95
Wetland : Samaspur Wildlife sanctuary	Rae Bareili, Uttar Pradesh	25°55' N & 81°27'51" E	37
Wetland : Dahar lake (sandi Wildlife sanctuary)	Mansa, Punjab	27°19' 42' N & 79°59'10" E	77
Wetland : Keetham Reservoir (Soorsarvar Wildlife sanctuary)	Agra, Uttar Pradesh	27°15' 57' N & 77°51'37" E	22

No wild life habitat is being disturbed due to development of EDFC. Details of trees falling within the ROW are required to be felled, details of which are given in **Table 5.9** below. Trees to be cut are majorly *Acacia nilotica, Azadirachta indica, Phoenix theophrasti, Dalbergia sissoo, Mangifera indica, Sygygium cumini, Thespesia populnea, Ficus religiosa, Cordia myxa, Milletia pinnata, Ziziphus mauritiana, Holoptelea integrifolia, Ficus racemosa, Eucalyptus*, *Holoptelea integrifolia, Cordia dichotoma, Bambusa vulgaris, Madhuca longifolia, Jasminum* sp., *Citrus medica., Saraca asoca, Aegle marmelos, Psidium guajava, Ficus benghalenisis* and *Albizia lebbeck* .

NOC from forest department has been taken by EDFC for felling trees in most of the section and others are under process. Compensatory plantation will be carried out in ratio of 1:2 to minimize impact on flora & micro-climate of the region.

Table 5.9: Detail of Tree Cutting

Nos. of trees to fell/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)		EDFC-3 (Sanhewal to Khurja-Dadri)		
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
Nos. of Trees to fell	18148	17084	4352	2550	19013	42400
Eco-Sensitive Area	No	No	No	No	No	No

The vegetation in the study area is deciduous in nature. Mainly three types of forests were found in the study area, i.e. tropical moist deciduous forest, tropical dry deciduous forest and tropical thorny forest. Tree species found in area are Jangali tulsi, Apmarg, Neem, Kikar, Babul, Siras, Khair, Bel, Palash, Kachnar, Amaltas, Gulmohar, Shisham, Safeda, Poplar, Karanj, Philkhan, Shahtoot, Aam, Dhak, Jamun, Datura etc. Shrubs such as Kuri, Gandela, Ber, Makoi, Binda, Timur, Bansa etc. are found along the project alignment.

Macrophytes like *Eichhornia, Hydrilla, Typha angustata,* etc are found in the rivers of study area. Fish species like *Catla catla, Labeo rohito, Cirrihinus* sp.*, Clarius batrachus, Wallago attu, Hilsa ilisha* etc. are found in the rivers of the study area.

Some of the fish species found in the rivers of the area are: *Catla catla, Labeo* sp., *Cirrihinus* sp., *Clarius batrachus, Wallago attu, Hilsa ilisha* etc.

Mammals identified in the area are cow, buffalo, horse, Indian fox, ass, camel, monkey, pig, sheep, goat, dog, Nilgai, Buffalo, cat, hare etc. Birds found in the area are kingfisher, peafowl, cuckoo, pigeon, crow, koel, crane, spotted dove, baya weaver, red whiskered bulbul etc. White rumped vulture found in the Pilkhani to Sanhewal area is a Schedule 1 species and sarus crane is vulnerable species in the area. Reptiles found in the area are garden lizard, monitor lizard and karait.

5.3.3 Physical Environmental Profile

Environmental profile has been described in terms of meteorology, air, environment, noise environment, water environment and climate change.

5.3.3.1 Meteorology

EDFC corridor from Sanhewal to Mugalsarai extends upto approximately 1238 kms. Corridors pass majorly through state of Uttar Pradesh, 2 districts of Haryana and 3 districts of Punjab. Entire corridor presents sub-tropical climatic characteristics; however, variations exist due to the difference in altitudes between various locations.

The climate of study area in Uttar Pradesh (U.P.) is primarily defined as humid subtropical with dry winter (cwa) type with parts of Eastern U.P. as semi-arid (BS) type. With temperatures fluctuating anywhere from 0°C to 50°C in several parts of the study area and cyclical droughts and floods due

to unpredictable rains, the summers are extremely hot, winters cold and rainy season can be either very wet or very dry. Meteorology of the study area passing through the state of Uttar Pradesh is taken from IMD and is given below in **Table 5.10.**

Table 5.10: Meteorology Data from Nearest IMD stations for Study Area Passing Through State of Uttar Pradesh

Stations/Climatic factors	Allahabad	Kanpur	Agra	Aligarh	Delhi	Meerut	Roorkee
Mean Daily Max Temp (ºC)	32.6	32.1	32.6	31.4	31.3	31.4	30.4
Mean Highest Temp (ºC)	45.9	42.6	46.4	44.2	43.8	44.0	43.9
Hottest Month	May	May & June	June	June	June	May & June	May & June
Mean Daily Min Temp (ºC)	19.6	19.0	19.2	18.2	18.8	17.3	16.3
Mean Lowest Temp (ºC)	3.9	3.2	3.5	3.8	4.0	3.1	2.1
Coldest Month	January	January	January	January	January	January	January
Annual Rainfall (mm)	976.1	802.1	731.5	762.6	799.5	893.0	996.4
Month for maximum rainfall (mm)	July	August	August	August	August	August	August
Relative Humidity (%)	19-84%	26-86%	42-81%	25-79%	22-75%	43-84%	27-85%
Atmospheric pressure (hPa)	984.3-1006.6	990.2 - 1003.2	977.2-997.9	974.7-996.3	971.6-992.8	974.3-992.2	966.0-986.1
Wind speed (km/hr)	2.5-8.5	4.7-20.7	2.1-4.8	4.8-8.2	7.4-10.8	5.0-8.0	4.1-22.4
Wind direction	West	West	NW followed by SW	West	West	West	NW followed by SE

Source: Climatologically Normal 1961-1990, IMD

The climate of study area in Haryana is similar to other states of India lying in the northern plains. It is extremely hot in summer, around 45°C (113°F) and mild in winters. The hottest months are May and June and the coldest are December and January. Rainfall is varied, with the Shivalik region being the wettest and the Aravali Hills region being the driest. About 80% of the rainfall occurs in the monsoon season (July–September) and sometimes causes local flooding. Meteorology of the study area passing through the state of Haryana is given in **Table 5.11.**

Table 5.11: Meteorology Data from Nearest IMD stations for Project Area Passing Through State of Haryana

Stations/Climatic factors	Yamunanagar	Ambala
Mean Daily Max Temp (ºC)	31.4	30.5
Mean Highest Temp (ºC)	48.8	43.8
Hottest Month	May & June	June
Mean Daily Min Temp (ºC)	19.2	17.4
Mean Lowest Temp (ºC)	6.8	2.8
Coldest Month	January	January
Annual Rainfall (mm)	1107	955.5
Month for maximum rainfall (mm)	July	July
Relative Humidity (%)	23-79%	27-83%
Atmospheric pressure (hPa)	968.2-991.2	965.1-985.4
Wind speed (km/hr)	4.4-7.6	5.0-8.0

Stations/Climatic factors	Yamunanagar	Ambala
Wind direction	SE followed by NW	SE followed by NW

Source: Climatologically Normal 1961-1990, IMD

Climate of study area in Punjab is tropical, semi arid, hot and subtropical monsoon type with cold winter and hot summer. The study area experiences four seasons Cold Season from November to March, hot season from April to June, Monsoon season from last week of June to the first week of September and post monsoon or transition season from Sept till beginning of November. Hot season i.e. April to June weather is relatively dry and uncomfortable. June is the hottest month with mean maximum temperature of 41°C. January is the coldest month with mean minimum temperature of 5.5°C. The relative humidity is generally high through the year except during months of April to June. Meteorology of the area passing through the state of Punjab is given at **Table 5.12.**

Table 5.12: Meteorology Data from Nearest IMD stations for Project Area Passing Through State of Punjab

Stations/Climatic factors	Ludhiana	Patiala
Mean Daily Max Temp (°C)	29.8	30.3
Mean Highest Temp (°C)	44.6	44.2
Hottest Month	June	June
Mean Daily Min Temp (°C)	16.2	17.3
Mean Lowest Temp (°C)	1.2	2.1
Coldest Month	January	January
Annual Rainfall (mm)	775.2	819.1
Month for maximum rainfall (mm)	July	July
Relative Humidity (%)	26-91%	28-85
Atmospheric pressure (hPa)	966.0-992.1	967.2-988.0
Wind speed (km/hr)	2-5	2.5-7.6
Wind direction	SE followed by NW	NW

Source: Climatologically Normal 1961-1990, IMD

5.3.3.2 Air Environment

Air environment has been described in terms of ambient air quality which is one of the sub components under identified VECs of Physical Environmental Profile which have potential to affect the quality of environment and social life. Ambient Air Quality along the EDFC corridor and nearby areas has been monitored during the ESIA study of each section. Data on ambient air quality from each such section has been compiled from ESIA report and is given below in **Table 5.13.**

Table 5.13: Ambient Air Quality Data along the Project Alignment (Average Data represented)

Parameters/ Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)		NAAQS, 2009
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010	
Max. PM_{10}	108	83	78	81	140	162	100
Min. PM_{10}	51	56	65	44	84	118	
Max. $PM_{2.5}$	55	--	23	28	56	45	60
Min. $PM_{2.5}$	23	--	18	19	33	18	
Max. SO_2	22	14	19.2	16.1	14.5	23	80

Parameters/ Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)		NAAQS, 2009
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010	
Min. SO_2	12	8	16.2	11.5	7.1	10	
Max. NO_x	31	25	22.5	23.4	26.6	18	80
Min. NO_x	10	14	19.3	17.6	13.0	8	
Max. CO	--	529	--	--	--	--	2000
Min. CO	--	98	--	--	--	--	

Source: EIA reports of EDFC 1, 2, 3 ***(All Units are µg/cum)***

As per the ambient air quality data given in table above, it is found that all the parameters along the project alignment are within the permissible limits of NAAQS, 2009, CPCB except PM_{10}/RPM value. Levels are found higher along Bhaupur to Mugalsarai and Pilkhani to Sanhewal section.

Since EDFC corridor development will have direct impacts due to other direct & indirect developmental activities on the overall district as well as in the nearby districts therefore for the purpose of CIA, ambient air quality is required to be analyzed at district level. SPCBs were refereed for obtaining the ambient air quality data in the districts falling in the study area. During the discussion with SPCBs, it was found that major reason of pollution in these areas is industrial pollution and vehicular exhausts primarily. Other reasons include littered waste, open burning of wood/garbage & improper waste management etc. Overview of ambient air quality of the districts through which EDFC corridor is passing is given below in **Table 5.14.**

Table 5.14: Ambient Air Quality Assessment of the Affected Districts

Affected Districts	Ambient Air Quality	Remarks
Kanpur Nagar	As per the analysis carried out by UPPCB, Kanpur, it is found that PM_{10} & $PM_{2.5}$ levels exceeds the NAAQS, 2009 limit with average value of 181 & 122 µg/cum during 2014 & 242 & 139 µg/cum during 2015 (Jan-June) respectively. Value of NO_2, SO_2, CO, O_3, Benzene, Toulene & Xylene are within the permissible limits of NAAQS, 2009. Monthly average data of ambient air quality for the district is attached as **Annexure 5.1**.	• **Area identified as hotspot** • High industrial activities & total 10 industrial areas • Operation of various polluting industries like tanneries, brick kilns, distilleries, paints • Large nos. of diesel & petrol based vehicles though CNG introduced in area to switch towards cleaner fuel • TPP of 75 MW is under construction, TPP of 220 MW at Panki is operational and 1 TPP of 660 MW is proposed at Panki • High population density (1452 person/sq km)
Firozabad	As per the analysis carried out by UPPCB, Firozabad, it was found that PM_{10} levels exceeds the NAAQS, 2009 limit with average value of 220 µg/cum during 2012-2013. Value of NO_2 & SO_2, are within the permissible limits of NAAQS, 2009. Monthly average data of ambient air quality for the district is attached as **Annexure 5.1**.	• **Area identified as hotspot due to TTZ area** • High industrial activities & total 5 industrial areas • Part of district falls within TTZ zone, which is highly sensitive. Fuel used largely within TTZ is PNG supplied by GAIL • Operation of various polluting industries like glass, Ghee & SMP, lead oxide, ingot, casting, brick kilns etc. • Brick kilns operate outside TTZ and use

Affected Districts	Ambient Air Quality	Remarks
		coal & wood as fuel • Large nos. of diesel & petrol based vehicles – 165130. However CNG based (639) & LPG based (2594) vehicles also ply in district • High Population Density (1038 person/sq km)
Bulandshahar	As per the analysis carried out by UPPCB, Bulandshahar, it is found that PM_{10} levels exceeds the NAAQS, 2009 limit with annual average value varying from 173-178 µg/cum during 2011-2013. Value of NO_2 & SO_2, are within the permissible limits of NAAQS, 2009. Annual average data of ambient air quality for the district is attached as **Annexure 5.1**.	• **Area identified as hotspot (Khurja)** • High industrial activities & total 3 nos. industrial areas. Two more industrial areas are under development. Brick kilns are scattered in the district • Operation of various polluting industries like Steel fabrication, paper & pulp, leather goods, chemical based, rubber etc • Large cluster of pottery units exist in the district • Industrial units taking adequate pollution control measures as per report of UPPCB thus air pollution is not identified as major issue in the district • Large nos. of diesel & petrol based vehicles. Commercial-14,350 & non-commercial-2,60,300 • High Population Density (772 person/sq km) • 1320 MW TPP under planning
Muzaffar Nagar	As per the analysis carried out by UPPCB, 4 areas are identified as areas critical for air quality they are Vahlna I/A, Begrajpur I/A, Bhopa Road I/A and Jansath Road I/A. RSMP value in Vahlna I/A & Bhopa Road I/A is more than NAAQS, 2009.	• Major source of air pollution-industries & vehicular movement • 5 industrial area, 1 unorganized industrial cluster & scattered brick kiln units • Major polluting industries-paper mill, sugar mill, induction furnace, pesticides, chemical & lead smelting • Industries taken up air pollution control measures as per requirement which has reduced air pollution load to great extent • Nos. of vehicles in district-117524. No proposal for setting up CNG/PNG/LPG fuel stations
Allahabad	As per the analysis carried out by UPPCB, Allahabad, it is found that PM_{10} levels exceeds the NAAQS, 2009 limit with average value of 237.77 µg/cum during January, 2014. Value of NO_2 & SO_2, are within the permissible limits of NAAQS, 2009. Average data for January month for ambient air quality for the district is attached as **Annexure 5.1**.	• Major source of air pollution-industries & vehicular movement • Not highly industrialized and lesser nos. of industries as compared to other districts of UP. 5 major and 3 mini industrial areas • Major air pollution causing industries types are: pharmaceuticals, chemicals, fertilizers, cement, electroplating, polyester filaments, milk processing, iron ingot & galvanization and brick kiln units • Various stone crusher units in Bhatoti, Teja • Increasing nos. of vehicles, traffic jams and max nos. of vehicle plying are diesel &

Affected Districts	Ambient Air Quality	Remarks
		petrol based • TPP of 1320 MW, Karchana, 1320 MW at Meja& 1980 MW at Bara are under planning. TPP of 1320 MW is functional
Varanasi	As per the analysis carried out by UPPCB, Varanasi, it is found that PM_{10} levels exceed the NAAQS, 2009 limit with average value of 141 µg/cum during Oct, 2013-Jan, 2014. Value of NO_2 & SO_2, are within the permissible limits of NAAQS, 2009. Average monthly data for ambient air quality for the district is attached as **Annexure 5.1**.	• **Area identified as hotspot (Mugalsarai)** • Industrial Activities including textile dying & printing, casting units, LPG bottling units, electrical units, oil mills, paper & pulp etc • Traffic congestion & narrow roads • Scattered brick kiln units in district
Agra	As per the analysis carried out by UPPCB, Agra, it is found that PM_{10} levels exceeds the NAAQS, 2009 limit with average value of 141 µg/cum during Oct, 2013-Jan, 2014. Value of NO_2 & SO_2, are within the permissible limits of NAAQS, 2009. Average monthly data for ambient air quality for the district is attached as **Annexure 5.1**.	• **Area identified as hotspot due to TTZ area** • 6 Nos. of industrial estates, major types of industries are petha manufacturing, textile, readymade garment, leather based, pulp & paper, sugar, chemical, metal based, engineering units, oil refinery, shoe industry • Area within TTZ zone, restriction on coal/oil based industries & vehicles. Many of such industries are relocated or switched to cleaner fuel. • All vehicles are CNG based within TTZ
Ghaziabad	As per the analysis carried out by UPPCB, Ghaziabad, it is found that PM_{10} levels exceeds the NAAQS, 2009 limit with average value of 321 µg/cum during Jan, July, 2013. Value of NO_2 & SO_2, are within the permissible limits of NAAQS, 2009. Average monthly data for ambient air quality for the district is attached as **Annexure 5.1**.	• Usage of DG sets during power failure (8-10 hrs in a day) • Burning of open fuel in rural areas • High industrialization-12 industrial areas. Type of industries are cycles, furniture, slaughter houses, breweries etc. • Large nos. petrol & diesel based vehicle, however CNG is introduced by IGL in district for three wheelers & high traffic jams due to lack of roads • Construction of roads without any air pollution control measures • TPP of 1320 MW at Dehra is under planning
Panchkula	As per the analysis carried out by UPPCB, Panchkula, it is found that air quality within the district is good and is within the permissible limits of NAAQS, 2009. Ambient air quality data for the month of July, 2015 is attached as **Annexure 5.1**.	• Usage of DG sets during power failure (8-10 hrs in a day) • 5 Industrial areas in the district. Total nos. of industrial units are 2430 • Major type of industrial units in the district are pharmaceuticals, machinery, automobile parts, leather goods etc.
Ludhiana	As per the analysis carried out by UPPCB, Ludhiana, it is found that PM_{10} levels exceeds the NAAQS, 2009 limit with average value of 152 µg/cum during 2014 & 137 µg/cum during 2015 (till June). Value of NO_2 & SO_2, are within the permissible limits of NAAQS, 2009. Average monthly data for ambient air quality for the district is	• **Area identified as hotspot** • High industrialization, 3 Nos. of industrial focal points and 3 Nos. of industrial areas. • Various highly polluting industries in district like steel re-rolling mills, foundry, electro plating, breweries, induction furnace, forging, cycle making, tyre manufacturing, sugar mills, hosiery, lighting,

Affected Districts	Ambient Air Quality	Remarks
	attached as **Annexure 5.1**.	galvanizing, wire drawing, phosphating, heat treatment, dyeing etc • High population density
Mandi Gobindgarh	As per the analysis carried out by UPPCB, Mandi Gobindgarh, it is found that PM_{10} levels are very high & vary from 94.32 (agriculture) to 342.59 (industrial) µg/cum during year 2012. Value of PM_{10} is observed to be higher than NAAQS, 2009 limit in all over the district except at agricultural/rural areas. Similarly values of $PM_{2.5}$ is also observed to be high varying from 45.29 µg/cum (agriculture) to 121.48 µg/cum (commercial area). Values are high in all over the district except at agricultural/rural areas Value of NO_2 & SO_2, are high but within the permissible limits of NAAQS, 2009.	• Small district, known for steel re-rolling mills (247), induction furnace (70), ceramics industry (10), rice shelling (132) & food processing (5). All are polluting industries • One major industrial area and one rural focal point • GAIL gas supply is available in district but cost is higher as compared to coal • Many industrial units are self closing due to unavailability/ high transportation cost of raw material • Scattered brick kilns (53 Nos.)

The above table indicates that air quality in terms of particulate matter (PM10 & 2.5) is not within permissible limits in the affected district though SOx & NOx levels are within the limits. With development of EDFC which is electricity based, it is assumed that emissions due to transportation of the goods through road (for long distances) will reduce and thus will improve the air quality in the area but the areas where proposed EDFC alignment will cross has potential to attract various other developments like urbanization, industrialization, infrastructure development etc. These all development again have significant impact on air quality. Some of the districts through which EDFC is crossing have also been listed under CEPI Areas in 2010. CEPI Areas are defined as the areas where air and water quality index is more than 70. As per the guidelines of MoEFCC, a moratorium was declared on these areas that no further industry will come up in this region and SPCBs were directed to prepare pollution control and action plan for these areas and on the basis of these plans. MoEFCC further lifted the moratorium from these areas. List of the districts which were declared as critically polluted areas is given below in **Table 5.15**.

Table 5.15: List of Districts Declared as Critically Polluted Areas in 2010 & Their Current Status

District	Status	Potential Air Pollution Sources Which May come Due to EDFC Corridor	Proposed Development for EDFC
Ghaziabad	Moratorium Lifted by MoEFCC	Increase in nos. of industrial areas, expansion of industrial areas and increased nos. of industrial units. Development of townships and commercial spaces for upcoming industrial areas	Nil
Ludhiana		Lack of land space and high land cost thus there are very less chances for coming up of new I/As but there are fare chances for expansion of existing industries and coming up of more industries in existing areas	2 Nos. of station. **Also identified as Hotspot**
Gautam Budh Nagar (Noida)		Increase in nos. of industrial	Khurja to Dadri line is

District	Status	Potential Air Pollution Sources Which May come Due to EDFC Corridor	Proposed Development for EDFC
		areas, expansion of industrial areas and increased nos. of industrial units. Development of townships and commercial spaces for upcoming industrial areas	connecting point of EDFC & WDFC. Crossing station and unloading & loading yard at Dadri. **Also identified as Hotspot**
Kanpur Nagar		Declaration of more area under industrial land use, increase in nos. of industry. Unloading & loading yard may be located here as this area is highly industrialized, thus increased movement of vehicles. Possibility of coming up of logistic parks as well	2 Nos. station at Bhimsen & Kanpur City, loading & unloading yards. **Also identified as Hotspot**
Agra		Potential for industrial growth. Logistic parks and service industry may come up in this region. Unloading & loading yard may be located here as this area is highly industrialized, thus increased movement of vehicles.	**Identified as Hotspot.** Located close to Tundla where crossing station and loading & unloading yard are proposed
Mandi Gobindgarh		Many of industries in area are closing due to unavailability of raw material and high transportation cost of raw material. DFC corridor may have potential to provide raw material for these industries at cheaper cost and the industrial activities may take peak again in this area	3 Nos. of station at Mandi Gobindgarh
Varanasi-Mirzapur		Zone famous for manufacturing of sarees, dying & printing industry. Saree and dye material is exported to all over country from Varanasi. Also there are casting units in the district thus raw material from them and the product from these units will easily be transported through EDFC thus there are chances for increase in these types of industries.	3 Nos. of stations at Mirzapur. **Mugalsarai identified as Hotspot which will have influence on Varanasi-Mirzapur area. Also IWT terminal proposed in Varanasi which can have potential to multiply the impact of DFC.**

An attempt has been made to further summarize the above baseline data to obtain the representative air quality of the study area. Table 5.16 provides the comparative analysis of the ambient air quality along the EDFC alignment and ambient air quality of the locations where SPCBs have carried out the monitoring. This will give the broad range of variation of value of ambient air quality in the study area. Table 5.16 indicates that PM_{10}, PM 2.5, SO_2 and NOx are the major stressors of air environment (VEC) caused by road traffic, urbanization & industrialization in the study area.

Table 5.16 Comparative Analysis of Ambient Air Quality in Study Area

Parameters/ Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)		EDFC-1 (Bhaupur to Khurja)				EDFC-3 (Sanhewal to Khurja-Dadri)			NAAQS, 2009
	Within 100 m of EDFC (Mar-Apr, 2011)	>100 m of EDFC (Dist. Kanpur, Allahabad)	Bhaupur-Khurja Within 100 m of EDFC (May, 2009)	Kaurara to Chamrola Within 100 m of EDFC (May, 2011)	Khurja to Dadri Within 100 m of EDFC (Jan, 2012)	>100 m of EDFC (Dist. Firozabad & Bulandshahr)	Khurja to Pilkhani Within 100 m of EDFC Feb-Mar, 2015	Pilkhani to Sanhewal Within 100 m of EDFC Dec-Feb, 2010	>100 m of EDFC (Dist. Ghaziabad, Bulandshahr, Panchkula & Ludhiana)	
Max. PM_{10}	108	308, 276	83	78	81	303, 177	140	162	363, 177, 90, 137	100
Min. PM_{10}	51	93, 215	56	65	44	89, 149	84	118	216, 149, 63, 118	
Max. $PM_{2.5}$	55	278, NA	--	23	28	NA, NA	56	45	NA, NA, 60, NA	60
Min. $PM_{2.5}$	23	51, NA	--	18	19	NA, NA	33	18	NA, NA, 12, NA	
Max. SO_2	22	15, 3.9	14	19.2	16.1	14, 28	14.5	23	27, 28, 7, 14	80
Min. SO_2	12	5, 2.3	8	16.2	11.5	9, 21	7.1	10	24, 21, 1, 11	
Max. NO_x	31	339, 56.7	25	22.5	23.4	36, 28	26.6	18	32, 28, 35, 27	80
Min. NO_x	10	117, 31.1	14	19.3	17.6	23, 21	13.0	8	28, 21, 17, 25	
Max. CO	--	3.54, NA	529	--	--	NA, NA	--	--	NA, NA, 0.88, NA	2000
Min. CO	--	1.26, NA	98	--	--	NA, NA	--	--	NA, NA, 0.27, NA	

(All Units are µg/cum)

Note: Areas marked in red are identified hotspots

Ambient Air Quality w.r.t. Noise & Vibrations

Noise level is a vital component of air environment. High noise levels have considerable impact on human health & biological cycle of various animals. Noise levels have been monitored along the EDFC corridor and nearby areas during the EIA study of each section. Also noise levels have been assessed during EIA study while passage of trains and the data is given in **Table 5.17.**

Table 5.17: Noise Level along EDFC Corridor and Near-by Areas

Parameters/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)	
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
Leq Day time	47.6-69.1	50.6-72.7	62.6-76.8	62.6-66.2	48.5-56.6	47.3-78.0
Leq Night Time	36.5-64.8	37.8-65.2	49.6-56.8	47.8-55.1	40.1-47.5	32.7-60.7
Leq Max	54.7 -91.8	70.7-92.9	89.2-110.2	89.2-109.8	--	65.0-82.0
While One Train Passing	84.0-87.9	85.1-89.0	86.2-102.4	87.6-100.4	78.2-82.5	--
While Two Train Passing	88.3-91.8	91.4-93.0	94.0-98.2	95.2-97.0	--	--
Leq-While Train passing at Distance of 12.5 m	72.1-76.0	73.8-75.9	89.1-104.1	92.1-102.1	--	--
Lmax-While Train passing at Distance of 12.5 m	90.7-94.0	90.6-94.3	92.7-109.8	93.7-107.8	--	--
Leq-While Train passing at Distance of 25 m	66.1 -70.1	66.3-70.1	78.2-90.2	79.2-88.2	--	--
Lmax-While Train passing at Distance of 25 m	86.4 -90.0	86.3-90.3	87.6-95.8	89.6-93.8	--	--
Leq-While Train passing at Distance of 50 m	60.3 -62.1	59.8-62.1	70.2-83.2	71.2-81.2	--	--
Lmax-While Train passing at Distance of 50 m	71.9 -78.2	71.1-78.6	78.4-87.0	79.4-85.0	--	--
Ambient noise Levels standards (dB(A)	Residential Area		Commercial		Industrial	
Day time	55		65		75	
Night Time	45		55		70	

Source: EIA reports of EDFC 1, 2, 3 *(All **Units are in dB(A))***

The stretch passes through residential and commercial areas primarily. The ambient noise levels are mostly found within the permissible ambient Noise levels at most of the places. However these levels exceed the level temporarily when train passes through such areas. Noise level of each district and within each district varies depending upon the activities. These noise levels vary with land use within the area and from one area to other area. Noise level status of some of affected districts is summarized in **Table 5.18** below.

Table 5.18: Noise Environment Status of Some of Affected Districts

District	Noise Environment Status
Bulandshahr	Avg. noise level in commercial areas: 56.25 -69.25 dB(A) Avg. noise level in residential areas: 62.70 -69.82 dB(A) Avg. noise level in silence areas: 44.25-61.10 dB(A) Noise levels are higher w.r.t CPCB standards. Detailed results are given in **Annexure 5.2**.
Allahabad	Avg. noise level in commercial areas: 62.03-63.02 dB(A) Avg. noise level in residential areas: 70.88-71.33 dB(A) Avg. noise level in silence areas: 56.42-57.8 dB(A) Noise levels are higher w.r.t CPCB standards. Detailed results are given in **Annexure 5.2**.

District	Noise Environment Status
Kanpur	Avg. noise level in commercial areas: 84-93 dB(A) & 73-80 dB(A) Avg. noise level in residential areas (day & night): 71-83 dB(A) & 66-73 dB(A) Avg. noise level in industrial areas (day & night): 78-85 dB(A) & 70-75 Avg. noise level in silence areas(day & night): 71-81 dB(A) & 65-78 dB(A) Noise levels are higher w.r.t CPCB standards. Detailed results are given in **Annexure 5.2**.
Firozabad	Avg. noise level in industrial areas: 72.0-82.3dB(A) Avg. noise level in residential areas: 51.8-64.90dB(A) Avg. noise level in silence areas: 49.40-66.70dB(A) Noise levels are higher w.r.t CPCB standards. Detailed results are given in **Annexure 5.2**.

Source: USPCB

Table 5.19: Comparative Analysis of Noise Quality in Study Area

Parameters/ Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)			EDFC-1 (Bhaupur to Khurja)					EDFC-3 (Sanhewal to Khurja-Dadri)			CPCB Standards
	Within 100 m of EDFC (Mar-Apr, 2011)	>100 m of EDFC (Dist. Kanpur, Allahabad)		Bhaupur-Khurja Within 100 m of EDFC (May, 2009)	Kaurara to Chamrola Within 100 m of EDFC (May, 2011)	Khurja to Dadri Within 100 m of EDFC (Jan, 2012)	>100 m of EDFC (Dist. Firozabad & Bulandshahr)		Khurja to Pilkhani Within 100 m of EDFC Feb-Mar, 2015	Pilkhani to Sanhewal Within 100 m of EDFC Dec-Feb, 2010	>100 m of EDFC (Dist. Bulandshahr)	
Leq Max dB(A)	47.6-69.1	Res: 98.6 Com:103 Ind: 106 Sil: 95	Res: 95.3 Com: 97.6 Sil: 86.6	50.6-72.7	62.6-76.8	62.6-66.2	Res:64.90 Ind: 72.0 Sil: 66.70	Res:57.5 Com:82.26 Sil: 57.3	48.5-56.6	47.3-78.0	Res:57.5 Com:82.26 Sil: 57.3	Res: 45-65 Com:55-65 Ind: 70-75 Sil: 40-50
Leq Min. dB(A)	36.5-64.8	Res: 60 Com:60 Ind: 106 Sil: 95	Res: 44.2 Com:40.8 Sil: 33.5	37.8-65.2	49.6-56.8	47.8-55.1	Res: 51.8 Ind:72 Sil:49.4	Res:39.1 Com: 46.25 Sil: 32.5	40.1-47.5	32.7-60.7	Res:39.1 Com: 46.25 Sil: 32.5	
Leq Average dB(A)	54.7 - 91.8	Res: 98.6 Com:103 Ind: 106 Sil: 95	Res: 62.03 Com:70.88 Sil: 56.42	70.7-92.9	89.2-110.2	89.2-109.8	Res:58.5 Ind: 78.09 Sil: 57.14	Res: 53.17 Com: 65.39 Sil: 42.2	--	65.0-82.0	Res: 53.17 Com: 65.39 Sil: 42.2	

Note: Areas marked in red are identified hotspots

Comparative analysis indicates that average noise levels exceed the CPCB standards in the study area.

Vibrations: Vibrations arise due to movement of the trains which have potential to affect the structures in close vicinity. EDFC may increase the numbers of trains plying in the area which will increase the frequency or the nos. of times that area/structure will experience the vibrations. Study on the existing vibration levels along the EDFC track and close by areas. Summary of data collected during EIA studies of all the three stretches is given below in **Table 5.20** below:

Table 5.20: Vibration Levels along the Existing IR Track Along the Project Corridor

Parameters/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)	
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
Passenger Train-12.5 m from track	63.7-80.1	63.7-79.8	54.6-76.5	63.2-71.3	75.9-79.1	52.0-68.8

Parameters/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)	
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
Passenger Train-25 m from track	51.2-66.7	51.0-65.5	46.2-68.1	56.3-61.2	60.5-62.1	51.3-62.9
Passenger Train-50 m from track	36.2-61.3	40.3-59.6	38.5-56.8	47.1-51.3	--	--
Open Wagon-12.5 m from track	65.2-77.2	64.9-78.5	62.3-75.3	58.1-70.0	--	54.8-74.7
Open Wagon-25 m from track	47.1-65.3	47.3-65.6	55.3-66.8	49.6-58.6	--	46.7-66.6
Open Wagon-50 m from track	41.2-63.2	41.2-62.4	47.8-58.4	41.2-52.0	--	--

Source: EIA reports of EDFC1,2,3

5.3.3.3 Water Environment

Water environment comprise of ground & surface water resources and ground and surface water quality. Water environment is environmental attribute which is impacted by any development in the area due to increased water demand and incremental pollution load due to industrial effluent and sewage.

Ground Water Resources & Quality: The major issues identified in the ground water sector of affected districts which need to be addressed while planning of areas include Over exploitation of ground water resources; Optimal utilization of ground water use; Ground water quality & contamination; Site specific availability of ground water; Water logging & salinity problem; Management of sewage and effluents generation and its disposal as per norms and Managed artificial ground water augmentation. This section contains information about ground water resources & quality of the areas surrounding the proposed EDFC alignment and affected district as whole. Information on the ground water resources for the area along proposed EDFC corridor is collected from ESIA report prepared for different sections of EDFC and is given in **Table 5.21** below. Ground water scenario at the district level referring the information available from CGWB studies is given in **Table 5.22**. This will provide the insight into ground water resources of the study area delineated for CIA study.

Table 5.21: Information on Ground Water Resources and Quality along EDFC Corridor and Nearby Areas

Parameters/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)	
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
Depth of water level-Pre monsoon (mbgl)	2.57 - 21.00	2.57 - 21.00	5-50	5-50	10-30	10-30
Depth of water level-Post monsoon (mbgl)	2.13 - 16.73	2.13 - 16.73	3-20	3-20	13-40	13-40
Yield capacity of Bore-wells	Good-moderate	Good-moderate	Good-moderate	Good-moderate	Good-moderate	Good-moderate
Yield shallow tubewell (lpm)	1000-2000	1000-2000	1000-2000	1000-2000	1000-2000	1000-2000
Yield depth tubewell (lpm)	2000-3000	2000-3000	2000-3000	2000-3000	2000-3000	2000-3000
Use	Domestic & Agriculture	Domestic & Agriculture	Domestic & Agriculture	Domestic & Agriculture	Domestic & Agriculture	Domestic & Agriculture
pH	6.8-7.9	6.8-8.1	7.62-8.16	8.1-8.3	7.25-7.89	7.4-8.3
BOD (mg/l)	<2	0	0	0	0	0
Chloride (mg/l)	6-64	28.06-547.21	22.63-56.57	35.63-46.17	8-96	7.1-120
Fluoride (mg/l)	0.6-1.6	0.2-0.6	<0.2	<0.2	0.48-0.94	0.2-0.6
Sulphate (mg/l)	21.0-69.04	74.51-614.72	19.36-533.12	45.36-98.22	7-116	14-78
Iron (mg/l)	0.09-0.42	0.02-0.42	<0.2	<0.2	0.02-0.36	0.08-0.67
Total Hardness (mg/l)	84-346	184.06-454.27	100-356	140-190	140-490	231-278
Potability	Potable	Potable	Potable	Potable	Potable	Potable

Source: ELA reports of EDFC1, 2, 3

Table 5.22: Information on Ground Water Resources and Quality in Affected Districts

District	Ground Water Resources	Ground water Quality	Remarks
Aligarh	• Pre-monsoon water level: 2.06-21 mbgl • Post-monsoon water level: 1.96-17.00 mbgl • Aquifers: Alluvium • Stage of GW development & status: 82.2% & semi-critical. Most of the blocks are under safe category & 2 are under semi-critical category • Ground water declining at steady rate especially in town area • Roof & surface run-off water harvesting at 4 locations in district by CGWB	• Ground water fresh upto 130 m • Major source of domestic & agriculture use • Potable for drinking • Hard water (high TDS) and EC- 381-5671 micromhos/cm at 25^0 C • Fluoride & Nitrate concentration at few locations more than 1.5 mg/l & 45 mg/l • Arsenic contamination is also detected at some places (0-0.52 µg/l)	• Major GW related issues in district are water logging, water table depletion and water pollution • High fluoride concentration due to usage of phosphatic fertilizers • Areas where ground water extraction should be controlled: Tappal, Khair, Lodha, Atrauli & Chaudas • RWH should actively be taken up • **Crossing station & unloading/loading yard**

District	Ground Water Resources	Ground water Quality	Remarks
			proposed at Daud Khan (Dhanipur block) under safe category
Allahabad	• Pre-monsoon water level: 3-15 mbgl • Post-monsoon water level: 1.45-13.0 mbgl • Aquifers: Alluvium • Stage of GW development & status: 69.12 % & safe. Most of the blocks are under safe category & 2 are under semi-critical category • Const. of check dams, contour bunds & ponds for artificial ground water recharge under practice in Shankargarh, Koraon, Manda & Meja blocks	• Ground water quality in shallow and deep aquifers is good except some contamination in canal command area • Major source of domestic & agriculture use • EC- 200-2080 micromhos/cm at 25^0 C	• High ground water exploitation in Karchhana block **(crossing station proposed)** • Canal system should be strengthened in other parts of district to balance pressure on ground water resources • Water logging issues in the district • High EC, nitrate & Fe conc. found in the district except at Chand Khamria, Naini I/A & Shankargarh • Large potential for artificial recharge of GW
Auraiya	• Depth to water level varies from 2-12 mbgl and 2-4 mbgl in canal command area. Deep ground water levels in Sarai Ajitmal & Auraiya blocks • Declining trend of water level observed in most of the district where as increase trend observed at two locations which may be due to irrigation influence • Aquifers: Alluvium • Stage of GW development & status: 57.44% & safe. All the blocks are under safe category except 1 is under semi-critical category • Ground water declining at steady rate especially in town area	• Ground water quality is good in district but brackish water is found in deep aquifers at some places • Ground water is slightly alkaline, EC- 405-1045 µs/cm. EC is even higher in other parts of district in of 750µs/cm • At some locations nitrate conc. exceed 45 mg/l may be due to usage of excess fertilizers	• Ground water problems include water logging & sodic land formation problems in area near canal and irrigation belts. Also deep aquifers yield brackish water in some locations • Treatment of area contaminated with salt encrustation by applying Gypsum treatment to ensure good agricultural yield • Large potential for RWH & artificial ground water recharge • **Crossing station proposed at Achalda detour which is close to Bidhuna which is classified as semi-critical zone**.
Etawah	• Pre-monsoon water level: 2.8-37.9 mbgl • Post-monsoon water level: 2.22-37.75mbgl • Aquifers: Alluvium Sand • Stage of GW development & status: 41.91% & semi-critical. All the blocks are under safe category • Ground water level showing declining trend	• Ground water potable in shallow water aquifers • EC varies from 335-1120 µs/cm • As content varies from 0 to 39 µg/l • Iron conc. high than permissible limits of IS:10500, 3025 at Etawah (1.2 mg/l) & Baricha block (2.56 mg/l)	• Since block is under safe category and stage of development in most of the district is below 45% thus there is potential to absorb more of industrial and agricultural growth. • Rain water harvesting and structures for artificial ground water augmentation should be taken up in district • **Crossing station proposed at Ekdil in the district**
Firozabad	• Pre-monsoon water level: 2.42-25.10 mbgl • Post-monsoon water level: 1.55-25.25 mbgl	• Ground water potable & slightly alkaline in pheratic aquifers	• De-silting of the naalas to be taken up to increase capacity of water storage during

District	Ground Water Resources	Ground water Quality	Remarks
	• Aquifers: Alluvium • Stage of GW development & status: 80.49% & semi-critical. 3 blocks are semi-critical and 1 block is critical • Ground water level showing declining trend	• EC varies in pheratic aquifers varies from 523 to 1279 microsiemens/cm • Water quality-slightly brackish to brackish in deep aquifers • High fluoride & nitrate concentration reported at few place due to usage of excess fertilizers • Data for ground water quality for Firozabad district for November, 2011 is attached as **Annexure 5.3**.	monsoon and thus ground water recharge • Artificial ground water augmentation should be taken up through rain water harvesting and other methods like check dams, ponds etc. • Ground water quality bad in Narkhi, Shikohabad & Tundla till shallow aquifer region where as ground water quality is deteriorated upto bedrock in southern part of district • **3 Crossing stations proposed in district and also a unloading & loading yard at Tundla** • Water intensive industries should not be encouraged in this area
Gautam Budh Nagar	• Pre-monsoon water level: 3.35-14.40 mbgl • Post-monsoon water level: 2.0-13.35 mbgl • Aquifers: Alluvium, Delhi quartzite • Stage of GW development & status: 51.40% & safe • Ground water level showing declining trend	• Ground water in shallow aquifers is good and safe for drinking and irrigation purpose but slightly alkaline (pH-7.95 to 8.15) • EC more than 1000 microsiemens/cm • High salinity in G.W in areas of Jahangirpur, Luharli, Bilaspur, Dadri, Dankaur & Jewar • High fluoride in Luhari village (geo-genic reason) • Ground water in deep aquifers is brackish to saline • High Manganese conc. in urban areas of Noida	• Ground water levels depleting in Noida & G. Noida region • High water logging problem • Soil salinity problem • Treatment of area contaminated with salt encrustation by applying Gypsum treatment to ensure good agricultural yield • Rain water harvesting and other techniques for artificial ground water augmentation should be adopted • **Crossing station & unloading/loading yard proposed at Dadri** • **Listed under CEPI but moratorium lifted** • **Area identified as Hotspot as area identified as industrial hub by DMIC and will be highly impacted due to DFC**
Ghaziabad & Hapur	• Pre-monsoon water level: 1.7-24.6 mbgl • Post-monsoon water level: 2.2-23.37 mbgl • Aquifers: Alluvium • Stage of GW development & status: 71.81% & safe. All blocks are safe & two are semi-critical • Ground water level showing declining trend	• Ground water quality of pheratic aquifers good but high TDS (max 990 mg/l-Bhojpura) and nitrate value (max 168 mg/l-Bhojpura) • EC ranges from 527-3318 µs/cm but is reported to be more than 2250 µs/cm at 25^0 C at Radha Kunj, Surya Nagar & 220	• Declining ground water regime due to over exploitation & deterioration of ground water quality & salinity in Loni block • Water based industries and industries having potential to pollute water should not be encouraged in this area • Major infrastructural & industrial development

District	Ground Water Resources	Ground water Quality	Remarks
		KV substation Sahibabad • High nitrate recorded in Bhojpura • Alkaline type of water	area (residential, multi-sports centre, roads, railway infrastructure, bridges, metro etc) due to its nearness to national capital Delhi • Rain water harvesting should be taken up actively for ground water augmentation • **Also listed under CEPI but moratorium is lifted** • **Notified Zone by CGWB (Municipal corporation of Ghaziabad including Loni)** • **Area close to Dadri so impacts will spill over to this area**
Kanpur Nagar	• Pre-monsoon water level: 2.2-27.13 mbgl • Post-monsoon water level: 2.08-27.13 mbgl • Aquifers: Alluvium • Stage of GW development & status: 67.33% & safe. All blocks are safe except 1 is semi-critical • Ground water level showing declining trend • 12 Nos. of roof top rain water harvesting schemes implemented under CGWB guidance	• Fe & Cu conc. more than permissible limit • As contamination found • Ground water is slightly alkaline • EC: 470-1560 µ/cm • Fluoride: 0.47-0.96 mg/l. within permissible limits of IS:10500	• Rain water harvesting & other method for ground water augmentation should be taken up actively. • **Also listed under CEPI but moratorium is lifted** • **Also identified as hot spot w.r.t major area for industrial development & urbanization** • **2 crossing stations and unloading & loading yard for DFC proposed at Kanpur Nagar.** • **Bhaupur area and Areas close by like Raina in Kanpur Dehat and other areas are identified as potential areas for more industrial activities w.r.t DFC development. Area within 10 kms areas of crossing stations have potential to be developed as industrial zones**
Muzaffar Nagar	• Pre-monsoon water level: 3.2-9.95 mbgl • Post-monsoon water level: 2.5-7.95 mbgl • Aquifers: Quaternary Alluvium • Stage of GW development & status: 82% & semi-critical. Two blocks over exploited and 5 are semi-critical • Ground water level showing declining trend overall in the district (increase only in Jansath 2)	• Ground water quality is potable. It is colorless, odorless but slightly alkaline • EC: 224 – 1885 µs/cm at 25^{0}C • Fluoride: 0 – 0.79 mg/l • High Nitrate conc. in some areas	• High potential for artificial ground water augmentation by rain water harvesting and other structures like check dams, ponds etc. • High water level depleting and contamination due to usage of excess fertilizers • Water based industries should not be encouraged in the area • **Four crossing stations of DFC proposed in the district.**

District	Ground Water Resources	Ground water Quality	Remarks
	• CGWB has prepared plan for ground water augmentation and various structures developed by State Govt. for artificial ground water recharge		
Mirzapur	• All the blocks in this district falls in safe category and one falls in semi-critical category (Rajgarh)	• High Nitrate conc. in some areas • As conc. found more than 0.05 mg/l in some areas • Ground water quality in most of the part of district is good	• **Listed under CEPI but moratorium lifted** • **2 crossing stations of EDFC proposed at Mirzapur**
Agra	• Major water source in area is River Yamuna • Pre-monsoon ground water level: 4.89-12.3 mbgl • Post-monsoon ground water level: 2.24-12.3 mbgl	• pH varies from 6.4-7.9 • TDS: 722-1910 mg/l, higher than IS:10500 limit • Total hardness: 307-549 mg/l • Turbidity: 5-9 NTU • Alkalinity: 259-604 mg/l • Chloride: 256-976 mg/l • Water is brackish except during monsoon	• **TTZ area and closeness to Tundla where unloading/loading yard may be developed**
Meerut	• High ground water exploration & depletion • 1 block classified as critical, 3 as semi critical and rest 8 are under safe category • Major source of water	• Ground water quality in most of the parts of district is good • High Nitrate (0-160 mg/l), fluoride, iron and manganese concentration at some parts of districts • TDS value ranges from 300-800 mg/l	• Rain water harvesting should be taken up actively in district to prevent depletion of ground water aquifers • Conjunctive use of water to be encouraged especially for industries and agriculture purpose • **5 crossing stations of EDFC proposed at Meerut**
Ambala	• Pre-monsoon water level: 2.44-13.39 mbgl • Post-monsoon water level: 2.21-13.61 mbgl • Aquifers: Alluvium (sand & gravel) • Stage of GW development & status: 76% & semi-critical. Two blocks are semi-critical, 1 block critical and 1 block is safe • Ground water level showing declining trend overall in the district (increase only in northern part of Ambala block)	• Fresh & suitable for drinking • Neutral to alkaline in nature • pH: 7.07-10.10 • EC: 741 to 3500 micro/mhos at 25^0C • Fluoride: 0.19-2.45 mg/l. high at only Saha & Patwi due to industrial area • CO_3-0-12 mg/l, HCO_3-268-834 mg/l, Cl-6.7-152 mg/l, SO_4-20-209 mg/l, NO_3-0-75 mg/l, Ca-12-103 mg/l, Mg-2.4-3.4 mg/l, Na-35-391 mg/l, K-1-2.9 mg/l, Total Hardness (Ca CO_3)-40-267 mg/l	• Problem of incrustation due to which life of TW shortens due to high pH & iron content • Water ponding due to occurrence of depressions in district. Water collected in these depression should be used for augmentation of ground water • **Three crossing stations of DFC proposed in the district.**
Ludhiana	• Pre-monsoon water level: 9.24-25.48mbgl	• Water is slightly alkaline with pH varied	• Decline water level & quality

District	Ground Water Resources	Ground water Quality	Remarks
	• Post-monsoon water level: 5.09-33.62 mbgl • Aquifers: Quaternary Alluvium (sand & gravel) • Stage of GW development & status: 144% & over exploited. All blocks are over exploited and 1 critical • Ground water level showing declining trend overall in the district	b/w 7.25-7.9 • EC varies from 550-1320 micro/mhos at 25^{0}C • Nitrate varies from 8-104 mg/l • All parameters well within IS:10500 except nitrate at Bhalolpur, Muskabad, Kohara, Beogowal • Ground water in areas along Budha ka Nallah polluted with various water borne diseases • As pollution also reported in the district	• Pollution of shallow aquifers with heavy metals like copper, manganese and iron • Water based industries should not be encouraged • Rain water harvesting should actively be taken up in the area to restore depleting aquifers • **Area Notified for ground water extraction by CGWB** • **2 Nos. of crossing stations proposed** • **Identified as hotspot due to high industrial stress in area** • **Identified as Critically polluted area but moratorium is lifted**
Patiala	• Pre-monsoon water level: 4.43-20.62 mbgl • Post-monsoon water level: 6.99-24.28 mbgl • Aquifers: Alluvium (sand & gravel) • Stage of GW development & status: 169% & over exploited. All blocks are over exploited • Ground water level showing declining trend overall in the district • 4 pilot projects for artificial ground water recharge taken up and completed successfully. Apart from this roof top rain water will be undertaken in school	• Water is alkaline & pH varies from 7.1-8.24 • EC in area ranges from 687 to 4100 Micromhos /cm • Nitrate value ranges from 0.40-200 mg./l exceeding permissible limits of IS:10500 • Fluoride conc. varies from 0.2-2.8 mg/l exceeding permissible limits of IS:10500 • Ground water quality of the district is attached as **Annexure 5.3**.	• Decline water level & quality • High salinity, nitrate & fluoride • Water based industries should not be encouraged and low water requirement crops should be grown • Rain water harvesting should actively be taken up in the area to restore depleting aquifers • Canal system should be strengthened to cater industry & agriculture sector • **Area Notified for ground water extraction by CGWB** • **1 No. of crossing stations proposed** • **Identified as hotspot due to high industrial stress in area** • **Close to Critically polluted area like Mandi Gobindgarh & Ludhiana (but moratorium is lifted)**

Source: CGWB, CPCB, Department of Agriculture & Cooperation, U.P., Zonal Project Directorate Kanpur,

Based on the data available from EIA studies of EDFC-1, 2 & 3 and CGWB a comparison has been made to analyse the water quality within 100 m zone of the EDFC and at district level. Comparison is given in **Table 5.23.**

Table 5.23: Comparative Analysis of Ground Water Quality in Study Area

Parameters/ Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)		EDFC-1 (Bhaupur to Khurja)				EDFC-3 (Sanhewal to Khurja-Dadri)			Permissible limits IS:10500
	Within 100 m of EDFC (Mar-Apr, 2011)	>100 m of EDFC (Dist. Allahabad, Varanasi)	Bhaupur-Khurja Within 100 m of EDFC (May, 2009)	Kaurara to Chamrola Within 100 m of EDFC (May, 2011)	Khurja to Dadri Within 100 m of EDFC (Jan, 2012)	>100 m of EDFC (Dist. Aligarh, Auraiya, Firozabad)	Khurja to Pilkhani Within 100 m of EDFC Feb-Mar, 2015	Pilkhani to Sanhewal Within 100 m of EDFC Dec-Feb, 2010	>100 m of EDFC (Patiala, Ambala)	
pH	6.8-7.9	Alkaline, 7.17-7.37	6.8-8.1	7.62-8.16	8.1-8.3	8.0-8.14, 6.82-7.91	7.25-7.89	7.4-8.3	7.1, 7.07-10.10	6.5-8.5
BOD (mg/l)	<2	NA, NA	0	0	0	NA, NA,	0	0	Nil NA	Nil
Chloride (mg/l)	6-64	NA, 27.48-29.98	28.06-547.21	22.63-56.57	35.63-46.17	21-1404, 30-1260	8-96	7.1-120	21, 6.7-152	1000
Fluoride (mg/l)	0.6-1.6	NA, NA	0.2-0.6	<0.2	<0.2	0.22-1.95, NA	0.48-0.94	0.2-0.6	0.44, NA	1.5
Sulphate (mg/l)	21.0-69.04	NA, NA	74.51-614.72	19.36-533.12	45.36-98.22	Nd-134, NA	7-116	14-78	37, 20-209	400
Iron (mg/l)	0.09-0.42	High Fe, NA	0.02-0.42	<0.2	<0.2	NA, NA	0.02-0.36	0.08-0.67	0.1, NA	0.3
Total Hardness (mg/l)	84-346	134-1393.6, 370-380	184.06-454.27	100-356	140-190	105-795, 180-1530	140-490	231-278	35, 40-267	600
Potability	Potable	Potable except at except at Chand Khamria, Naini I/A & Shankargarh	Potable	Potable	Potable	High TDS, Fluoride & Nitrate. As contamination at some places at Auraiya	Potable	Potable	Potable, potable	--

NA: Data Not Available, Nd: Not detected

Table 5.21, 5.22 and 5.23 indicate that though ground water availability is moderate, declining levels and quality are indicators of increasing stress caused by increasing agriculture & domestic usage.

Surface Water Resources & Quality of the Districts

Project alignment crosses various water bodies including rivers, streams, nallahs, canals etc. Surface water quality of the water bodies which are crossed by the EDFC alignment or running parallel to EDFC alignment in close vicinity is given in **Table 5.24** below. **Table 5.24** indicates that surface water quality is not fit for drinking purposes.

Surface Water System of the Study Area

The project alignment is a part of the Ganges basin, which contains the largest river system on the subcontinent comprising the Rivers of Ganga, Yamuna and number of other rivers.

The proposed alignment of EDFC from **Bhaupur to Mugalsarai** cross perennial rivers of Yamuna and Tonse part of Ganga Basin. Important rivers and streams in the project area are part of Yamuna drainage basin and comprises of River Tonse, Arind and its tributaries.

The proposed alignment of EDFC from **Bhaupur to Khurja** does not cross any of the perennial rivers of Ganga Basin or any other river systems. Important rivers and streams in the project area are part of Yamuna drainage basin and comprises of River Kuwari, Sengar and its tributary Sirsa, Arind and its tributaries Ahenya, Puraha and Pandu. These rivers are seasonal in nature and do not serve any irrigation or drinking water requirements of the region. The proposed alignment of EDFC from **Kaurara to Chamrola** does not cross any of the perennial rivers of Ganga Basin or any other river systems. Major drainage of the district through which EDFC alignment is crossing in this section are River Yamuna, Arind, Sirsa, Sengar, Awagarh, Gambhir & Chambal.

The alignment of EDFC from **Khurja to Dadari** crosses Seasonal River – Karon at km 1375.39 of Ganga Basin. This is tributary to Yamuna River.

The proposed alignment of EDFC from **Khurja to Pilkhani** cross river Hindon and Kali which are tributary to River Yamuna

The proposed alignment of EDFC from **Pilkhani to Sahnewal** crosses many surface water bodies of the Ganga-Yamuna basin. Some of the important rivers and canals crossing the alignment are: Yamuna (at Kalahari in Yamunanagar), Tangri (Dukheri), Markanda (at Ambala), Chaudah Dhara and Ghaghhar. However, except Yamuna all other rivers are found to be non-perennial in this section. District wise details of surface water system in the study area & water quality are given in **Table 5.25.**

Status of water Demand and Effluent Management in the Affected Districts: Proposed EDFC has potential to encourage the industrialization, urbanization and infrastructural development in affected districts. All these will have influence of demographics of the area. There are potentially high chances of immigration of people in this area due to which pressure on existing resources like water supply and waste treatment system will increase. Also industrial development will put pressure on water resources & quality of the area. **Table 5.26** below summarizes the water demand and the effluent/sewage treatment system in the area.

Table 5.24: Surface Water Quality Data (Average Data represented)

Parameters/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)		Permissible Limit IS: 10500
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010	
pH	7.1-7.5	7.3-7.5	8.26	8.5	7.04-8.59	7.4-8.2	6.5-8.5
BOD (mg/l)	10-42	16.84-32.67	Not monitored-water polluted	11.9	2.2-14.8	0-18	Nil
Chloride (mg/l)	12-31	29.42-43.08	160.30	164.70	6-112	10-12	1000
Fluoride (mg/l)	0.11-0.32	0.1-0.6	<0.2	<0.2	0.46-0.96	0-0.5	1.5
Sulphate (mg/l)	12.31-41.12	47.82-74.80	670.32	534.32	18-24	8-14	400
Total Hardness (mg/l)	61-181	145.02-190.0	260	270	50-340	128-260	600

Source: EIA reports of EDFC 1, 2, 3

Table 5.25: District Wise Details of Surface Water System & Water Quality

District	Affected Water Bodies	Water Quality	Use
Bulandshahr	Narora Ganga, Kali Nadi (not natural but a drain meets Ganga), Karwan Nadi (Tributary of Yamuna) & Neem Nadi (Tributary of Kali Nadi)	**Upstream Ganga:** BOD: 1.1-3.6 mg/l, COD: 5.5-12.8 mg/l, Turbidity: 35-60 NTU, pH: 7.0-7.5, EC: 171-270 µs/cm, DO: 5.92-10.26 mg/l, TDS: 101-200 mg/l & TSS: 30-40 mg/l **Kali Nadi Upstream & Downstream** Drain with BOD of above 50 mg/l & DO nil. Detailed results attached as **Annexure 5.4**.	Ganga River: Irrigation & Industrial purpose Ganga River, Kali Nadi, Neem Nadi & Karwan Nadi-disposal of sewage & effluent
Muzaffar nagar	Hindon River (tributary of Yamuna), West Kali Nadi (tributary of Hindon)	West Kali Nadi is drain with high BOD & Nil DO value. It is classified under category D & E of CPCB surface water quality classification	Hindon river-Irrigation West Kali Nadi-Disposal of effluent/ Sewage
Allahabad	River Ganga & Yamuna	DO, BOD & T. coliform value in Yamuna River varies from 6.5-8 mg/l, 1.5-3.0 mg/l & 6000-12000 MPN/100 ml DO, BOD & T. coliform value in Yamuna River varies from 6-9 mg/l, 2.5-8.0 mg/l & 4000-13000 MPN/100 ml. Detailed results attached as **Annexure 5.4.**	River Ganga & Yamuna- Domestic, industrial & Agriculture use
Varanasi	River Ganga	BOD in Ganga river vary from 2.7 -4.4	River Ganga & Yamuna- Domestic,

District	Affected Water Bodies	Water Quality	Use
		mg/l and DO varies from 6.6-8.5 mg/l. BOD in Varuna River varies from 2.9-30.4 mg/l & DO varies from 4.8-8.2 mg/l. Detailed results attached as **Annexure 5.4**.	industrial & Agriculture use
Agra	River Yamuna	**River Yamuna U/S Kailash Ghat** pH: 7.8-8.3, BOD-3.8-7 mg/l & DO: 2-5 mg/l **River Yamuna U/S Jeoni Mandi** pH: 7.6-8.2, BOD-3-7 mg/l & DO: 2-3.8 mg/l **River Yamuna D/S Taj Mahal** pH: 7-8, BOD-5-11 mg/l & DO: 1.5-2.5 mg/l Detailed results attached as **Annexure 5.4**.	River Yamuna- Agriculture use & sewage/effluent disposal
Kanpur	Ganga, Ramganga, Eastern Kali, Pandu Nadi	**Bithur Ghat, Kanpur U/S Ganga RIver:** Color:10-50 Hz, DO: 6.5-11.6 mg/l, BOD: 2.6-5.7 mg/l, T. Coliform: 2000-1,50,000 MPN/100 ml, F. Coliform: 700-28,000 MPN/100 ml **Shukla Ganj Ghat, Kanpur Ganga RIver:** Color:10-50 Hz, DO: 6.5-12.2 mg/l, BOD: 2.8-4.0 mg/l, T. coliform: 2300-1,50,000 MPN/100 ml, F. coliform: 700-39000 MPN/100 ml **Jana Gaon, Kanpur D/S Ganga River:** Color:10-50 Hz, DO: 4.6-10.8 mg/l, BOD: 4.6-19.2 mg/l, T. Coliform: 3900-2,10,000 MPN/100 ml, F. coliform: 3900-93000 MPN/100 ml Detailed results attached as **Annexure 5.4**.	River Ganga- Industrial, Domestic & Agriculture and disposal of sewage & effluent River Kali: Disposal of sewage & effluent River Pandu: Agriculture & disposal of effluent & sewage
Firozabad	River Yamuna & Sirsa	**River Yamuna U/s** pH: 7,0-8.47, DO: 5.7-7.3 mg/l, Turbidity: 40-114 NTU, BOD: 8.2-18,0 mg/l, COD: 27.6-64.8 mg/l **River Yamuna D/s** pH: 6.43-8.09, DO: 5.6-7.0 mg/l, Turbidity: 56-126 NTU, BOD: 14-25.0 mg/l, COD: 30.4-77.6 mg/l Detailed results attached as **Annexure 5.4**.	River Yamuna & Sirsa: Agriculture & Disposal of sewage & effluent

District	Affected Water Bodies	Water Quality	Use
Ghaziabad & Hapur	River Hindon, Ganga (in Hapur) and Kali River	**Ganga River Water at Brij Ghat, Garh Mukteshwar, Hapur:** BOD varies from 2.7-3.4 mg/l, COD: 11.6-18.0 mg/l, F. coliform: 610-840 MPN/100 ml & T. Coliform: 1200-1500 MPN/100 ml **Kali River :** BOD varies from 42-91 mg/l, COD: 165-322 mg/l, DO: Nil **Hindon River :** BOD varies from 10-185 mg/l, COD: 32-760 mg/l, F. coliform: 70000-140000 MPN/100 ml & T. Coliform: 68000-2400000 MPN/100 ml Detailed results attached as **Annexure 5.4**.	River Hindon & Ganga- agriculture & disposal of sewage/effluent. River Kali: disposal of sewage/effluent.
Ludhiana	River Satluj, Budha Nallah	**Satluj water quality U/S Budha Nallah** BOD: 1.1 mg/l, COD: 4.1 mg/l, DO: 6.3 mg/l, T. coliform: 1050 MPN/100 ml, water body class as per CPCB-C **Satluj water quality D/S Budha Nallah** BOD: 13.9 mg/l, COD: 49.5 mg/l, DO: 5.3 mg/l, T. coliform: 55000 MPN/100 ml, water body class as per CPCB-D	River Satluj: Agriculture, industrial & domestic & disposal of effluent Budha ka Nallah: Agriculture & disposal of sewage/effluent

Table 5.26: Water Demand and Effluent/Sewage treatment System of the Area

District	Current Water Demand (Domestic, Agriculture & Industrial)	Projected Water Demand (Domestic & Industrial)	CSTP capacity	CETP capacity	Water bodies affected due to disposal of treated/untreated effluent
Bulandshahar	No Data	No data	**2 CSTP: Anoop Sehahr Area:** Zone A: 0.805 MLD Zone B: 1.75 MLD Both located near River Narora Ganga and operated by Municipal council, Anoop Sehahr. CSTP not provided in any other part of district. Treated & untreated sewage from Anoop Sehahr & Sewahe from narora is drained into river Ganga. Sewage from Sikandrabad residential area & Khurja area is discharged into Karwan river through drains	Nil. Industrial treated & untreated effluent is discharged into Kali Nadi. Industrial effluent from Sikandrabad & Khurja area is discharged into Karwan river through drain	Narora Ganga, Kali Nadi & Karwan Nadi
Muzzafar Nagar	1415.06 MCM	146.87 MCM (till 2029)	Municipal Council Muzaffar Nagar: Sewage: 60 MLD STP: 32.5 MLD Disposal: West Kali Nadi No STP for other 10 residential areas of district. Domestic sewage from Muzaffar Nagar through 12 drains is disposed off in Western Kali Nadi. Total sewage load in Western Kali Nadi is 4875 Kg/day (65 MLD). Disposal of sewage from Budhana area (1.5 MLD, BOD-225 kg/day) into Hindon River.	Nil Disposal of effluent (treated-2 MLD with BOD-60 kg/day) from Titvi Sugar Complex, Titvi, Muzaffar Nagar & Bajaj Hindustan Ltd. Sugar Mill, Budhana in River Hindon. Discharge of effluent from UP. Sugar Corporation Ltd, Rohana Kalan, M/s Triveni engineering & Industries Ltd. and paper mills into Western Kali Nadi. Total industrial load in Western Kali nadi-1200 kg/day (40 MLD)	Hindon River, Western Kali Nadi
Allahabad	No data	No data	250 MLD of sewage generation from district. Discharged into River Ganga & Yamuna. 6 CSTP (29 MLD, 80 MLD60 MLD, 10 MLD, 50 MLD & 25 MLD) to treat sewage before disposal into river.	No major polluting industries. Major water pollution source is bathing in Ganga river during low flow period. Big industries like Reliance & IFFCO treat their effluent to 100% and	River Yamuna & Ganga

District	Current Water Demand (Domestic, Agriculture & Industrial)	Projected Water Demand (Domestic & Industrial)	CSTP capacity	CETP capacity	Water bodies affected due to disposal of treated/untreated effluent
				treated effluent meeting the standards prescribed is discharged into River Ganga. BOD load of total 3207 kg/day is discharged into river (80 kg/day-upstream & 3127 kg/day-downstream)	
Varanasi	No data	No data	320 MLD of sewage generated from Varanasi city. 100 MLD treated in STP (80 MLD, 8 MLD & 12 MLD). Proposal of establishing 3 more STP of capacity 140 MLD, 120 MLD & 3 MLD. BOD load of 58,000 kg/day is dumped in river. BOD will be further reduced to 9600 kg/day after installation of 3 more STP. Sewage generation from Ramnagar is 7.5 MLD which is disposed off into river directly without treatment. BOD load of 1875 kg/day is dumped in river.	Most of industries discharge their waste in river after treatment only, Some saree manufacturing units and electroplating units discharge their wastewater in river without treatment. Effluent generated from these industries is 325 KL/day of effluent is generated from industries within city which add BOD load of 121 kg/day in river Effluent of 6.96 MLD of effluent is generated from Ramnagar area and have BOD load of 208.8 kg/day. Industries in Ramnagar treat their waste before discharge in river. Total effluent discharge in River Ganga is 7.3 MLD and add BOD load of 208.8 kg/day due to installation of water pollution control equipment	River Ganga
Agra	260 MLD	No Data	Till 2025 app. 300 MLD of sewage will be generated from Agra. To cater present sewage 94 MLD (14 MLD, 40 MLD, 78 MLD, 12 MLD & 10 MLD) of STP are installed and are	• CETP installed in Leather Park for treatment of effluent • ETP installed at Slaughter Houses at Kuberpur for	River Yamuna

District	Current Water Demand (Domestic, Agriculture & Industrial)	Projected Water Demand (Domestic & Industrial)	CSTP capacity	CETP capacity	Water bodies affected due to disposal of treated/untreated effluent
			operational. 60 MLD of STP construction is under process (36 MLD & 24 MLD) 94 MLD (12, 24, 14 & 24 MLD) capacity STP will be installed by 2025 to cater projected sewage generation	treatment of effluent. • ETPs installed in all electroplating units at Nunihai, Agra	
Kanpur Nagar	No data	53.05	426 MLD-Sewage through 26 drains. STP capacity 160 MLD (130, 5 & 27 MLD) 4 new STP under construction to treat remaining sewage (270, 43, 42 & 15 MLD).	427 MLD- Effluent. Effluent from tanneries treated within industry to first level. Second level treatment is given in CETP of capacity 36 MLD at Jajmau (9 MLD effluent from tanneries & 27 MLD sewage) CETP of capacity 70 KLD to treat effluent from chrome tanning industries to extract chrome. After chrome extraction effluent is directed in above 36 MLD STP.	Ganga, Ramganga, Eastern Kali, Pandu Nadi
Firozabad	No Data	No data	97.417 of sewage generation. No STP in district. STP of 65 KLD proposed within MC, Firozabad	No major effluent as most of industries does not produce significant waste water. Pulp and paper industries generate 3350 KLD of waste water which is treated in ETP within the I/Us	
Ghaziabad	No Data	51.29 MCM	257 MLD-sewage. 220 MLD of sewage treated in the STP installed and treated effluent discharge in Hindon River. 64 MLD of untreated sewage is discharge into Sahibabad drain. One more MLD is under construction at Raj Nagar extension. One STP is proposed to be constructed at Loni & one at	30 MLD-effluent, treated within the premises of each industry. One CETP of 4 MLD is established within Tronica city, Ghaziabad to treat effluent from dyeing & washing industries. One CETP of 2.1 MLD is under construction at textile centre, Pilkhua, Hapur	River Hindon

District	Current Water Demand (Domestic, Agriculture & Industrial)	Projected Water Demand (Domestic & Industrial)	CSTP capacity	CETP capacity	Water bodies affected due to disposal of treated/untreated effluent
			Bapudham		
Ludhiana	415 MLD (only for Ludhiana Metro city)	172 MCM	2083 MLD-sewage, 1250 MLD disposed off without treatment. 332 MLD of sewage generated from Ludhiana MC, part of which is treated in STP at Balloke (152 MLD), Bhattian (111 MLD) and Jamalpur (48 KLD). Treated and untreated sewage is disposed off in River Satluj through Budha ka Nallah.	All industries treat their effluent in ETPs. Industries which do not treat their water have being notified by PPCB for installation or closed. CETP of capacity 15 MLD installed at Dyeing unit at Bahadur ke road & construction of CETP module I (50 MLD) & CETP II (40 MLD) for dyeing industries, Tajpura road cluster units and Focal point cluster unit	Budha ka nallah, River Satluj

Surface water environment baseline status indicates stress on the resource (Availability & Quality) cause due to urbanization, industrialization & infrastructure development.

5.3.3.4 Climate Change Baseline

Climate change is a change in the statistical distribution of weather patterns when that change lasts for an extended period of time. Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate tectonics, and volcanic eruptions. Certain human activities have also been identified as significant causes of recent accelerated climate change, often referred to as "global warming". As per predictions, it is estimated that mean annual rise of temperature will be 1-5.50 C over the next century while the annual precipitation is likely to increase in the north and decrease in south, the intensity of daily precipitation and the probability of extreme precipitation intensities can increase in all regions.

It is envisioned that the climate change outcomes like intense rainfall, decreased rainfall, increased temperatures etc are posing significant threats to the infrastructure, agriculture and other activities. However it is difficult to set up one to one relation of each anthropogenic activity and specific adverse event as contribution of each activity is too small to cause any change or accelerated change. Any change which is experienced is due to the cumulative effect of these activities. Thus it is required to control these activities and the emissions and the accelerated pace of the change. As per estimations and studies, India's contribution to GHG stock is low and will not meet those of developed countries in near future. As per study carried out by Kumar et al, the mean minimum and maximum temperatures in India may increase by 2-40C as a result of climate change.

The proposed EDFC corridor is broad gauge electrified corridor runs from Mugalasarai to Ludhiana almost all along the existing IR. Development of these corridors will lead to shift of freight from road to rail mode and increased rail efficiency. These will substantially reduce the GHG emissions and thus will slow down the accelerated pace of climate change. Predictions made in reduction of GHG are given below

- In 2016-17, in absence of DFC (i.e. 'No-DFC scenario') GHG emissions would have been 8.7 million ton CO2 while those in case of DFC would be 2.59 million ton CO2.
- According to the projection, in 2041-42, GHG emissions under 'No-DFC scenario' would have been 33.2 million ton CO2 while those in case of DFC scenario would be 5.97 million ton CO2.
- The GHG emission GAP between No-DFC scenario and DFC scenario increases from 6.11 million ton CO2 in 2016-17 to 27.23 million ton CO2 in 2041-42 i.e. almost by 4.5 times.
- Cumulative GHG emissions over the 30 year period in the No-DFC scenario would have been 582 million ton CO2 while in the DFC scenario it would be 124.5 million ton CO2. This demonstrates that in absence of DFC implementation approximately 4.5 times more GHG would be emitted in 30 year period for freight transportation in the Eastern and Western Corridor.

Thus it can be concluded that the proposed EDFC project will have positive impact on climate by reducing the GHG emissions and global warming.

5.4 Socio-Economic Environment

Socio-economic environment baseline has been described in terms of population & literacy, infrastructure, industry & power plants.

Population & Literacy

Population & Literacy statistics for the districts through which EDFC traverses indicate net increase. **Table 5.27** depicts the population of the district as per census 2011 and projections for year 2021. The influence zone considered for indicating the demography and the work force changes we have adopted the district as an entity.

Work Force Population

Similarly the work force within these districts including the non-working population is provided in **Table 5.28.**

Affected Population

Development of EDFC corridor involved large scale land acquisition. Details of land acquisition have been given in sections above. Details of land owners and affected families/people is given in **Table 5.29.**

Occupation: Occupation varies from region to region. Major affected population consist of land owners, most of them practice agriculture.

Health & Medical facility: Health & Medical facility in all the districts is well developed.

Transportation & Connectivity: Proposed EDFC alignment is well connected by various NHs, SHs, MDRs and other local roads. EDFC at present is passing through three states, i.e. Uttar Pradesh, Punjab & Haryana.

The road network that is connecting across these three states is quite extensive, however it is important to understand the network that already exists along the proposed DFCCIL EDFC 1, 2 &3 and examine the necessary linkages to the three corridors by way of State Highways and National Highways. There are various National Highways (NH) that are connecting to DFCCIL corridor and many are proposed to be constructed to connect to DFCCIL so as freight can be transported from Rail top Road when required. In this context the NH-1 and 2 are the most important NH road corridors which are the major carriers of cargo presently along with the existing railway network and partially the Inland water (National Water No.1 – which is the Ganga River).

Further to this there are various State Highways (SH) of the respective states that have been developed or in the stage of being developed. These SH will also be connected to the DFCCIL corridor. These NH and SH connectivity will provide the last mile connectivity to the cargo movement from the DFCCIL corridor to the logistic parks and from the sources of cargo generation to the various industrial centres or the consumer markets across this corridor. List of the national highways connecting the EDFC alignment is given in **Table 5.30** below. Salient features of the transportation network of EDFC are given below:

Table 5.27: Population & Literacy of the Districts through Which EDFC Corridor Traverse

Sr. No.	District	Population				Literacy			
		2001	2011	Growth Rate	2021	2001	2011	Growth Rate	2021
EDFC 1									
1	Kanpur Dehat	1,563,336	1,796,184	15%	2,063,636	852,350	1,170,243	37%	1,606,744
2	Auraiya	1,179,993	1,379,545	17%	1,612,826	680,440	930,836	37%	1,273,384
3	Etawah	1,338,871	1,581,810	18%	1,868,909	766,407	1,062,003	39%	1,471,936
4	Firozabad	2,052,958	2,498,156	22%	3,040,006	1,065,525	1,521,806	43%	2,173,139
5	Hathras (Mahamayanagar)	1,336,031	1,564,708	17%	1,832,586	675,483	942,572	57%	1,477,953
6	Agra	3,620,436	4,418,797	22%	5,393,142	1,852,919	2,680,510	45%	3,878,698
7	Aligarh	2,992,286	3,673,889	23%	4,510,801	1,420,604	2,092,567	47%	3,082,351
8	Bulandshehar	2,913,122	3,499,171	20%	4,203,204	1,408,082	2,031,656	44%	2,931,680
9	Gautam Budh Nagar	1,202,030	1,648,115	37%	2,259,730	675,669	1,122,947	66%	1,866,338
Total		**18,199,063**	**22,060,375**		**26,784,840**	**9,397,479**	**13,555,140**		**19,762,222**
EDFC 2									
1	Ramabainagar	-	-	-	-	-	-	-	-
2	Kanpur Nagar	4,167,999	4,581,268	10%	5,035,730	2,659,833	3,243,022	22%	3,954,217
3	Fathepur	2,308,384	2,632,733	14%	3,002,632	1,062,431	1,512,166	42%	2,152,266
4	Kaushambi	1,293,154	1,599,596	24%	1,978,700	481,756	813,424	69%	1,373,385
5	Allahabad	4,936,105	5,954,391	21%	7,182,782	2,506,942	3,665,727	46%	5,360,026
6	Mirzapur	2,116,042	2,496,970	18%	2,946,425	935,101	1,428,683	53%	2,182,742
7	Chanduli	1,643,251	1,952,756	19%	2,320,460	785,284	1,174,606	50%	1,756,976
Total		**16,464,935**	**19,217,714**		**22,466,728**	**8,431,347**	**11,837,628**		**16,779,611**
EDFC 3									
1	Ghaziabad	3,290,586	4,681,645	42%	6,660,576	1,899,735	3,123,264	64%	5,134,646
2	Meerut	2,997,361	3,443,689	15%	3,956,454	1,606,469	2,141,488	33%	2,854,604
3	Hapur	-	-	-	-	-	-	-	-
4	Muzzaffarnagar	3,543,362	4,143,512	17%	4,845,423	1,738,529	2,417,339	39%	3,361,068
5	Saharanpur	2,896,863	3,466,382	20%	4,147,873	1,444,013	2,077,108	44%	2,987,920
6	Yamunanagar	1,041,630	1,214,205	17%	1,415,399	638,711	832,457	30%	1,084,941
7	Ambala	1,014,411	1,128,350	11%	1,255,064	662,789	818,025	23%	1,009,688
8	Fatehgarh Sahib	538,041	600,163	11%	668,522	347,364	426,033	23%	522,529
9	Patiala	1,844,934	1,895,686	3%	1,947,817	1,119,824	1,266,791	13%	1,432,994
10	Ludhiana	3,032,831	3,498,739	15%	4,036,145	2,036,278	2,560,225	26%	3,219,227
Total		**20,200,019**	**24,072,371**		**28,933,273**	**11,493,712**	**15,662,730**		**21,607,617**
Total of EDFC 1+2+3		**54,864,017**	**65,350,460**		**78,184,841**	**29,322,538**	**41,055,498**		**58,149,451**

Table 5.28: Work Force Population of the Districts through Which EDFC Corridor Traverse

Sr. No.	District	Working Population				Non-Working Population			
		2001	2011	Growth Rate	2021	2001	2011	Growth Rate	2021
EDFC 1									
1	Kanpur Dehat	513211	628864	23%	770610	1050125	1167320	11%	1297710
2	Auraiya	388260	442023	14%	503243	791733	937522	18%	1110214
3	Etawah	368609	506072	37%	694786	970262	1075738	11%	1192671
4	Firozabad	558941	761521	36%	1037572	1494017	1736635	16%	2018665
5	Hathras (Mahamayanagar)	391970	484115	24%	597882	944061	1080593	14%	1236847
6	Agra	984305	1389844	41%	1962460	2636131	3028953	15%	3480267
7	Aligarh	916298	1174361	28%	1505178	2075988	2499528	20%	3009432
8	Bulandshehar	1173805	1173260	0%	1172673	1739317	2325911	34%	3110441
9	Gautam Budh Nagar	363814	569109	56%	890371	838216	1079006	29%	1389004
Total		**5659213**	**7129169**		**9134776**	**12539850**	**14931206**		**17845249**
EDFC 2									
1	Ramabainagar	-	-	-	-	-	-	-	-
2	Kanpur Nagar	1247833	1572232	26%	1981012	2920166	3009036	3%	3100511
3	Fathepur	869612	1063929	22%	1301717	1438772	1568804	9%	1710467
4	Kaushambi	506733	639086	26%	806015	786421	960510	22%	1173167
5	Allahabad	1671349	2111907	26%	2668606	3264756	3842484	18%	4522604
6	Mirzapur	714739	881996	23%	1088383	1401303	1614974	15%	1861258
7	Chanduli	527633	652543	24%	807065	1115618	1300213	17%	1515398
Total		**5537899**	**6921693**		**8652799**	**10927036**	**12296021**		**13883404**
EDFC 3									
1	Ghaziabad	938251	1520538	62%	2464184	2352335	3161107	34%	4248528
2	Meerut	895856	1090539	22%	1327622	2101505	2353150	12%	2635057
3	Hapur	-	-	-	-	-	-	-	0
4	Muzzaffarnagar	1173153	1291644	10%	1422100	2370209	2851868	20%	3431368
5	Saharanpur	817528	1037344	27%	1316182	2079335	2429038	17%	2837602
6	Yamunanagar	336533	389233	16%	450187	705097	824972	17%	965217
7	Ambala	324521	372139	15%	426769	689890	756211	10%	828883
8	Fatehgarh Sahib	206139	214783	4%	223804	331902	385380	16%	447503
9	Patiala	681951	660267	-3%	639337	1162983	1235419	6%	1312262
10	Ludhiana	1149638	1284822	12%	1435917	1883193	2213917	18%	2602902
Total		**6523570**	**7861309**		**9706102**	**13676449**	**16211062**		**19309323**
Total of EDFC 1+2+3		**17720682**	**21912171**		**27493677**	**37143335**	**43438289**		**51037976**

Table 5.29: Nos. of PAFs/PAPs

Nos. of trees to fell/Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)	
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010
PAFs	13034	8595	1745	1974	11982	3051
Agriculture PAFs	95.64%	96.54%	94.73%	50.0%	79.86%	77%
Residential PAFs	4.36%	3.46%	5.27%	50.0%	20.14%	23%
PAPs	63968	46646	10005	5841	42197	3051
Total Structures including CPRs	623	206	97	121	0	324
CPRs Structures	55	22	56	14	0	8

Note: Pilkhani to Khurja RAP yet not prepared

Table 5.30: Road Connectivity of Proposed EDFC Alignment

No.	Existing Districts	National Highway
EDFC-1		
1	Kanpur Dehat	NH-3
2	Auraiya	NH-3
3	Etawah	NH-3 and NH-92 (Etawah to Gwalior)
4	Firozabad	NH-2
5	Hathras	NH-2
6	Agra	NH-2, NH-3 and NH-93 (Agra to Muradabad)
7	Aligarh	NH-2
8	Bulandsher	NH-2
9	Gautam Budh nagar	NH-2
EDFC-2		
1	Rambainagar	NH-2
2	Kanpur Nagar	NH-2
3	Fathepur	NH-2
4	Kaushambhi	NH-2
5	Allahabad	NH-2 and NH-96 Allahabad to Partapgarh
6	Mirjapur	NH-2
7	Chaundoli	NH-2
EDFC-3		
1	Ghaziabad	NH-58 and NH-24

No.	Existing Districts	National Highway
2	Meerut	NH-58 and NH-119 Meerut to Najibabad
3	Mujafarnagar	NH-58
4	Saharanpur	NH-73
5	Yamunagar	NH-73
6	Ambala	NH-1 and 21A to Chandigarh andNH-1 To Delhi
7	Fathegarhsahib	NH-1
8	Patiala	NH-1
9	Ludhiana	NH-1 and NH-95 Connecting Ludhiana to Chandigarh

Industries & Power Plants

The dedicated freight corridor has been generally designed to accommodate various industrial growth centers and provide dedicated cargo movement along its stretch. This corridor would reduce or eliminate the pressure of the present cargo movement on the existing railway sector. In view of this, analysis of the EDFC 1 & 2 corridors indicate that these traverse through the traditional industrial centers of Uttar Pradesh (UP). These stretches have also been identified by different studies as future industrial growth centers. The initial section of the EDFC 3 also covers parts of UP leading to the States of Haryana and Punjab wherein the corridor again traverses the industrial locations or districts with industrial concentrations. Industrial profile of the districts through which EDFC will pass is given in the **Table 5.31** below.

Table 5.31: Industrial Profile in the Affected District

<table>
<tr><th>District</th><th>Industrial Profile of Affected District</th><th>List of Planned & Existing Power Plants in Affected District</th></tr>
<tr><td>Kanpur Dehat</td><td>Major industrial blocks are Jainpur, Sarvankhera and Raina in Akbarpur Tehsil. Some industrial development is also present in Bhognipur and Amraudha. However none of these zone are located within 10 km area of the proposed EDFC alignment, but these area will be definitely benefitted with coming up of EDFC.
Type of industries in Kanpur Dehat are Fertilizers, Paint, Food processing (cold drink bottling plant), Detergents, Leather, handloom cloth, medicine, shoes, aluminium utensils, tractor trolly, mustard oil, flour and agricultural implements and plastic.
Nos. of SSI industries in the district are: 5364 & nos. of heavy industries are 52. Major industrial estates in district are Industrial Estate, Raina I & II, Industrial Area, Jainpur, plastic city (growth centre) in Jainpur and Leather Park in Unnao. There are other 3 small industrial estates in the district at Jhinijhak, Rasulabad & Derapur.
The district is industrially backwards due to inadequate infrastructure and communication facilities available.</td><td>Lanco Infratech Ltd. by Bhoginpur, UP (1320 MW)- under construction</td></tr>
<tr><td>Kanpur Nagar</td><td>There are total 10 industrial areas in Kanpur Nagar. Details given in table below
<table>
<tr><th>Industrial Area</th><th>Area</th></tr>
<tr><td colspan="2">Industrial Areas</td></tr>
<tr><td>Kalpi Road</td><td>38 acres</td></tr>
<tr><td>Uptron Estate Panki</td><td>14.20 acres</td></tr>
<tr><td colspan="2">UPSIDC Industrial Area</td></tr>
<tr><td>Panki 1</td><td>231.05 acres</td></tr>
<tr><td>Panki 2</td><td>112.57 acres</td></tr>
<tr><td>Panki 3</td><td>200.00 acres</td></tr>
<tr><td>Panki 4</td><td>25.00 acres</td></tr>
<tr><td>Panki 5</td><td>147.58 acres</td></tr>
<tr><td colspan="2">STPI Multi Hosiery Complex</td></tr>
<tr><td>Dada Nagar</td><td>10000 sq m</td></tr>
<tr><td colspan="2">Apparel Park Rooma</td></tr>
<tr><td>Rooma</td><td>228.10 acres</td></tr>
<tr><td>Chakeri</td><td>260.25 acres</td></tr>
</table>
No of registered industrial units in Kanpur Nagar are 17444, out of which 92 are medium & large scale industries. Type of industries in the district are agro based, soda water, cotton textile, woolen silk & artificial thread, jute & jute based, readymade garment & embroidery,</td><td>Kanpur Fertilizers & Chemicals Ltd. (75 MW)-implementation

UPRVUNL (220 MW), Panki, U.P.-constructed

660 MW TPP-under planning</td></tr>
</table>

District	Industrial Profile of Affected District	List of Planned & Existing Power Plants in Affected District
	wood/wooden based furniture, paper & paper product, leather based, chemical/chemical based, rubber, plastic & petro based, mineral based, metal based (steel fab.), engineering, electrical machinery & transport equipment, repairing & servicing, samosa/kachori making & others. Items exported by industries are leather/leather products, machinery parts, automobiles parts, saddlery, veterinary needles, plastic items, handicrafts, artificial jewelry, suitcases, software export, chemicals, textile, handlooms, powerlooms, essential oils & perfumes, pharmaceuticals, spices	
Auraiya	There are 4 industrial estates in Aurariya. Industrial Estate at Achhalda (2.96 acres), Industrial Estate Auraiya (2.77 acres), Industrial Estate Bidhunia (2.34 acres) and Industrial Estate at Dibiyapur (367.72 acres). Type of industries in these industrial areas are Rice & Dal mill, Ghee, soda water, steel furniture, cement products, cotton textile, woolen, silk & artificial thread based clothes, Jute & jute based, Readymade garments & embroidery, wood/wooden based furniture, paper & paper products, leather, chemical/chemical based, rubber, plastic & petro based, metal based, engineering units, electrical machinery & transport equipment, repairing & servicing and others. Apart from above industrial areas, a plastic city covering area of 314 acres has been developed in the district. Total industrial units in the district are 1675 and all are SSI. GAIL has set up a petrochemical complex in with capacity of 1,00,000 TPA of HDPE & 1,60,000 LLDPE. Uttar Pradesh Petrochemical Complex is located at Pata, Auraiya, U.P.	Unitech Machines Ltd. Power plant of capacity (250 MW)- implementation Auraiya Gas Power Project (NCR) at Dibiyapur, Auraiya, UP (663.36 MW)
Etawah	Sand mining from river Yamuna & Chambal There are two industrial areas in the district, i.e. Rural ind. Estate Jaswant Nagar (1.68 ha) & Large ind. Estate Sarai Aisar (58.15 ha). Total nos. of industrial units in the district are 4249 out of which 3 are medium and large scale industries. Major type of industries in these areas are agro based, cotton textile, readymade garments & embroidery, wooden/wooden based furniture, paper & paper products, leather based, chemical/chemical based, rubber, plastic & petro based, mineral based, metal based, electrical machinery and transport equipment, repairing & servicing and others.	Nil
Ferozabad	Five industrial estate exists in the distract at Firozabad (40.96 ha), Shikohabad (10.80 ha), Usaini (5 ha), Tundla (2.5 ha) & Jalesar Road (32.9 ha). Total nos. of industrial units are 7874 nos. out of which 10 are medium & large. Major type of industries are agro based, Ready-made garments & embroidery , wood/wooden based furniture, paper & paper product, leather based, chemical/chemical based, rubber, plastic & petro based, mineral based, engineering units, electrical machinery & transport equipment and repairing & servicing and others (glass & glassware). Only one large scale unit & 9 medium scale industries exists in the district. Major exportable item is glass.	
Hathras	There are 5 industrial areas in the district, i.e. Hathras (11.236 ha), Sadabad Mini (9.178 ha), Sahpau Mini (0.867 ha) & Sikandra rau (1 ha). Total industrial units registered are 1488 & 35 unregistered ready garments units, 4500 glass beads producing units, 20 units manufacturing colors and some desi ghee manufacturing units. Major type of industries are agro based, cotton textile, readymade garments & embroidery, wood/wooden furniture, paper & paper product, chemical/chemical based, rubber, plastic & petro based, repairing & servicing and others. There are 2 large scale units and 1 medium scale	

<table>
<tr><th>District</th><th>Industrial Profile of Affected District</th><th>List of Planned & Existing Power Plants in Affected District</th></tr>
<tr><td></td><td>industry. Major exportable item is glass beads.</td><td></td></tr>
<tr><td>Agra</td><td>Agra is developed as tourist centre, Centre for Shoe Industry, educational hub over the period of time. Agra is also known as the Handicraft City. Foundry Industry is also age old .The city is under supervision of a permanent Committee of Hon'ble Supreme court for monitoring pollution level. An area known as Taj Trapezium Zone was made to check the pollution level around Taj Mahal. Hence Pollution free Industry has a lot of potential for setting up industries to attract people to settle.
There are 6 industrial areas in total in Agra district, having 709 production units in total. There are total 6,746 existing units of micro & small enterprises and Artisan units in the district. Existing Clusters of Micro & Small Enterprise include major clusters of Shoe, Marble Handicraft, Carpet are main cluster of Agra district having 90 functional units of carpet cluster, 2500 functional registered and unregistered units of stone and marbles craft and 5000 units of shoe cluster.</td><td></td></tr>
<tr><td>Aligarh</td><td>There are total 2558 units of small enterprises and artisan units. This category includes agro based, soda water, cotton textiles, Woolen, silk & artificial Thread based clothes, jute and jute based, readymade garments & embroidery, wood / wooden based furniture, paper and paper products, leather based, chemical based and rubber, plastic and petro based type of industries. Details of industrial areas is given below in the table
<table>
<tr><th>S. No.</th><th>Name of Ind. Area</th><th>No of allotted Plots</th><th>No. of Units in Production</th></tr>
<tr><td>1</td><td>Indl estate Exhibition ground</td><td>130,
31 shed</td><td>154</td></tr>
<tr><td>2</td><td>Indl estate Atrauli</td><td>24</td><td>5</td></tr>
<tr><td>3</td><td>Tala Nagari Sector 1</td><td>863</td><td>150</td></tr>
<tr><td>4</td><td>Tala Nagari Sector 2</td><td>398</td><td>80</td></tr>
<tr><td>5</td><td>CDF Indl Area</td><td>113</td><td>1</td></tr>
<tr><td colspan="2">Total</td><td>1528, 31 shed</td><td>390</td></tr>
</table></td><td></td></tr>
<tr><td>Bulandsehar</td><td>There are 5 industrial areas in Bulandshahr, details are given below:
1. UPSIDC I/A Sikandrabad- 1400 acres (yeast, pipe, alcohol, pesticide, ceramic tiles and paints)
2. UPSIDC I/A Junction Road Khurja- 25 acres (Pottery & dairy)
3. Govt Industrial Estate Khurja-4.67 acres (meat processing & slaughter house)
Land has been acquired for development of 2 industrial areas at Chola by UPSIDC (27 acres) & Khurja bu UPSIDC (1200 acres). Total registered units are 5565 nos. Major industries are agro based, cotton textile, readymade garments & embroidery, wood/wooden furniture, paper & paper products, leather based, chemical/chemical based, rubber, plastic & petro based, metal based, engineering units, electrical machinery and transport equipment, repairing & servicing and others. There are 25 large scale and 5 medium scale industries. Major exportable</td><td>THDC India Ltd. (1320 MW), Khurja, Bulandshahr-planning</td></tr>
</table>

District	Industrial Profile of Affected District	List of Planned & Existing Power Plants in Affected District
	item are ceramic items and steel pipes. No. of brick kiln-385, cold stores-36	
Gautam Budh Nagar	There are 3 industrial areas in the district, i.e. Noida Ph-I, Sec-1, 11, 16 (393 ha), Noida Ph-II 100/export (259 ha) & Noida Ph-III Sec 57-64 (376 ha). Total nos. of registered units are 1063 & actual are 6349 nos. No of medium & large scale industries are 359. Type of industries are food based, beverages, tobacco, cotton textile, wool, silk & synthetic fibre textile, Jute, remp & mesta textile, hosiery & garments, wood products, paper products & printing, leather products, rubber & plastic products, chemical/chemical products, non-metallic mineral products, basic metal & metal products, machinery & parts, electrical machinery & apparatus, transport equipments & parts, manufacturing industries, repairing industries, electronics, telecommunication. Major exportable items are electronics, textile products, engg, computer software and ceramic products	Noida Power Co. Ltd. (400 MW), Greater Noida-planning GMR Group (1200 MW), Mathurapur Village, UP-planning National Capital TPP, Vidyutnagar, Gautam Budh Nagar (1820 MW)-functional Gas based power plant-829.78 MW 5 MW Solar power plan, dadri-functional
Fathepur	There are 8 industrial areas in the district at Fathepur (4284 sq m), Itraura (4368 sq m), Rampur Ghariyo (3444 sq m), Saray Jagat (3864 sq m), Sujrahi (4032 sq m), Trilokpuri (3444 ha), Sadhuwapur (3024 sq m), Chak Hata (3024 sq m). Total industrial units in the area are 11640, out of which 12 are medium and small scale. Major industries are agro based, soda water, cotton textile, readymade garments & embroidery, wood/wooden furniture, paper & paper products, leather based, chemical/chemical based, rubber, plastic & petro based, metal based, engineering units, electrical machinery and transport equipment, leather/leather products repairing & servicing and others. Major exportable items are leather exports & handicrafts	
Kaushambi	There are two industrial areas in the district, mini industrial area at Parshara (1.484 ha) & Madhupur Block Newada (1.027 ha). Total nos. of registered industrial units are 2231, whereas total industrial units are 3852. Major industries are agro based, cotton textile, readymade garments & embroidery, Woolen, silk & artificial Thread based clothes, Jute & jute based, wood/wooden furniture, paper & paper products, , chemical / chemical based, metal based, engineering units, electrical machinery, repairing & servicing and others.	
Allahabad	There are 5 industrial areas in the district, they are: UPSIDC Naini (314.57 ha), DIC Naini (26.942 ha), MNNIT Teliyarganj (7.6 ha), Udyog Nagar (10 ha) & Phoolpur (10 ha). Apart from this there are three mini industrial areas, i.e. Saraon, Meja & Handia. Nos. of industrial unit in district are 10047. Out of this 6 are large scale & 5 are medium scale units.	Jaiprakash Associates Ltd (1320 MW), karchana, Allahabad-planning NTPC Ltd (1320 Ltd), Meja-functional & 1320 MW more under planning Allahabad UP Power Corp Ltd (1980 MW), Bara

District	Industrial Profile of Affected District	List of Planned & Existing Power Plants in Affected District
		Allahabad-planning
Mirzapur	There are 5 industrial areas in the district, that is at Mirzapur (15.212 ha), Chunar (11.47 ha), Ramnagar (2.12 ha), Ghatampur (2.5 ha) & Rajgadh (2.5 ha). Total industrial units are 5274, all are small scale and only 1 is medium scale industry & 5 large scale industries. Major industries are agro based, readymade garments & embroidery, Woolen, silk & artificial Thread based clothes, Jute & jute based, wood/wooden furniture, paper & paper products, leather based, chemical / chemical based, rubber, plastic & petro based, mineral based, metal based, engineering units, electrical machinery & transport equipment, repairing & servicing and others (brick manufacturing, parlour, photography etc).	Shanti Gopal Concast Ltd. (25 MW), Dhauha, Mirzapur-implementation
Chanduli	There are two industrial areas in the district, they are Ramnagar Phase 1 (305 ha) & Phase 2 (150 ha). Nos of industrial units in the district are 3039, out of which 7 are large and medium scale industries. Major industries are agro based, soda water, cotton textile, readymade garments & embroidery, Woolen, silk & artificial Thread based clothes, wood/wooden furniture, paper & paper products, leather based, chemical / chemical based, rubber, plastic & petro based, mineral based, metal based, engineering units, electrical machinery & transport equipment, repairing & servicing and others	Nil
Ghaziabad	There are 12 industrial areas in the district, they are Loni Estate (2.18 acres), Site 1 Bulandshahr Road (170.65 acre), Site 2 Loni Road (79.48 acres), Site 3 Meerut Road (116.26 acres), Site 4 Sahibabad (563.09 acres), South side of GT Road (138.06 acres), Masoori Gulawati Road (309.36 acres), Kavi Nagar, Sec-17 (60.28 acres), Sec-22, Meerut Road (36.71 acres), Loha Mandi (13.3 acres), Site-2, Loni Road Harsha (13 acres), Udyog Kunj (14.37 acres). Nos. of industrial units are 5957 (1796 registered) out of this 35 units are large units and 14 units are medium scale. Major exportable items are home furnishing, automotive fabrics, fashion accessories, frozen meat, beer & pharmaceuticals, steel ingot, bicycle, ayurvedic medicine, electronics parts, polyster buttons, white crystal sugar, PU foam, automobile piston & rings, stainless steel wires & bars, high & low carbon steel wires, plastic moulded furniture, steel blades & alloy steel & craft paper. Major industries are agro based, soda water, cotton textile, readymade garments & embroidery, Woolen & silk based textile, wood/wooden furniture, paper & paper products, rubber, plastic & petro based, mineral based, metal based, engineering units, electrical machinery & transport equipment, repairing & servicing and others	Reliance Energy Generation Ltd (1320 MW), Dehra, Ghaziabad-planning
Hapur	Hapur (Haripur) is a major industrial town in the National Capital Region area of western Uttar Pradesh. There are approximate 25 factories of paper cone in Hapur. The town is famous for its 'paper', though some other industries have also come up. Pilkhuwa is a famous for its handloom-made bed sheets	Nil
Meerut	There are 4 industrial areas in the district, they are Govt. Industrial estate, Partapur (16.18 acres), Sports good complex (12.72 acres), Partapur Industrial area (12.34 acres), Udyogpuram (72.83 acres). Total nos. of industrial units 8197 nos., out of which 13 are medium & large units. Major export items are sports goods, musical instruments & frozen meat Major industries are agro based, cotton textile, readymade garments & embroidery, Woolen & silk based textile, wood/wooden furniture,	Nil

District	Industrial Profile of Affected District	List of Planned & Existing Power Plants in Affected District
	leather based, chemical/chemical based, paper & paper products, rubber, plastic & petro based, mineral based, metal based, engineering units, electrical machinery & transport equipment, repairing & servicing and others	
Muzaffarnagar	There are 5 industrial areas within the district, they are Suzadu I/A (8.582 ha), Shamli I/A (6.962 ha), Mini I/A, Kandhla (2.048 ha), Mini I/A, Shahpur (31.556 ha), Begrajpur I/A (31.556 ha). Apart from this there is an unorganized sector in Shamli area in which 50 units operate. Total industrial units are 26446 out of which 64 are large and medium scale units. Major industries are agro based, sugar/gur, readymade garments & embroidery, wood/wooden furniture, chemical/chemical products, paper & paper products, metal based, engineering units, electrical machinery & transport equipment, repairing & servicing and others	Nil
Saharanpur	There are 5 industrial areas in the district, they are Pilkhani I/A (95 ha), Mini I/E Ambehtapeer, Mini I/E Titron, I.E Rly Road Deoband (30 acres), I/A at Delhi Road Saharanpur (30 acres). Total nos. of industrial units in the district are 12172 out of which 32 are medium & large scale industries. Major exportable items are wooden Craft paper, sugar, milk powder, medicine (ayurvedic) Major industries are agro based, soda water, cotton textile, woolen silk & artificial thread based clothes, jute & jute based, readymade garments & embroidery, wood/wooden furniture, chemical / chemical products, paper & paper products, leather based, rubber, plastic & petro based, mineral based, metal based (steel Fab/foundry), machinery & parts, engineering units, electrical machinery & transport equipment, repairing & servicing and Misc Mfg (Cigarettes, distillery, wooden crafts, sugar, shoes, mango & fruit pulp etc)	Nil
Yamunanagar	There are 3 industrial estates in the district, they are IE Manakpur phase 1 (54.50 ha), IE Yamuna nagar phase 1 (8.09 ha) & IE Yamuna Nagar phase II (8.90 ha). One industrial estate Manakpur phase-II covering area of 104.43 ha will be developed. Total nos. of industrial units are 3250 nos. Nos. of large & medium scale industries in the district are 14 nos. Major exportable items are engineering goods, stainless steel & aluminum utensils, plywood, dairy equipments etc. Major industries are agro based, readymade garments & embroidery, wood/wooden furniture, chemical / chemical products, paper & paper products, metal based, engineering units, repairing & servicing	DCRTPP -600 MW, Yamunanagar 800 MW Supercritical thermal unit at Yamuna nagar
Ambala	There are 3 industrial areas in Ambala, they are HSIDC Ambala Cantt (50.421 ha), Industrial growth centre Saha phase 1 (410.26 ha) & Industrial growth centre Saha Phase 2 is proposed to be developed in area of 250 acres. Total nos. of industrial units are 3536 nos. out of this 7 are medium & large units Major industries are agro based, soda water, cotton textile, woolen, silk & artificial thread based clothes, readymade garments & embroidery, wood/wooden furniture, chemical / chemical products, paper & paper products, metal based, engineering units, leather based, rubber, plastic & petro based, mineral based, electrical machinery & transport equipment, repairing & servicing. Major exportable items are scientific instruments, electrical appliances, agriculture implements	
Fatehgarh Sahib	There is one industrial area in Mandi Gobindgarh covering area of	

District	Industrial Profile of Affected District	List of Planned & Existing Power Plants in Affected District
	204.05 acres. Nos. of industrial units are 3125 out of which 12 are large and medium scale units. Most of the industries in the area are closing due to unavailability of the raw material. Major exportable item is frozen food, vegetables, steel re-rolling sheets. Major type of industries in area are steel re-rolling mills, textiles, apparels, leather products, breweries, printing, chemicals, food products/beverages, wood products, rubber & plastic products, metallic products, basic metals, machinery & equipment, radio TV communication equipment, motor vehicles trailers etc, transport equipment, furniture, recycling, motor vehicle & household good repairing, cold storage and other service activities	
Patiala	There are 5 industrial areas in the district, they are I/E Patiyala (13 acres), I/E, Rajpura (51 acres), Focal Point Rajpura (12 acres), Focal Point Nabha (50 acres) & Focal Point Patiala (180 acres). There are total 8040 nos. of units, out of which 31 are medium & large units. Major exportable items are pistons pins & milk products Major type of industries in area are steel re-rolling mills, textiles, wearing apparel, food products / beverages, paper & paper products, printing, coke & refined petroleum products, chemical & chemical products, wood products, rubber & plastic products, metallic products, basic metals, machinery & equipment, radio TV communication equipment, motor vehicles trailers etc, transport equipment, furniture, recycling, motor vehicle & household good repairing, cold storage and other service activities, computer education, recreational culture activities & others.	Rajpura TPP (700 MW)
Ludhiana	There are 6 industrial areas, they are Focal point (Phase I-VIII), Focal point, Khanna, Focal point, Raikot, Industrial area A, Ludhiyana, Industrial area B, Ludhiyana & Industrial Estate, Ludhiyan. Total nos. of industrial units in the district are 39207, out of which 116 nos. are medium & large units. Major exportable items are textile, garment & apparel, cycle parts, fasteners, electronics item, electroplating, food products, milk products, agriculture implements, auto parts & repairing, hand tools, machine tools and electronics items. Major type of industries in area are steel re-rolling mills, textiles, wearing apparel, food products / beverages, paper & paper products, printing, coke & refined petroleum products, chemical & chemical products, wood products, rubber & plastic products, metallic products, basic metals, machinery & equipment, radio TV communication equipment, motor vehicles trailers etc, transport equipment, furniture, recycling, motor vehicle & household good repairing, cold storage and other service activities, computer education, recreational culture activities & others.	

5.5 External Environment & Social Drivers

External environment & social drivers includes the natural disasters like earthquake, cyclones, fires, forest fires, volcanic eruptions, immigration, emigration etc. Some of the drivers which will affect the EDFC development project or which will affect the surrounding areas are given below:

Earthquakes: As described in earlier section, area falls within seismic zone III & IV as per BIS classification. This zone has experienced various earthquakes in past and have recorded high causality & loss of property. Occurrence of earthquake has potential to disturb & disrupt

infrastructure, transportation, industrial operations, connectivity, communication etc, if occurs with severe intensity

Flood: Area falls under ganga River water System. Ganga is perennial river and flows through Allahabad, Meerut, Bulandshahr and many other district. Ganga River has experienced and recorded several devastating floods. Similarly floods also have potential to disrupt all infrastructural, communication, industrial, electricity operations in the area:

Immigration & Emigration: Whenever there are some developments in part of the state or country, there is possibility of movement of population to the activity zone in search of employment. Thus the areas proposed and identified as major development area may experience high immigration. Thus for these areas, infrastructural development is essentially to be taken in phased manner as per requirement. Young/Work force population from rural areas may migrate into these regions.

5.6 Identification of Hotspots on Basis of Baseline Study

From the above study, areas has been identified which are sensitive or the areas where status of VECs is critical. These areas are considered as hotspots which will experience maximum stress in future, i.e. post development of EDFC and other identified developments. These identified Hotspots as per baseline study is given in **Table 5.32 below**.

Table 5.32: Identified Hotspots on Basis of Baseline Study

S. No.	Zones	Criteria
1.	EDFC-1 (major hotspot-Agra & Firozabad TTZ)	**This zone is highly sensitive as it falls under TTZ**. Any increase in pollutant concentration will show multiplied impact due to sensitivity as compared to other zones.
2.	EDFC-1 (Kanpur Dehat, Auraiya & Etwah)	**Infrastructure facilities in the area are poor and already stressed due to existing developments.** Also land resources are available in Etawah and Auraiya area. These developments will impact already scarce existing infrastructure facilities in the area.
3.	EDFC-2 (major hotspot-Kanpur Nagar)	Kanpur Nagar is major industrialized area in Uttar Pradesh known for tanneries/leather producing industries, which are highly polluting. Kanpur was also declared as CEPI zone. **Baseline conditions of area are already critical**. These developments will significantly impact already stressed VECs
4.	EDFC-2 (major hotspot-Mugalsarai)	**Close vicinity to Varanasi, which is highly populated city and area for development of inland water terminal make it zone foreseeable for future development.**
5.	EDFC-2 (Mirzapur)	**Varanasi to Mirzapur zone was also declared as CEPI zone.**
6.	EDFC-3 (major hotspots-Ludhiana)	Ludhiana area is highly polluted, was declared as CEPI zone and also notified zone by CGWB. **Baseline conditions of area are critical.**

These zones have been already marked in Maps shown in either chapter 3 or chapter 4.

5.7 Conclusion

Baseline study has been conducted to assess the existing condition or status of the identified VECs in the study area. Baseline study has been carried out on the basis of secondary information collected from EIA/SIA study of proposed EDFC sections, data from pollution control boards, IMD, Agricultural departments and other Governmental Organization. Baseline study has provided the details of condition of identified VECs along the EDFC and of the district through which EDFC traverse. Through baseline study it has been identified that RPM concentration in air and noise levels in major town & cities is higher than NAAQS. Ground water quality and yield of aquifers in the study area is good. However contamination of ground water has been reported at many locations in study area. Ground water pollution is reported due leaching of industrial pollutants and usage of excess fertilizers. Ground water pollution is reported in Kanpur Nagar, Ludhiana, Firozabad and other districts. Surface water in the study area has been assessed and it has been found the rivers like Ganga, Kali, Hindon, Yamuna are highly polluted especially in downstream of the major towns & cities. All the districts do not have adequate sewage and effluent treatment facilities. Waste management system in the districts is also not adequate. No major eco-sensitive zone is identified within the study area. No archaeological site except budiya ka Taal is identified within study area (along EDFC-1). For development of EDFC, large area of agricultural land has been acquired. Land resources at many locations like Kanpur Nagar, Ludhiana, Patiala etc are already stressed. Future developments will further stress the land resources within these areas. Topography of the area through which EDFC traverse is plain and geologically the study area is formed of younger alluvium of Ganga basin. Soil in this region is prone to erosion. Being alluvial, the soil is fertile and supports good crops. However, soil salinity problem is reported in some of the districts due to usage of excess fertilizers and irrigation. As per BIS classification, study area is classified as Zone III & Zone IV and has moderate to high seismic risk. Population density in the districts through which EDFC traverse varies from moderate to high. High population density is reported in Kanpur nagar, Ludhiana, Allahabad, Muzaffarnagar and other zones. This has given us the details of the area which are already stressed and polluted. This data has helped to identify the significance of the impact on the VECs condition and has provided the basis of carrying out the impact assessment study.

CHAPTER 6: CUMULATIVE IMAPCT ASSESSMENT

6.1 Introduction

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as "developments") when added to other existing, planned, and/or reasonably anticipated future ones. For practical reasons, the identification and management of cumulative impacts are limited to those effects generally recognized as important on the basis of scientific concerns and/or concerns of affected communities. Multiple and successive environmental and social impacts from existing developments, combined with the potential incremental impacts resulting from proposed and/or anticipated future developments, may result in significant cumulative impacts that would not be expected in the case of a stand-alone development.

Cumulative impacts are contextual and encompass a broad spectrum of impacts at different spatial and temporal scales. In this case, cumulative impacts occur because a series of projects of the same type and correlated to each other are being developed; for example, when several development projects are planned or constructed along the EDFC or within the same stretch, when multiple roads projects and waterways projects are developed in close proximity, or when a number of logistic hubs, industrial areas are constructed or planned within the same flyway or region.

Cumulative Impact Assessment study for EDFC Corridor includes quantitative and qualitative assessment of the impacts which will be cumulatively caused by the existing development, EDFC development, other proposed / planned developments and anticipated developments. Zones for which cumulative assessment will be carried out are identified as hotspots on the basis of outputs of desktop study, baseline study and stakeholder consultation. Final hotspots for which CIA study has been carried out is given in section below.

6.2 Finalization of Hotspots for Cumulative Impact Assessment

Hotspots are identified on the basis of literature review, stakeholder consultation and baseline study independently. Finalized hotspots are selected by combining the information on hotspots obtained from literature review, stakeholder consultation and baseline study. It has been found that some of the hotspots identified were common in all the three studies. List of final hotspots along with the reasons for selection of these zones is given in **Table 6.1**. These hotspots are also marked on the maps and are given in **Figure 6.1-6.7.** Details of existing developments and condition of VECs in these zones and the proposed/planned & anticipated developments which can further affect the conditions of VECs are briefed in **Table 6.2.**

Table 6.1: Finalized Hotspots Selected for CIA Study

S. No.	Hotspots	Criteria
10.	EDFC-1 (major hotspot Khurja to Bodaki)	This zone can experience high industrial growth and urbanization in future as land resources are available in plenty and connectivity will be improved due to development of EDFC and existing road infrastructure. Zone is **foreseeable as industrial hub/belt in future**
11.	EDFC-1 (major hotspot-Agra & Firozabad TTZ)	**This zone is highly sensitive as it falls under TTZ**. Any increase in pollutant concentration will show multiplied impact due to sensitivity as compared to other zones.
12.	EDFC-1 (Kanpur Dehat, Auraiya & Etwah)	Zone caters varied kind of industries. **Infrastructure facilities in the area are poor and already stressed due to existing developments.** As per stakeholder consultation, Kanpur Dehat, Auraiya and Etawah are zones identified for major developments like new industrial areas, plastic cities, townships, logistic hubs etc. Also land resources are available in Etawah and Auraiya area. These developments will impact already scarce existing infrastructure facilities in the area.
13.	EDFC-2 (major hotspot-Kanpur Nagar)	Kanpur Nagar is major industrialized area in Uttar Pradesh known for tanneries/leather producing industries, which are highly polluting. Kanpur was also declared as CEPI zone. **Baseline conditions of area are already critical**. Zone has also potential to absorb further proposed and anticipated developments like logistic hubs, industrial zones etc. These developments will significantly impact already stressed VECs
14.	EDFC-2 (major hotspot-Mugalsarai)	Mugalsarai lies within Chandauli District. District does not have major developments but its **close vicinity to Varanasi, which is highly populated city and area for development of inland water terminal make it zone foreseeable for future development.**
15.	EDFC-2 (Allahabad)	Allahabad is zone for high industrial and residential activities. Industries are not of polluting nature. In lieu of large area of the district, large land resources are available in the area. **This zone has high potential for catering large industrial and residential developments**.
16.	EDFC-2 (Mirzapur)	Area has various industrial areas and also various industrial areas are under implementation. **Varanasi to Mirzapur zone was also declared as CEPI zone.** Also zone has potential to receive various developments. Thus this zone is anticipated to experience cumulative impacts
17.	EDFC-2 (Kasuhambi)	It is anticipated with development of EDFC, **immediate industrial & infrastructural growth is expected in this region due to availability of land resources**. Also residential developments may come up within study area but in period of 4-5 years
18.	EDFC-3 (major hotspots-Ludhiana-)	Ludhiana area is highly polluted, was declared as CEPI zone and also notified zone by CGWB. **Baseline conditions of area are critical.** Area supports large nos. of industries and both of polluting and non polluting types. Also various mega projects are under proposal in this zone. Thus impacts due to existing and anticipated developments in this zone will be severe and zone is thus considered for assessment of cumulative impacts. Patiala is also notified zone by CGWB and Mandigobindgarh was also categorized as CEPI zone. Thus in this zone all the three districts are considered.

Table 6.2: Zones within Study Area Having Potential to be impacted

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
1.	**EDFC-1 (major hotspot Khurja to Bodaki)**	• 2 Industrial areas at Khurja. Major industries are pottery, dairy, meat processing & slaughter houses • No I/A within Dadri • Major settlement-Khurja, Dadri & Greater Noida • National Capital TPP (1820 MW), Dadri • Roads/highways: NH-91, SH-63, SH-65	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) due to high industrialization and vehicular movement • Noida in Gautam Budh Nagar was classified as CEPI zone (moratorium lifted). Zone sensitive and will be significantly impacted with even addition of small quantity of pollutants • Ground water depletion in Noida & Greater Noida at very high rate. Khurja-over exploited zone. Ghaziabad is notified zone by CGWB. Water based industries/urbanization may further intensify the impact on ground water resources. • Kali Nadi & Karwan	• Air Quality • Water Quality • Water Resources • Noise levels • Bio-diversity • Soil Quality • Existing Resources • Health	• Development of EDFC • Unloading & loading Yard of DFCCIL • DFCCIL line from Khurja to Dadri • 1320 MW TPP by THDC India Ltd. under planning at Khurja • 1200 MW (GMR) & 400 MW (Noida power corp.) under planning at G. Noida	• Logistic park in Dadri (DMIC) • Dadri-Noida-Ghaziabad region is identified as major investment hub • Bodaki to be developed as multi-modal transit hub (DMIC & GNIDA) • 300 acres Industrial township in Azayabpur • 200 sq km industrial zone (DMIC & GNIDA)	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
			Nadi highly polluted. Insufficient STP capacity at Khurja. No CETP in industrial area. Thus all proposed development have potential to increase the pollutant load to the surface water bodies which may make them inhabitable for aquatic organisms • Noise level in Khurja higher than permissible limit, CPCB. Noise levels can further be increased due to proposed developments. • Vibrations are high near the railway track but are not felt at larger distance from track • Wetlands of Yamuna River & Sheikha Jheel at Aligarh Falls within 10 km area of EDFC alignment • No facility for waste management in				

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
			Bulandshahar (Khurja) thus piled up municipal waste in low lying areas. Littering and unmanaged waste has potential to cause various health hazards • High population. Population growth rate of 20% in Bulandshahr & 37% in Gautam Budh Nagar				
2.	**EDFC-1 (major hotspot-Agra & Firozabad TTZ)**	• Agra-tourist centre • 6 I/As in Agra-shoe industry, handicraft, marble, carpet • 5 I/As in Firozabad-glass, readymade garments, embroidery, wood/wood based, furniture, rubber etc • Lucknow Agra Expressway under construction • Agriculture belt of the region • Major settlements: Agra, Tundla, Firozabad • Roads/Highways: NH-3, NH-11, NH-2,	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • Agra was declared as CEPI (moratorium lifted) & very sensitive due to TTZ zone • High noise levels at Firozabad & Agra (commercial, industrial and residential areas) • High TDS in ground water. High BOD & low DO in down streams of Yamuna • Insufficient STP	• Air Quality • Water Quality • Noise level • Soil quality • Health	• Development of EDFC - EDFC alignment crosses TTZ Area • Unloading & Loading yard of DFCCIL at Tundla • Potential sector for service industries	• Taj International Airport	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
		NH-93, SH-31 etc	capacity at Agra and none at Firozabad • Municipal waste management facility available at Agra & none in Firozabad thus increased waste littering				
3.	**EDFC-1 (Kanpur Dehat, Auraiya & Etwah)**	• Land acquired by CONCORD near Maitha, Kanpur Dehat to develop container depot • 4 I/As, 3 small I/As & 1 plastic city a Kanpur Dehat-leather, detergent, handloom, utensils etc. and industrial development in Bhognipur & Amraudha area • 4 I/As & plastic city-Daal, Ghee, soda water, steel, cement etc.-Auraiya • 2 rural I/As & 1 large I/A-paper, wood, leather, rubber-Etawah • Major settlement: Bhaupur, Etawah, Bharthna • Major roads: NH-2,	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • No significant impact on water resources & water quality • Water logging problems near canals • Ground water is slightly alkaline and high nitrate conc. in Auraiya. Ground water shows declining trend in both the districts. Iron Conc. in Etawah high • High polluted waters of River Kali, Pandu & Ganga • Wetland tanks near Fathepur lies within 10 kms of EDFC alignment	• Air Quality • Water Quality • Existing Resources • Health • Soil Quality	• Development of EDFC • Logistic parks on important EDFC stations like Bhaupur & Ekdil • Industrial belts proposed near every major junction of DFCCIL (proposal for notify 5 km strip near EDFC-1 sent to GoUP from UPSIDC to ensure organized industrial development and to prevent haphazard LA for development	• Residential colonies near Plastic city at Auraiya • MMEZ proposed between Auriaya and Etwah	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
		SH-46, MDR-85 C, Sahayal road, SH-40, Bharthana Etawah road, NH-92, SH-62 • TPP at Lalitpur, Kanpur Dehat at implementation stage	• No municipal solid waste facility is available at these districts. Solid waste is dumped in open. • High Population Density in Kanpur Dehat		by private parties)		
4.	**EDFC-2 (major hotspot-Kanpur Nagar)**	• 7 I/As, Dada Nagar Hosiery park & apparel park at Ruma-leather, textile, hosiery, readymade garments, embroidery, soda water etc. • TPP under implementation (75 MW) • 220 MW TPP existing • Major settlement-Kanpur • Major roads: NH-91, NH-2, NH-29, NH-86, SH-38 & SH-58	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • Kanpur was categorized as CEPI zone (moratorium lifted) • Ground water alkaline. Fe & Cu conc. high due to contamination with industrial effluents • High BOD & T. coliform and low DO in River Ganga (both up stream & downstream) • Insufficient CSTP capacity due to which high surface water pollution • Insufficient CETP capacity to treat industrial effluent	• Air Quality • Water Quality • Water resources • Soil Quality • Health • Bio-diversity • Existing Resources • Land Resources	• Development of EDFC • Connectivity of DFCCIL to Logistic hub at Kanpur (6000 ha) • 660 MW TPP under planning	• Multi-purpose SEZ at Lakhanpur (Textile, Leather, Engineering Goods & FTWZ) • 6 laning of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687 • 2 laning with pave shoulder of Kanpur-Kabrai of NH-86. (PCOD issued on 5 May) • 6-laning of Chakeri to Allahabad of NH-2 from	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
			• Facility available for dumping of MSW but improper waste collection & management system in the district.			km 483.687 to 628.753	
5.	**EDFC-2 (major hotspot-Mugalsarai)**	• 5 Nos dams at Chandauli (Naugarh, Mushakhard, Chandraprabha, Latifshah & Bhaisoda) • 3 Nos. canal (Chandraprabha, Mushakahad & Narayanpur lift canal) • Two I/As in Chandauli-woolen, silk, artificial thread, rubber, plastic & petro based • Major roads: Mugalsarai Chahaniya road, MDR 65 E, Sakaldiha Mugalsarai Hwy & NH-2 • Major populated area-Mugalsarai, Chanduali, Ramnagar & BHU	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • Varanasi-Mirzapur was classified as CEPI (moratorium lifted) • Turtle Sanctuary at Ramnagar Varanasi within 10 area of EDFC alignment • High Population Density	• Air Quality • Water Quality • Soil Quality • Bio-diversity	• Development of EDFC • Widening works of ROB Bichhyya crossing, CDO office to Sakaldiha road	• Allahabd-Naini-Bara Investment Zone (3000 ha) • Various proposed industries at Mugalsarai • Strengthening of Chandauli-Sakaldiha-Saidpur road (SH-69) • Augmentation of NW-1 & inland water terminal proposed at Varanasi	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)
6.	**EDFC-2 (Allahabad)**	• Bachara Dam • Yamuna Bridge • 5 I/As & 3 mini I/As-ready garments, wood/wooden	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • High ground water	• Water Resources • Water Quality • Air Quality	• Development of EDFC • Bara TPP (3 X 660 MW), Karchana TPP	• Two proposed dams at Banjari Kalan & Khesampur village	• IT/ITES parks • Townships • Commercial areas • Logistic parks

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
		furniture, steel fabrication, engineering units, transport equipment etc • Major settlements: Allahabad, Bamraulli • Major roads: NH-2, NH-76, NH-96, NH-2, SH-9	exploitation in Karchana and EDFC will cross through Karchana • Water logging issues in the district • High EC, nitrate & Fe conc. found in the district except at Chand Khamria, Naini I/A & Shankargarh • Polluted waters of River Ganga & Yamuna • STP sufficient capacity available to treat sewage and treated sewage is discharged into River Ganga & Yamuna • MSW management facility available at district		(2 X 660 MW) & Meja TPP (3 X 660 MW) at Allahabad		• SEZ • Roads & highways (new & expansion)
7.	**EDFC-2 (Mirzapur)**	• Adwa Dam & Ahraura Dam • 8 Mini I/As under implementation • 25 MW captive power plant at Shahpuri • TPP under implementation	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • Varanasi to Mirzapur categorized as CEPI zone (moratorium lifted) due to bad air	• Air Quality • Water Quality • Water Resources • Soil Quality • Health	• Development of EDFC	• South Vindhyachal Industrial Area	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
		• Major settlements: Mirzapur, Vindhyachal, Rasulpur • Major roads: NH-76, NH-7, MDR-156 E & SH-5	& water quality • Nitrate conc. is found bit higher in ground water at some place • No waste management facility available at district and high quantity of waste is generated which is dumped openly				
8.	**EDFC-2 (Kasuhambi)**	• 2 I/As at Parshara & Madhupur Block Nawada • Roads: SH-24, MDR 26 B & NH-2 • Major settlements-Bharwari	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • High ground water extraction in this area	• Air Quality • Water Quality • Water	• Development of EDFC • Cold storage	• New industries like rice mill	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)
9.	**EDFC-3 (major hotspots-Ludhiana)**	**<u>Existing</u>** • 6 I/As-textile, garment, induction furnace, foundry, steel re-rolling, electroplating, galvanizing, wire drawing, phosphating etc • Major settlements-Ambala, Rajpura, Mandi Gobindgarh, Khanna, Doraha, Sanhewal & Ludhiana	• High concentration of PM_{10}, $PM_{2.5}$ (more than permissible limits) • Ludhiana & Mandigobindgarh categorized as CEPI (moratorium lifted) zone due to bad air & water quality • Ludhiana & Patiala notified by CGWB & high stage of ground water	• Land Resources • Air Quality • Water Quality • Water Resources	• Development of EDFC • 4 ROBs (Ludhiana-Mandi Gobindgarh), 6 RUBs	• Industrial textile park proposed at Duraha and Industrial focal point at Tanansu • Lining of two canals at Sirhind • Widening of NH-1 (Jalandar-Ambala)	• IT/ITES parks • Townships • Commercial areas • Logistic parks • SEZ • Roads & highways (new & expansion)

S. No.	Hotspots	Major Existing Development within Study Area	Baseline Information	Identified Affected VECs* as per Baseline Data	Proposed/Planned Development		Induced/Anticipated Developments
					DFCCIL Induced Developments	Independently Planned Developments	
		• Major roads-NH-1, NH-95, Hambran Road, Ludhiana road, Jalandhar-Raikot Road, SH-20, Ludhiana Bypass, Delhi Sanhewal road, Gill road, Jodhan-Raikot road, Ambala road, NH-64, NH-22, NH-72, NH-65	development due to excess water withdrawal • High nitrate level in ground water in Ludhiana. Ground water is alkaline in nature and High TDS value in both Ludiana & Patiala. • Budha Nallah is severely polluted which drains into Satluj River • Insufficient STP capacity to treat sewage from districts • MSW management Facility available in Ludhiana but not efficient				

*No further addition in VECs due to proposed Developments.

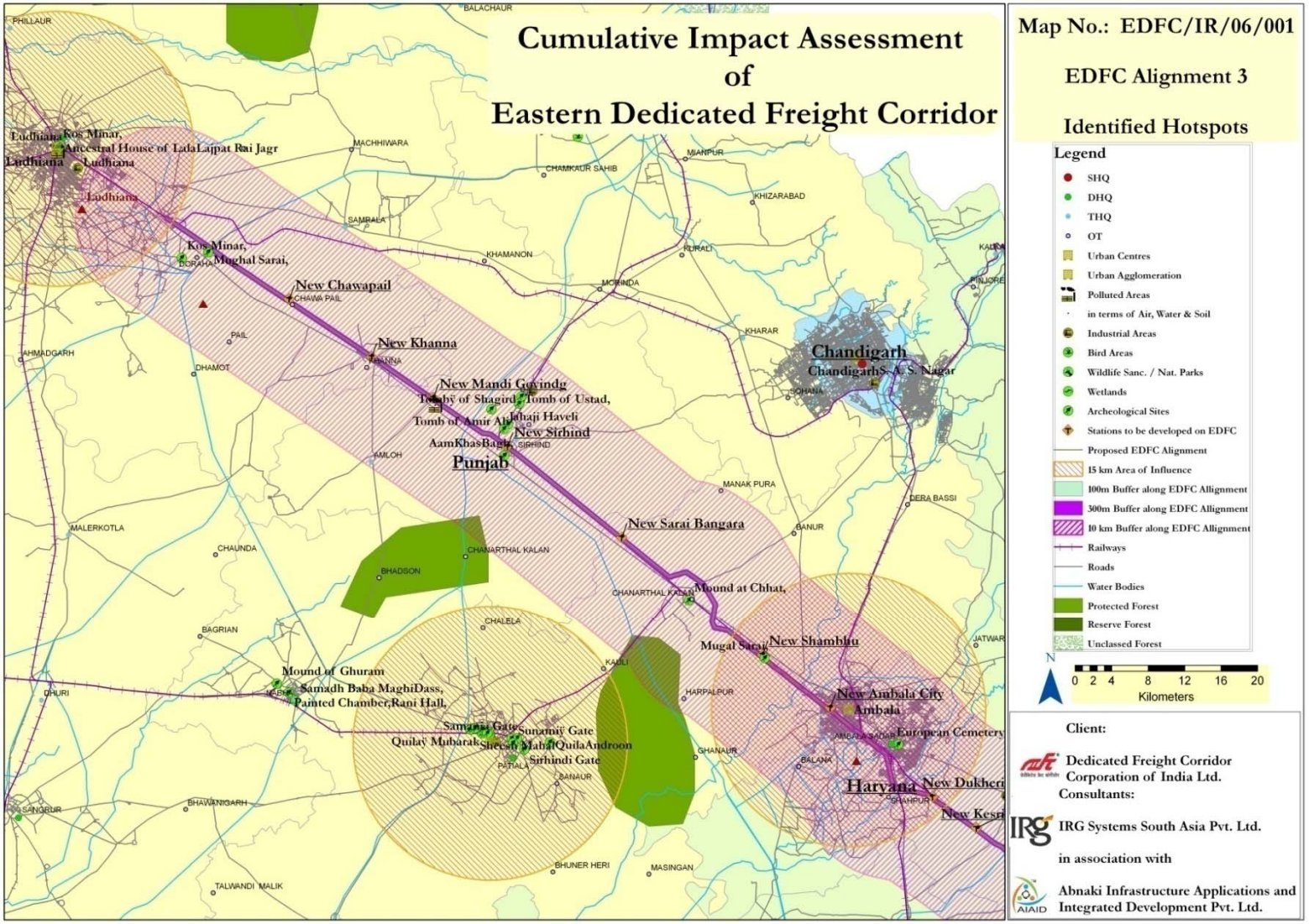


Figure 6.1: Map Showing Hotspots-Ludhiana Region (Ludhiana-Patiala-Mandigobindgarh)

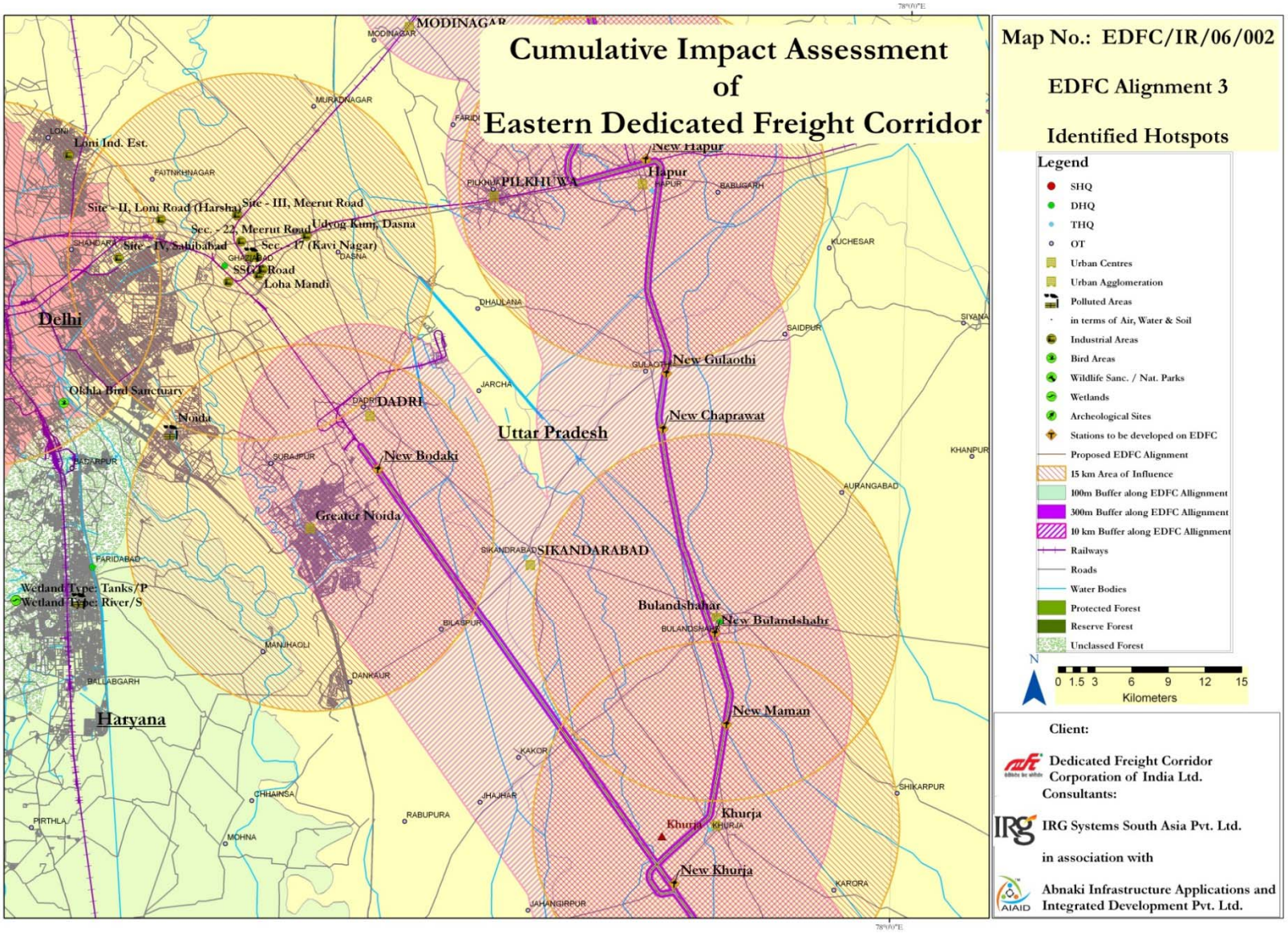


Figure 6.2: Map Showing Hotspots-Khurja to Bodaki Region

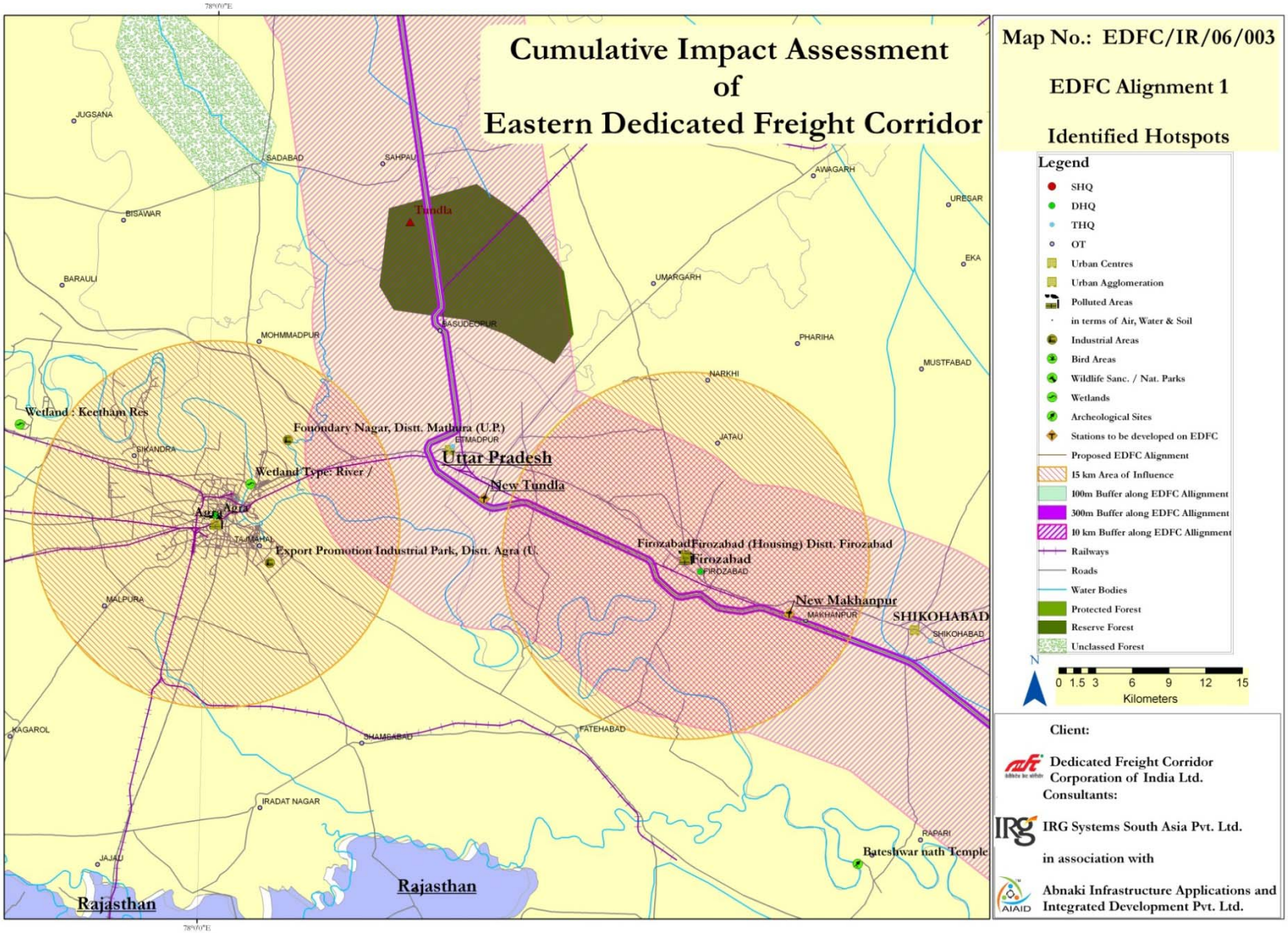


Figure 6.3: Map Showing Hotspots-Agra & Firozabad TTZ Area

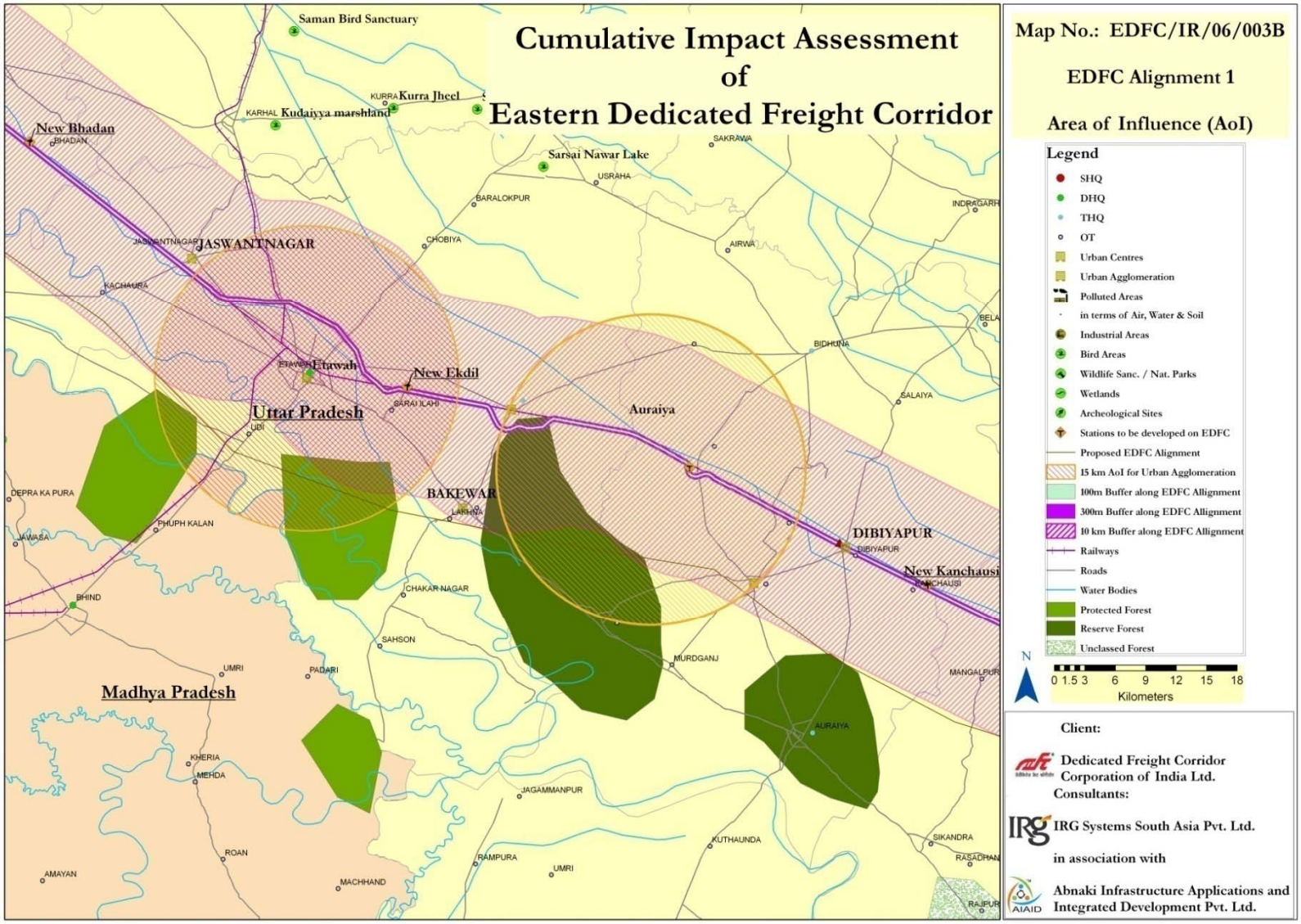


Figure 6.4: Map Showing Hotspots-Etawah & Auraiya Region

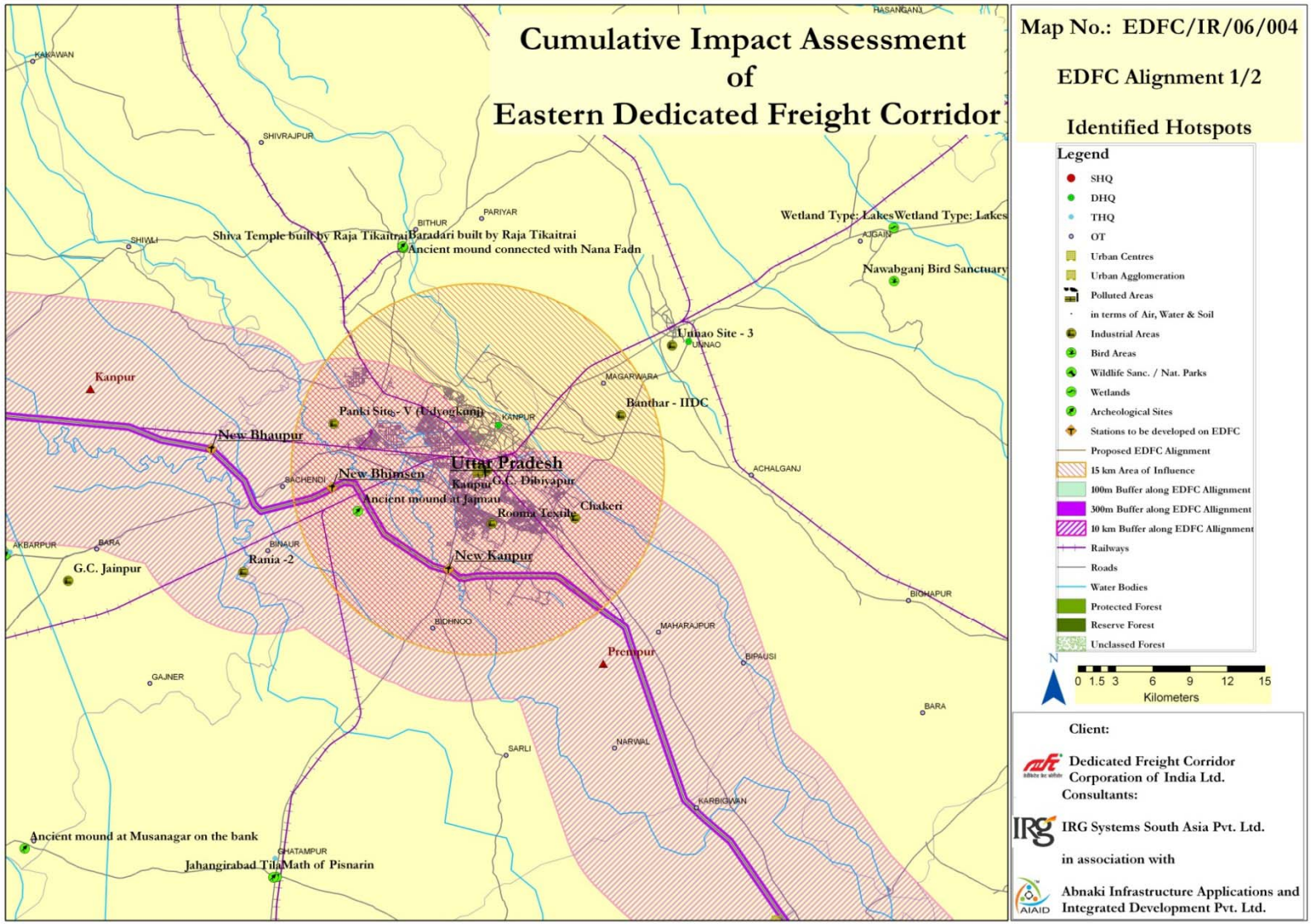


Figure 6.5: Map Showing Hotspots-Kanpur Dehat & Kanpur Nagar Region

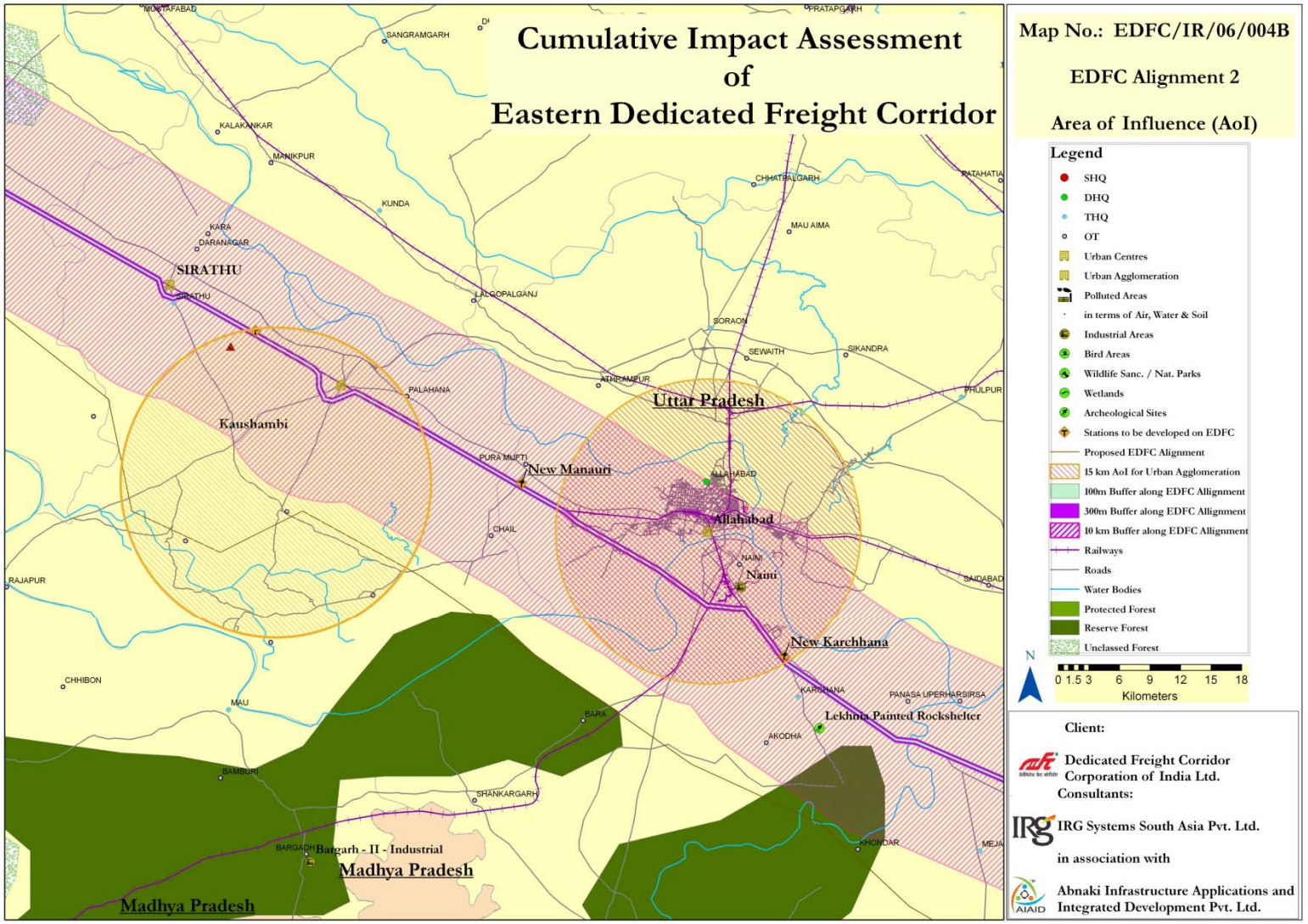


Figure 6.6: Map Showing Hotspots-Allahabad Region

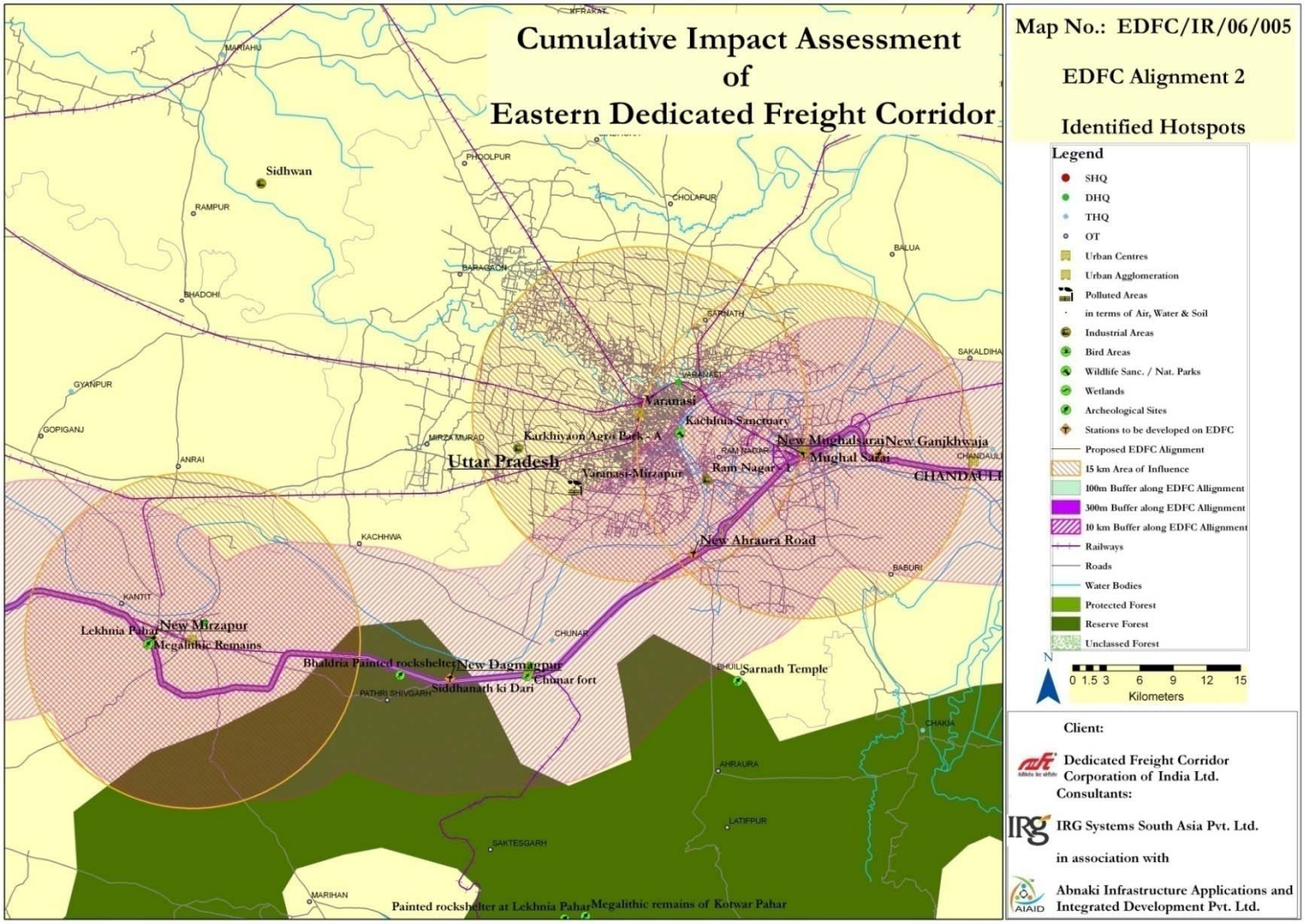


Figure.6 7: Map Showing Hotspots-Mugalsarai & Mirzapur Region

From the **Table 6.2** above it can be said that already majorly impacted VECs includes air quality, water resources, water quality, existing resources, bio-diversity, soil quality, land resources & health. So it is anticipated, the above identified proposed/planned/anticipated development may further impact these identified VECs. Apart from these VECs, other VECs identified in chapter 3 are also likely to be affected.

Also most of the above identified existing/proposed/planned developments lie within study area of 10 km distance from proposed EDFC development except Agra and its industrial areas and Ludhiana and some of its industrial areas. Thus the zone of impact of these developments may overlap with each other and existing development resulting into impact of larger magnitude and significance when compared to impact of individual development. To assess the cumulatively affected VECs it is essential to identify the VECs which will be affected individually by each of this development and the identification is done in section below.

6.3 Impact Identification Due to Proposed and Anticipated Developments

From the above table, it is identified that major proposed/planned/anticipated development includes the following:

1. Expansion of DFC/IR Track
2. Improvement/Construction of new roads/highways
3. Expansion/construction of new industrial areas
4. Augmentation of National Waterway 1
5. New townships
6. New Growth centre/logistic parks/warehouses
7. IT/ITES Parks
8. Loading & unloading yards
9. Expansion/Construction of new TPP
10. Expansion of existing towns (urban sprawling)
11. Urbanization of rural areas

All above developments are further broadly classified into 6 major heads which includes all above developments and they are listed below:

1. EDFC & Associated rail infrastructure development
2. Roads Developments
3. Industrial development
4. Infrastructural development
5. Urbanization
6. Waterways

An attempt has been made to make quantitative and qualitative assessment of the impacts of these developments independently on the VECs which are identified in Chapter 3 on basis of stakeholder consultation, expert's advice, DFCCIL's data, etc. is given in **Table 6.3**. Based on assumptions and applicable sectoral norms, details like area of development (for industries, commercial, residential, road development, growth in traffic, etc) has been worked out and impacts are quantified in terms of effluent/emission/water demand, etc. The anticipated impacts have been assessed as positive, negative and nil on the identified VECs. It is seen that proposed planned development will further impact VECs which are already impacted (as identified in **Table 6.1)** either by improving or

deteriorating the condition. It is however necessary to assess how these VECs and developments (existing, planned, proposed & anticipated) will interact with each other, resulting into cumulative impacts.

However, the anticipated negative impacts on identified VECs are localized, short term and transient in nature particularly in construction phase, which could be mitigated by implementation of environment and social management plans, applicable best practices of concerned sector(s), etc. Modal shift of freight from road to railway will further offset the anticipated impacts on negative VECs related to air quality, noise, etc. However, air quality will improve due to modal shift in operational phase of the project. Overall, it is anticipated that positive impacts like development of new infrastructure, creation of new employment opportunities, livelihood improvement leading to improved quality of life, socio-economic parameters, improved access to goods and services to be provided by the project will outweigh the anticipated negative impacts (which can be mitigated) and contribute to realisation of project objectives and intended benefits.

Quantitative assessment of impacts due to proposed, planned and anticipated developments in the study area is given in Annexure 6.1.

Table 6.3: Impacts Due to Proposed, Planned and Anticipated Developments in Study Area

Stretch	Areas	Proposed / Planned Development	1st Level Impact		2nd Level Quantification of Impact	Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
EDFC – 1 (344.16 Km)	Khurja, Bulandshahr	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC ▪ Dadri to Khurja																	
		Development of EDFC Stations Without Unloading & Loading (New Maman, New Bulandshahr)	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for Car=4/day PCU flow for two wheeler=43.2/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with connecting Road New Khurja (Junction Station) New Khurja – 2000 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person =60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for truck=700 /day PCU flow for Car=4/day PCU flow for two wheeler=43.2/day **Air Pollution** **CO=**857 g/kwh **NOx**=2000g/Kwh **PM**=11.43 g/kwh	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Developments	Increase in Commercial Area	Area=30 Acre Population=12141	Total Water requirement=546 KLD Waste Water Generation=437.07 KLD														

Stretch	Areas	Proposed / Planned Development	1st Level Impact		2nd Level Quantification of Impact	Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		▪ 1320 MW TPP by THDC India Ltd. under planning at Khurja				-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area=100 Acre Population=21780	Total water required=2.94 MLD Waste water generated=2.35 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity	380 Acre		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic Thermal power plants listed in 17 categories of highly polluting industries other than Red category industries categorized by CPCB.	Number of Bus=98 Number of Car=726	PCU flow for Bus=343/day PCU flow for Car=726/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Industrial Development	Increase in Industrial Area	**90 Acre population = 36362**															
			Increase in Commercial Area	**1.79 Acre Population=728 person**	Water Requirement=32.73 KLD Waste Water generation=26.19 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	**4173 Acre Residential Population=181812**	Water Requirement= 24.54 MLD Waste Water generation=19.63 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity	**22 Acre**		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=1212 Number of Bus=233	PCU flow for car=1212/day PCU flow Bus=818/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
	Aligarh	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC alignment crosses TTZ Area ▪ Potential sector for service industries ▪ **Crossing station & unloading/loading yard proposed at Daud Khan**																	
		Development of EDFC	Increase in Commercial Area		Area=0.074 Acre Total Water Required=1.35														

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		Stations Without Unloading & Loading New Hathras		Population=30	KLD Waste Water Generated=1.08 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area 3 Acre Population=150	Total Water Required=20.6 KLD Waste Water Generated=16.48 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=2 Number Of two wheeler=27	PCU flow for Car=2/day PCU flow for two wheeler=21.6/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with connecting Road New Daudkhan (Junction Station)	Increase in Commercial Area	Area=0.14 Acre No. of person =60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
		New Daudkhan – 5000 tonnes/day	Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of trucks=500 Number of Cars**=4** Two Wheeler Motorcycle= 54	PCU flow for truck=1750/day PCU flow for Car=4/day PCU flow for 3 wheeler=43.2/day **Air Pollution** **CO**= 2142 g/kwh **NOx**= 5000g/Kwh **PM**= 28.57 g/kwh	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Developments	Increase in Commercial Area															
			Increase in Residential Area															

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
			Road Connectivity																
			Increase in Traffic																
		Industrial Development	Increase in Industrial Area	**90 Acre population = 36362**		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Commercial Area	**1.79 Acre Population=728 person**	Water Requirement=32.73 KLD Waste Water generation=26.19 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	**4173 Acre Residential Population=181812**	Water Requirement= 24.54 MLD Waste Water generation=19.63 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity	**22 Acre**		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=1212 Number of Bus	PCU flow for car=1212/day PCU flow Bus=818/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
	Tundla, Khandauli & Firozabad	**DFCCIL Induced Developments (Direct)** Proposed development of Amritsar, Delhi, Kolkata Industrial Corridor (ADKIC) will be taken up in a band of 150-200 km on either side of EDFC, in a phased manner. Every state falling in the ADKIC area could promote 1 cluster of about 10 km² area in which 40% area would be earmarked permanently for manufacturing and processing activities. Each of the industrial nodes will generate a minimum of two freight trains per day, which can go up to 7 to 8 trains per day following traffic levels are anticipated.																
		Development of EDFC Stations Without Unloading & Loading o New Firozabad	Increase in Commercial Area	Area=0.14 Acre No. of person=60		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre	Total Water Required=40.5														

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		o New Makkhanpur		No. of person=300	KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for Car=4/day PCU flow for two wheeler=43.2/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Road New Tundla (Junction Station), New Tundla – 2500 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person =60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of trucks=250 Number of Cars**=4** Two Wheeler Motorcycle= 54	PCU flow for truck=875 /day PCU flow for Car=4/day PCU flow for 3 wheeler=43.2/day **Air Pollution** **CO**=1071.43 g/kwh **NOx**=2500g/Kwh **PM**=14.29 g/kwh	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Development	Increase in Industrial Area	Firozabad (Indl.) Distt. Firozabad - 498.37 acres														
			Increase in Commercial Area	Area 4 Acre Population=1618	Total Water required=72.8 KLD Waste water generated=58.2 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Firozabad (Housing) Distt. Firozabad - 62.68 acres	Total Water required=5.13 MLD Waste water generated=4.10 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity															

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
						-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of trucks=250 Number of Cars=**2013** Number of Bus= 362	PCU flow for truck=875 /day PCU flow for Car=2013/day PCU flow for Bus =1267 /day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
	Agra	**DFCCIL Induced Developments (Direct)**																	
		Development of EDFC Stations Without Unloading & Loading New Bhadan	Increase in Commercial Area	Area=300 m2 Population=30	Total Water Required=1.35 KLD Waste Water Generated=1.08 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area 3 Acre Population=150	Total Water Required=20.6 KLD Waste Water Generated=16.48 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=2 Number Of two wheeler=27	PCU flow for Car=2/day PCU flow for two wheeler=21.6 /day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Development	Increase in Industrial Area	Export Promotion Industrial Park, District Agra – 101.00 acres; Foundry Nagar, Distt. Agra - 180.404 acres; Leather Park Distt. Agra - 283.20 acres and Sikandra Site – A & B Distt. Agra - 66.149 = Total 630.753 acres area acquired														
			Increase in Commercial Area	Area=12.60 Acre Population=5100	Water required=229 KLD Waste Water generated=183.61 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity																

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
						-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic Leather processing including tanneries listed in 17 categories of highly polluting industries other than Red category industries categorized by CPCB. Foundries industries or process involving foundry operation are listed in 54 red categories industries categorized by CPCB.			-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
	Etawah	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC																	
		Development of EDFC Stations Without Unloading & Loading ▪ New Achalda ▪ New Kachausi	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for Car=4/day PCU flow for two wheeler=43.2/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Road o New Ekdil o Logistic parks on important EDFC stations like Bhaupur & Ekdil	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
		Independently Planned Developments ▪ Industrial belts proposed near every major junction of DFCCIL (proposal for notifying 5 km strip near EDFC-1 sent to GoUP from	Increase in Industrial Area																
			Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality 1	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		UPSIDC to ensure organized industrial development and to prevent haphazard LA for development by private parties)																	
	Aurayia	**DFCCIL Induced Developments (Direct)**																	
		Development of EDFC Stations without Unloading & Loading	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
		Independently Planned Developments	Increase in Industrial Area	G.C. Dibiyapur (Industrial) 274.45 acres															
			Increase in Commercial Area	1.97 Acre Population=801	Total Water Required=36.05 KLD Waste Water Generated=28.8 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	G.C. Dibiyapur (Housing) 84.93 acres	Total Water Required= 1.85 MLD Waste Water Generated=1.48 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Cars=**1335** Number of Bus= 180	PCU flow for Car=1335/day PCU flow for Bus =630 /day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
	Kanpur Dehat	**DFCCIL Induced Developments (Direct)**																	
		Development of EDFC Stations without Unloading & Loading	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
		Independently Planned Developments	Increase in Industrial Area	Rania Site – I, Kanpur Dehat – 7.35 acres;															

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
				Rania Site – II, Kanpur Dehat - 164.97 acres = Total 172.32 acres area acquired															
			Increase in Commercial Area	1.35 Acre Population=562	Total Water Required=25.84 KLD Waste Water Generated=20.80 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 3220 Acre No. of person=140280	Total Water Required=18.95 MLD Waste Water Generated=15.60 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity	17.32 Acre		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Cars=**935** Number of Bus= 126	PCU flow for Car=935/day PCU flow for Bus =441 /day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
EDFC – 2 (448.51 km)	Kanpur Nagar	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC ▪ Connectivity of DFCCIL to Logistic hub at Kanpur (6000 ha) ▪ 660 MW TPP under planning ▪ Multi Model Logistic Park at New Bhaupur in 100 acre ▪ Two crossing stations and loading/unloading yard for DFCCIL at Kanpur Nagar																
		Development of EDFC Stations Without Unloading & Loading ▪ New Sujatpur ▪ New Malwan ▪ New Rasulabad	Increase in Commercial Area	Area=0.23 Acre No. of person=90	Total Water Required=4.05 KLD Waste Water Generated=3.24 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 10.23 Acre No. of person=450	Total Water Required=60.3 KLD Waste Water Generated=48.24 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=6	PCU flow for Car=6/day														

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
				Number Of two wheeler=81	PCU flow for two wheeler=64.8/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Road ▪ New Bhaupur (Junction Station) New Bhaupur – 10,000 tonnes/day ▪ New Bhimsenpur (Junction Station) ▪ New Kanpur (Junction Station)	Increase in Commercial Area	Area=0.44 Acre No. of person =180	Total Water Required=8.1 KLD Waste Water Generated=6.4 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 20 Acre No. of person=900	Total Water Required=121.5 KLD Waste Water Generated=97.2 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of truck 1000 Number of Cars**=9** Two Wheeler Motorcycle= 117	PCU flow for Truck=3500/day PCU flow for Car=9/day PCU flow for 3 wheeler=117/day **Air Pollution caused due truck=** **CO=4285 g/kwh** **NOx=10000 g/kwh** **PM=57.14 g/kwh**	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Developments ▪ Multi-purpose SEZ at Lakhanpur (Textile, Leather, Engineering Goods & FTWZ) ▪ 6 laning of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687 ▪ 2 laning with pave shoulder of Kanpur-Kabrai of NH-86. (PCOD issued on 5 May) ▪ 6-laning of Chakeri to Allahabad of NH-2 from km 483.687 to 628.753	Increase in Industrial Area	Malwan, Fatehpur - 438.25; Panki Site – 2 - 211.69; Panki Site - 1, Kanpur Nagar - 240.809; Panki Site – III - 211.69 and Panki Site – IV - 27.42 = Total 1129.859 acres area acquired														
			Increase in Commercial Area	Acre 9.03 Acre Population 3658	Total Water Required=164.32 KLD Waste Water Generated=132.54 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area=20790 Acre Population =914469	Total Water Required=123 MLD Waste Water Generated=98.76 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		▪ Kanpur – Unnao Modern Industrial Project ▪ Mega Leather Cluster in Kanpur	Road Connectivity	Area 112.98 Acre		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic Leather processing including tanneries listed in 17 categories of highly polluting industries other than Red category industries categorized by CPCB.	Number of Cars=**6096** No. of Bus= 826	PCU flow for Car=6096/day PCU flow bus=2880/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
	Kaushambi	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC																	
		Developments of EDFC Stations Without Unloading & Loading	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
		DFCCIL line from Khurja to Dadri (Construction Phase)	Resource Utilization (Land, Water, Ballast)																
		Independently Planned Developments ▪ New industries like rice mill ▪ Cold storage	Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic Parboiled rice mills listed in 54 red category industries categorized by CPCB																
	Mirzapur	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC																	
		Development of EDFC Stations Without Unloading & Loading New Dagmagpur	Increase in Commercial Area	Area=0.074m2 No. of person=30	Total Water Required=1.3 KLD Waste Water Generated=1.04 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
			Increase in Traffic	Number of Car=3 Number Of two wheeler=41	PCU flow for Car=3/day PCU flow for two wheeler=32.8/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Road New Mirzapur, New Mirzapur – 2500 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of truck=250 Number of Car=4 Number Of two wheeler=54	PCU flow for Truck=875/day PCU flow for Car=4/day PCU flow for two wheeler=43.2 /day CO=1071.43 g/kwh NOx=2500.00g/kwh PM=14.29 g/kwh	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Developments ▪ South Vindhyachal Industrial Area	Increase in Industrial Area															
			Increase in Commercial Area															
			Increase in Residential Area															
			Road Connectivity															
			Increase in Traffic															
	Mugalsarai, Chandauli	**DFCCIL Induced Developments (Direct)** Proposed development of Amritsar, Delhi, Kolkata Industrial Corridor (ADKIC) will be taken up in a band of 150-200 km on either side of																

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality 1	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		EDFC, in a phased manner. Every state falling in the ADKIC area could promote 1 cluster of about 10 km² area in which 40% area would be earmarked permanently for manufacturing and processing activities. Each of the industrial nodes will generate a minimum of two freight trains per day, which can go up to 7 to 8 trains per day following traffic levels are anticipated.																
		Development of EDFC Stations Without Unloading & Loading o New Ganjkhawaja o New Durgawati o New Ahraura Road (Junction Station	Increase in Commercial Area	Area=0.22 Acre No. of person=90	Total Water Required=4.03 KLD Waste Water Generated=3.24 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area=10.33 Acre No. of person=450	Total Water Required=60.8 KLD Waste Water Generated=48.6 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=6 Number Of two wheeler=81	PCU flow for Car=6/day PCU flow for two wheeler=64.8 /day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Roads o New Mugalsarai (Junction Station) o Chandauli – 10,000 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 13.22 Acre No. of person=600	Total Water Required=81 KLD Waste Water Generated=64.8 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic																

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
				Number of truck=1000 Number of Car=22 Number Of two wheeler=297	PCU flow for Truck=3500/day PCU flow for Car=22/day PCU flow for two wheeler=297 /day CO=4285.71 g/kwh NOx=10000g/kwh PM=57.14 g/kwh	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		DFCCIL Line from Khurja to Dadri (Construction Phase)	Resource Utilization (Land, Water, Ballast)															
		Independently Planned Developments ▪ Development of terminal and associated infrastructure at Ramnagar, Varanasi for inland navigation as part of Jal Marg Vikas Project, NW-1 (Haldia-Allahabad)	Increase in Industrial Area															
			Increase in Commercial Area															
			Increase in Residential Area															
			Road Connectivity															
			Increase in Traffic															
EDFC – 3 (445.71)	Ludhiana & Patiala	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC																
		Development of EDFC Stations without Unloading & Loading o New Khanna o New Sarai Banjara o New Patiala	Increase in Commercial Area	Area=0.23 Acre No. of person=90	Total Water Required=4.05 KLD Waste Water Generated=3.24 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 10.23 Acre No. of person=450	Total Water Required=60.3 KLD Waste Water Generated=48.24 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=6 Number Of two wheeler=81	PCU flow for Car=6/day PCU flow for two wheeler=64.8 /day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting	Increase in Commercial Area	Area=0.29 Acre No. of person =120	Total Water Required=16.29 KLD														

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		Road o New Chawapail (Junction Station) o New Sirhind (Junction Station)			Waste Water Generated=12.87 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 13.64 Acre No. of person=600	Total Water Required=81.64 KLD Waste Water Generated=64.28 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of truck 1000 Number of Cars=**8** Two Wheeler Motorcycle=108	PCU flow for Car=8/day PCU flow for 3 wheeler=86/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Developments ▪ Industrial textile park proposed at Duraha and Industrial focal point at Tanansu ▪ Lining of two canals at Sirhind ▪ **Widening of NH-1 (Jalandhar-Ambala)**	Increase in Industrial Area															
			Increase in Commercial Area															
			Increase in Residential Area															
			Road Connectivity															
			Increase in Traffic Yarn and textile processing involving scouring, bleaching, dyeing, printing or any effluent / emission – generating process are listed in 54 red category industries categorized by CPCB															
	Mandi Gobindgarh	**DFCCIL Induced Developments (Direct)**																
		Development of EDFC Stations without Unloading & Loading	Increase in Commercial Area															
			Increase in Residential Area															
			Road Connectivity															
			Increase in Traffic															
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area															
			Increase in Residential Area															
			Road Connectivity															
			Increase in Traffic															
		Independently Planned Developments Industrial Area	Increase in Industrial Area															
			Increase in Commercial Area															
			Increase in Residential Area															
			Road Connectivity															

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
			Increase in Traffic																
	Ambala	**DFCCIL Induced Developments (Direct)**																	
		Development of EDFC Stations without Unloading & Loading o New Ambala o New Dukheri o New Kesari o New Bapara o New Darajpur	Increase in Commercial Area	Area=0.44 Acre No. of person=180	Total Water Required=24.93 KLD Waste Water Generated=19.26 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 34.23 Acre No. of person=1500	Total Water Required=202.32 KLD Waste Water Generated=162.36 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=16 Number Of two wheeler=216	PCU flow for Car=16/day PCU flow for two wheeler=172/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Roads o New Shambhu (Junction Station) o New Kalanaur (Junction Station)	Increase in Commercial Area	Area=0.29 Acre No. of person =120	Total Water Required=16.29 KLD Waste Water Generated=12.87 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 13.64 Acre No. of person=600	Total Water Required=81.64 KLD Waste Water Generated=64.28 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of truck 1000 Number of Cars=8 Two Wheeler Motorcycle=108	PCU flow for Car=8/day PCU flow for 3 wheeler=86/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Developments	Increase in Industrial Area																
			Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
	Muzaffarna	**DFCCIL Induced**																	

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
	gar, Meerut, Hapur, Shamli & Modi Nagar	**Developments (Direct)**																	
		Development of EDFC Stations without Unloading & Loading o New Tapari o New Talheri Bazar o New Deobanda o New Rohan Kala o New Bamanheri o New Manzurpur o New Khatauli o New Sakotitanda o New Daurala o New Meerut City o New Partappur o New Kaili	Increase in Commercial Area	Area=0.90 Acre No. of person=360	Total Water Required=48.36 KLD Waste Water Generated=38.66 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 81.84 Acre No. of person=3600	Total Water Required=486.23 KLD Waste Water Generated=388.23 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=36 Number Of two wheeler=486	PCU flow for Car=36/day PCU flow for two wheeler=388/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Roads ▪ New Pilkhani (Junction Station) ▪ New Saharanpur – 5,000 tonnes/day ▪ New Muzaffarnagar – 5,000 tonnes/day	Increase in Commercial Area	Area=0.44 Acre No. of person =180	Total Water Required=8.1 KLD Waste Water Generated=6.4 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 20 Acre No. of person=900	Total Water Required=121.5 KLD Waste Water Generated=97.2 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of truck 1000 Number of Cars**=40** Two Wheeler Motorcycle= 540	PCU flow for Truck=3500/day PCU flow for Car=40/day PCU flow for 3 wheeler=432/day **Air Pollution caused due truck=** **CO=4285 g/kwh** **NOx=10000 g/kwh**	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
					PM=57.14 g/kwh														
		Independently Planned Developments	Increase in Industrial Area																
			Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
	Ghaziabad & Gautam Budh Nagar	**DFCCIL Induced Developments (Direct)**																	
		Development of EDFC Stations without Unloading & Loading o New Hapur o New Gulaothi	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=12 Number Of two wheeler=162	PCU flow for Car=12/day PCU flow for two wheeler=129/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Independently Planned Developments o UPSIDC; Tronica City in Ghaziabad o Setting up a FAB Plant with an investment of Rs. 100,000 crore near Noida. o Proposed metro rail link Noida and Greater Noida with an investment of Rs. 5533 crores.	Increase in Industrial Area																
			Increase in Commercial Area																
			Increase in Residential Area																
			Road Connectivity																
			Increase in Traffic																
	Gautam Budh Nagar	**DFCCIL Induced Developments (Direct)** ▪ Crossing station, Unloading & loading yard																	

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		& container depot at Dadri. ▪ Logistic Park at Dadri																	
		Development of EDFC Stations without Unloading & Loading o New Chaprawat o New Chamrawali	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=12 Number Of two wheeler=162	PCU flow for Car=12/day PCU flow for two wheeler=129/day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-
		Unloading & Loading Yards with Connecting Roads ▪ New Bodaki (Junction Station)	Increase in Commercial Area	Area=600 m2 No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area= 13.22 Acre No. of person=600	Total Water Required=81 KLD Waste Water Generated=64.8 KLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity			-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of truck=1000 Number of Car=22 Number Of two wheeler=297	PCU flow for Truck=3500/day PCU flow for Car=22/day PCU flow for two wheeler=297 /day CO=4285.71 g/kwh NOx=10000g/kwh PM=57.14 g/kwh	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Anticipated Impacts on VECs												
						Air Quality	Water Quality	Water Resources	Landuse	Soil Quality l	Existing Infrastructure	New Infrastructure	Quality of Life	Micro Climate	Noise Level	Soil Erosion	Vibration	Drainage Pattern	Ecology
		Independently Planned Developments o Bodaki to be developed as multimodal transit hub (DMIC & GNIDA). o 1200 MW (GMR) & 400 MW (Noida Power Corporation) at Greater Noida. o Setting up a FAB Plant with an investment of Rs. 100,000 crore near Noida. o Proposed metro rail link Noida and Greater Noida with an investment of Rs. 5533 crores.	Increase in Industrial Area	Area =1800 Acre														
			Increase in Commercial Area	Area 36 Acre Population=14568	Total Water Required=1.9 MLD Waste Water Generated=1.57 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Residential Area	Area=100 Acre Population=21780	Total water required=2.94 MLD Waste water generated=2.35 MLD	-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Road Connectivity	Area=450 Acre		-	-	-	-	-	+	+	+	-	-	-	-	-	-
			Increase in Traffic	Number of Car=632 Number Of Bus=85	PCU flow for Car=632/day PCU flow for two wheeler=298 /day	-	**Nil**	**Nil**	-	-	+	+	+	-	-	-	-	-	-

Source: National Building Code (NBC), 2005 /
Land Requirement for Thermal Power Station (Ministry of Power), December2007
Indian Emission regulation, December, 2011

6.4 Interaction of the VECs and the Proposed Developments

As the VECs which are already impacted due to existing developments and VECs which will be affected by proposed/planned/anticipated developments are identified, an attempt has been made to assess the interaction of each of these identified VECs with each of such development. When these VECs and the developments will interact with each other they will result into change in conditions of these VECs. Diagram depicting the interaction between the VECs and Development is given in **Figure 6.8**. ***From this figure it can be interpreted that each of the development identified within study area have their own zone of impact which overlaps with the impact zone of EDFC (10 km on either side). Thus the areas where overlapping of impact zones is expected, will experience cumulative impacts.*** Matrix detailing interaction of these VECS and developments (in terms of impacts) and cumulative impact of these interactions is given in **Table 6.4.**

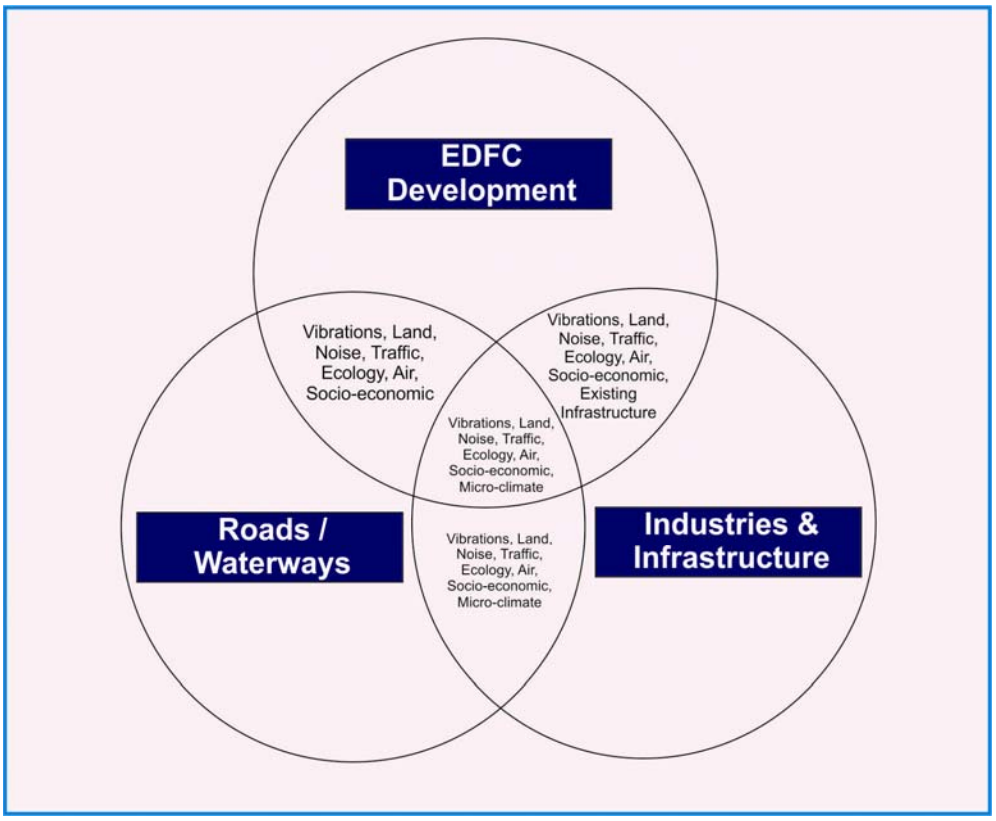


Figure 6.8: Diagram Depicting Overlapping Impacts Due to Interaction of Developments and Identified VECs

Table 6.4: Interaction Matrix of Developments and Identified VECs

Developments / VECs	Small Scale Impacts							Large Scale Impacts
	Existing	**Development of EDFC & IR Track**	**Development of Inland Waterways**	**Development of Industries & Industrial Area/zones/parks**	**Development of Residential colonies/commercial areas/township**	**Urbanization**	**Road Development**	**Cumulative Impact**
Air Quality	Air Quality deteriorated- high particulate matter	Air quality will improve	Air quality will improve	Air Quality will deteriorate significantly but can be controlled with adequate APCEs	Air Quality will deteriorate	Air Quality will deteriorate	Air quality will improve	Air Quality will deteriorate
Water Quality	Surface water quality deteriorated & Pollutants like Fe, nitrate high at many locations in ground water	Water quality will not be significantly impacted	Water quality will be deteriorated significantly	Water quality will be deteriorated but can be controlled by keeping provision of adequate ETPS/STPs/CETPs	Water quality will be deteriorated but can be controlled with provision of CSTPs, and their regular monitoring	Water quality will be deteriorated	Water quality will not be significantly impacted	Water quality will be deteriorated significantly
Water Resources	Ground water level declining trend	No impact on water resources	No impact on water resources	More depletion of ground water resources but can be controlled using techniques with minimum water consumption and least water wastage	More depletion of ground water resources but can be controlled using water conservation measures	More depletion of ground water resources	No impact on water resources	Water Resources will further be depleted
Noise Level	Noise levels high in commercial, residential and industrial areas. Noise level in sensitive locations is even higher during day	Intermittent noise level will increase in areas along EDFC track	No impact on noise levels	Noise level will increase but can be controlled using noise control technologies	Noise level will increase	Noise level will increase significantly	Noise level will increase	Noise level will significantly increase

Developments / VECs	Small Scale Impacts							Large Scale Impacts
	Existing	**Development of EDFC & IR Track**	**Development of Inland Waterways**	**Development of Industries & Industrial Area/zones/parks**	**Development of Residential colonies/commercial areas/township**	**Urbanization**	**Road Development**	**Cumulative Impact**
	at many locations							
Vibration	Only problem along existing IR tracks	Will increase along the proposed EDFC alignment	No Impacts	No Impacts	No Impacts	No Impacts	No Impacts	Vibration will increase in area close vicinity of railway track
Bio-diversity	Large scale defforestation and destruction of vegetation for carrying out developmental works 4 Nos. Eco-sensitive zone within study area	High Negative impact. 4 Eco-sensitive zone within 10 km of proposed EDFC alignment and large nos. of tree cutting	High impact on aquatic flora & fauna including dolphins, turtles and fishes. May directly impact the primary productivity of water body	High Impact on terrestrial flora. May have impact on aquatic flora Green belt will be developed as per mandate of MoEFCC and compensatory afforestation for tree cutting in ratio of 1:2 may balance the negative impact	Will disturb both flora & fauna	Will disturb both flora & fauna	High Impact on terrestrial flora. May have impact on aquatic flora Green belt will be developed as per mandate of MoEFCC and compensatory afforestation for tree cutting in ratio of 1:2 may balance the negative impact	Flora & Fauna both terrestrial & aquatic will be significantly impacted
Soil Quality	Water logged and saline soils found in U.P due to canal, rivers and excess irrigation	Large amount of soil excavation involved construction of embankment	Dredged soil, if contain haz. Material/toxins etc will further pollute the soil quality	Soil pollution may occur, if appropriate measures for material & waste handling not taken	Soil pollution, soil compaction etc may increase	Soil pollution, soil compaction etc may increase	Large amount of soil is required to provide base	Soil quality, & fertility further deteriorate
Soil Erosion	Soil erosion noticed along bank of rivers	Excavation of soil from borrow area will lead to significant soil erosion	Construction of structures may further lead to soil erosion in upstream and downstream of	Soil quality may be polluted but can be taken care by taking adequate waste	Soil erosion may increase due to deforestation	Soil erosion may increase due to deforestation	Excavation of soil from borrow area will lead to significant soil	Enhanced soil erosion

Developments / VECs	Small Scale Impacts							Large Scale Impacts
	Existing	**Development of EDFC & IR Track**	**Development of Inland Waterways**	**Development of Industries & Industrial Area/zones/parks**	**Development of Residential colonies/commercial areas/township**	**Urbanization**	**Road Development**	**Cumulative Impact**
			river	management techniques and mulching			erosion	
Land Use	Agriculture & forest land being diverted for non agriculture/non forest use	Land use diversion for EDFC construction. App. 85% of land is of agriculture land use. Soil from agricultural land being used for development of borrow areas	Land may required to be acquired for construction of various proposed civil interventions.	Land use may change significantly	Developed as per master plan but may also be developed by diverting the land use	Developed as per master plan but may also be developed by diverting the land use	Land use diversion for road construction- significant for green field projects	More change of land use. Diversion of more agricultural and forest land for other uses
Quality of Life	High level of unemployment & high poverty	Increase employment opportunities thus will improve quality of life	Increase employment opportunities thus will improve quality of life	Increase employment opportunities thus will improve quality of life	Increase employment opportunities thus will improve quality of life	Increase employment opportunities thus will improve quality of life	Increase employment opportunities thus will improve quality of life	Significant improvement in quality of life
Pressure on Existing Resources	High population and limited resources & infrastructure	Will reduce pressure on IR track and NH but may pressurize the feeder routes and nearby settlements/industrial towns due to induced growth options	Will reduce pressure on IR track and NH but may pressurize the feeder routes and nearby settlements/industrial towns due to induced growth options	Will further increase pressure on all the resources significantly	Will further increase pressure on all the resources	Will further increase pressure on all the resources significantly	Infrastructure will be improved due to availability of easy connectivity	Pressure on existing resources will increase significantly, if new sources not provided to cater pressure from upcoming developments
Infrastructure	Insufficient in	Will improve	Will improve	Will improve	Will improve	Will improve	Will improve	Will improve

Developments / VECs	Small Scale Impacts							Large Scale Impacts
	Existing	**Development of EDFC & IR Track**	**Development of Inland Waterways**	**Development of Industries & Industrial Area/zones/parks**	**Development of Residential colonies/commercial areas/township**	**Urbanization**	**Road Development**	**Cumulative Impact**
	terms of railways, roads, electricity, power land etc	infrastructure significantly	infrastructure significantly	infrastructure significantly	infrastructure significantly	infrastructure significantly	infrastructure significantly	infrastructure significantly
Micro-Climate	Climate change is being observed in terms of erratic rainfall, flash floods, droughts etc	Will reduce GHG emissions ultimately thus positive impacts	Will reduce GHG emissions ultimately thus positive impacts	Will enhance GHG emissions will impact negatively	Will enhance GHG emissions will impact negatively	Will enhance GHG emissions will impact negatively	Will reduce GHG emissions ultimately thus positive impacts	GHG emissions will increase significantly if too many polluting industries will come and no proper APC measures are taken
Natural Drainage Pattern	Drainage pattern has been altered due to construction of various structures and this results into urban flooding at various locations but affect minimized by providing storm water drainage system and cross drainage structures	Natural drainage pattern will be disturbed as alignment crosses various streams, nallahs & rivers but effect can be minimized by providing cross-drainage structures	Construction of infrastructure and related facilities of waterways may impact the flow of the river and thus the drainage pattern of river	Effects the natural drainage pattern but impact is insignificant as storm water drainage system is provided to divert the storm water with each such development	Effects the natural drainage pattern but impact is insignificant as storm water drainage system is provided to divert the storm water with each such development	Increased sealed surfaces and thus disturbs natural drainage pattern resulting into urban flooding and water lodging during monsoons	Natural drainage pattern will be disturbed as alignment crosses various streams, nallahs & rivers but effect can be minimized by providing cross-drainage structures	Natural Pattern will be altered significantly but impact can be minimized by providing adequate cross drainage structures and storm water drains of adequate capacity

We can say that maximum interaction will take place in the zones which carries major existing/proposed/planned developments and will cater the maximum anticipated developments. These zones are the zones which are identified in table 6.1 above on basis of baseline study and stakeholder consultation as they are the ones which are experiencing or will experience developments. Due to these interactions, VECs in these zones will experience the cumulative impacts, i.e. impact due to these developments individually and impact due to other developments in the surrounding areas. Cumulative impacts anticipated on VECs are listed in the last column of **Table 6.4** above.

A detailed study has been carried out to assess the cumulative impact of the EDFC development & other developments in the study area on the socio-economic component. This study specifically details the impact of the project both positive and negative on socio-economic status of the study area. This study is attached as **Annexure 6.3.**

6.5 Assessment of Cumulative Impacts

In this section an attempt has been made to quantify the anticipated impact by assigning ranking and weightage to each impact and the development. A scale has been developed on the basis of the 4 parameters, i.e. Scale sensitivity Probability & Duration. On basis of these parameters, significance of impact of each of the identified development will be assessed on each VEC. Scale developed for the assessment is detailed in Table 6.6 below.

Scale sensitivity Probability Duration (SSPD) method of assigning ranking to each of the identified impact to determine the significance of such impact has been used for impact assessment in this study. Impact assessment is carried out for each of the hotspot identified in **Table 6.1** above to assess the cumulative impact in these zones and significance of cumulative impact through SSPD method. Rating of the significance of impact is done on scale of 1-5. Definition of the scale used for assigning significance to impact is given in **Table 6.5** below. Further contribution of each of selected parameter will not be same for determining condition of the VECs. Thus weightage is assign to each of these parameters. On the basis of this scale score has been assigned to impacts which are caused due to development on VECs. Average score has been calculated by multiplying weightage assigned and the score assigned to the impact. A scale again has been designed to assess the magnitude of the impact assessed on these VECs and is given in **Table 6.6.**

Table 6.5: Definition of Rating Scale Used for Assigning Significance to the Impacts

Parameter	Rating Scale/Category			Weightage
Score	1	2	3	
Scale/Spread	Localized <300 m buffer	Interim 300 m-10 km buffer	Regional >10 km buffer	20%
Severity	Reversible & low damage	Reversible & high damage/Irreversible & low-moderate damage	Irreversible & high damage	50%
Probability of Occurrence	Occurs during construction only	Intermittent-both construction & operation phase	Continuous-both construction & operation phase	10%
Duration	Short term	Long Term/Permanent-low-moderate	Long Term/Permanent-severe	20%

Table 6.6: Rating Scale for Average Score

Range of Average Score	Type of Impact
0.5-1.0	Low (L)
1.0-1.5	Moderately Low (ML)
1.5-2.0	Moderate (M)
2.0-2.5	Moderately High (MH)
2.5-3.0	High (H)

Cumulative Impact Assessment for Hotspot Khurja to Bodaki: As per baseline study and stakeholder consultations, it is found that Khurja to Bodaki zone will be zone which will experience significant growth after development of EDFC as large areas of G.B. Nagar & Ghaziabad Districts including Bodaki are undeveloped and the land resources thus can be utilized effectively in this region. Bodaki is identified as multi-modal industrial hub by DMIC. Loading and unloading yard of DFCCIL is proposed at Dadri which will definitely attract industries and high vehicular movement near unloading and loading facility. Also there various existing developments in the area which have significant impact on the VECs like TPP Dadri, Khurja Town, Khurja Industrial areas etc. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.7.**

Table 6.7: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Khurja to Bodaki Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	2	2	3	2	2.1	1	1	1	1	1	2	3	3	3	2.8	1	2	2	2	1.8	3	2	3	2	2.3	1	2	1	2	1.7	1.7	2.0	2.2	2.0	2.0	M
Water Quality	2	2	3	3	2.3	1	1	1	1	1	2	3	3	3	2.8	2	2	3	2	2.1	3	3	3	2	2.8	1	1	1	1	1	1.8	2.0	2.3	2.0	2.0	M
Water Resources	2	3	3	3	2.8	1	1	2	1	1.1	2	3	3	3	2.8	1	2	3	2	1.9	3	3	3	3	3	1	1	1	1	1	1.7	2.2	2.5	2.2	2.1	MH
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	1	1	2	1.2	1	2	2	2	1.8	1	2	3	2	1.9	1.0	1.8	2.0	2.0	1.7	M
Vibrations	1	1	1	1	1	1	2	3	2	1.8	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1.0	1.8	1.2	1.2	1.5	ML
Bio-Diversity	3	2	1	3	2.3	1	3	1	3	2.4	2	2	1	3	2.1	1	2	1	3	1.9	3	2	1	3	2.3	1	3	1	3	2.4	1.8	2.3	1.0	3.0	2.2	MH
Soil Quality	3	3	1	3	2.8	1	2	1	1	1.5	2	3	3	3	2.8	1	2	1	1	1.5	3	2	3	3	2.5	1	2	1	3	1.9	1.8	2.3	1.7	2.3	2.2	MH
Soil Erosion	3	2	2	3	2.4	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	3	2	2	3	2.4	1	2	1	1	1.5	1.7	2.0	1.3	1.7	1.8	M
Land Use	3	3	1	3	2.8	1	2	1	3	1.9	1	2	1	3	1.9	1	2	1	3	1.9	3	3	1	3	2.8	1	2	1	3	1.9	1.7	2.3	1.0	3.0	2.2	MH
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.7	1.0	1.0	1.0	1.1	ML
Pressure on Existing Resources	2	2	3	3	2.3	2	2	2	2	2	2	2	2	2	2	2	2	3	3	2.3	2	2	3	3	2.3	2	2	2	2	2	2.0	2.0	2.5	2.5	2.2	MH
Micro-Climate	3	2	3	3	2.5	1	2	1	3	1.9	2	2	3	2	2.1	1	2	1	3	1.9	3	2	3	3	2.5	1	2	1	3	1.9	1.8	2.0	2.0	2.8	2.1	MH
Natural Drainage Pattern	2	3	3	2	2.6	1	2	1	2	1.7	2	2	3	2	2.1	2	2	3	2	2.1	2	3	3	2	2.6	1	2	1	2	1.7	1.7	2.3	2.3	2.0	2.1	MH

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Agra & Firozabad TTZ: TTZ zone is declared as sensitive location due to presence of Taj Mahal. Taj Mahal is monument of cultural and heritage importance and is one of the 7 wonders in World. Bad air quality have significant impact on appearance of Taj Mahal. As per stakeholder consultations, it is found that a DFCCIL loading & unloading yard is proposed at Tundla which will accelerate industrial growth in nearby areas which may lead to increase in pollution within the zone. But being TTZ zone, no heavy polluting industry will come in this zone and all industries will use non polluting cleaner fuels like LPG/PNG. It is also under consideration to construct Taj International Airport in this zone to enhance tourism. Due to all these developments volume of traffic will increase significantly in this zone further congesting the roads and increasing the emissions due to vehicular exhaust. Baseline condition of the area is already stressed As per baseline study it is found that there are 6 industrial areas in Agra and 5 I/As in Firozabad. Also Lucknow Agra expressway is under construction in this region. This is area of high agriculture production. Major settlements in the area are Agra, Tundla & Firozabad and major roads are NH-3, 11, 2, 93 & SH-31. Concentration of PM_{10} & $PM_{2.5}$ and noise levels are found to be higher than NAAQS standards in commercial, residential and industrial areas as carried by UPPCB. Agra was also declared as CEPI zone but now moratorium is lifted from the area. Ground water shows high TDS concentration. Water of Yamuna is polluted in Agra both in upstream and downstream of Agra. Waste management facility is available in Agra but not in Firozabad. Thus increased development in Firozabad area may increase waste littering and associated health hazards in the area. Thus it is anticipated the zone is sensitive and the impact on VECs is essentially to be assessed in this zone due to existing and upcoming developments. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.8.**

Table 6.8: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Agra Firozabad TTZ Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	3	3	3	3	1	1	1	1	1	2	2	3	2	2.1	1	2	2	2	1.8	3	3	3	3	3	1	1	1	1	1	1.8	2.0	2.2	2.0	2.0	M
Water Quality	3	2	3	3	2.5	1	1	1	1	1	2	2	3	2	2.1	2	2	3	2	2.1	3	2	3	3	2.5	1	1	1	1	1	2.0	1.7	2.3	2.0	1.9	M
Water Resources	2	2	3	3	2.3	1	1	2	1	1.1	2	2	3	2	2.1	1	2	3	2	1.9	2	2	3	3	2.3	1	1	2	1	1.1	1.5	1.7	2.7	2.0	1.8	M
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	1	2	2	1.3	1	2	2	2	1.8	1	2	1	2	1.7	1.0	1.8	1.2	2.0	1.7	M
Vibrations	1	1	1	1	1	1	2	3	2	1.9	1	2	1	1	1.5	1	2	1	1	1.5	1	1	1	1	1	1	2	3	2	1.9	1.0	1.7	1.2	1.3	1.4	ML
Bio-Diversity	3	2	1	3	2.3	1	3	1	3	2.4	2	2	1	2	1.9	1	2	1	2	1.7	3	2	1	3	2.3	1	3	1	3	2.4	1.8	2.3	1.0	2.7	2.2	MH
Soil Quality	3	2	1	2	2.1	1	2	1	1	1.5	2	2	3	2	2.1	1	2	1	1	1.5	3	2	1	2	2.1	1	2	1	1	1.5	1.8	2.0	1.3	1.5	1.8	M
Soil Erosion	3	2	2	2	2.2	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	3	2	2	2	2.2	1	2	1	1	1.5	1.7	2.0	1.3	1.3	1.7	M
Land Use	3	3	1	3	2.8	1	2	1	3	1.9	3	2	1	3	2.3	1	2	1	3	1.9	3	2	1	2	2.1	1	2	1	3	1.9	2.0	2.2	1.0	2.8	2.2	MH
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	2	1	1	1	1.2	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.8	1.0	1.0	1.0	1.2	ML
Pressure on Existing Resources	2	2	3	3	2.3	2	2	2	2	2	2	2	2	2	2	2	2	3	2	2.1	2	2	3	2	2.1	2	2	2	2	2	2.0	2.0	2.5	2.2	2.1	MH
Micro-Climate	3	2	3	3	2.5	1	2	1	3	1.9	2	2	3	2	2.1	1	2	1	2	1.7	3	2	3	2	2.3	1	2	1	3	1.9	1.8	2.0	2.0	2.5	2.1	MH
Natural Drainage Pattern	2	3	3	2	2.6	1	2	1	1	1.5	2	2	1	2	1.9	2	2	1	2	1.9	2	3	3	2	2.6	1	2	1	1	1.5	1.7	2.3	1.7	1.7	2.0	M

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Kanpur Dehat, Auraiya & Etwah: Major existing polluting sources in these regions are leather based industries in Kanpur Dehat, Industries of Auraiya and Etawah, major settlements of Bhaupur, Etawah & Bharthana, vehicular movement on NH-2, SH-46, NH-92, SH-62 etc, TPP at Laitpur, Kanpur Dehat. Due to these & other existing and ongoing developments, concentration of PM_{10} & $PM_{2.5}$ and noise levels are found to be higher than NAAQS standards in commercial, residential and industrial areas as carried by UPPCB. Water logging problems are also observed in the area along the canals. Ground water level of the region shows declining. Surface water bodies of the region are highly polluted. Also no municipal waste management facility is available at district thus high problem of littering waste and associated health hazards in the region. As per this study, it is found that area is already polluted and any further addition of pollutants in the area will have significant impacts. Further as per stakeholder consultation, various other developments are proposed in the regions including residential colonies near existing plastic city at Auraiya, logistic parks near Bhaupur & Ekdil, MMEZ between Auraiya & Etawah, industrial zones around major junctions of EDFC etc. All these zones have potential to impact the VECs. Thus this zone is anticipated to experience significant impact cumulatively due to existing and upcoming developments. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.9.**

Table 6.9: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Kanpur Dehat, Auraiya & Etwah Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	3	2.8	1	2	2	2	1.8	3	3	3	2	2.8	1	2	1	1	1.5	1.8	2.5	2.2	2.0	2.2	MH
Water Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	3	2.8	2	2	3	2	2.1	3	3	3	2	2.8	1	2	1	1	1.5	2.0	2.5	2.3	2.0	2.3	MH
Water Resources	3	3	3	3	3	1	2	2	1	1.6	2	2	3	3	2.3	1	2	3	2	1.9	3	3	3	2	2.8	1	2	2	1	1.6	1.8	2.3	2.7	2.0	2.2	MH
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	2	1	2	1.7	1	2	2	2	1.8	1	2	3	2	1.9	1.0	2.0	2.0	2.0	1.8	M
Vibrations	1	2	1	1	1.5	1	2	2	2	1.8	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	2	1.7	1.0	2.0	1.2	1.3	1.6	M
Bio-Diversity	3	2	3	3	2.5	1	3	1	3	2.4	2	3	3	2	2.6	1	2	1	3	1.9	3	2	1	2	2.1	1	3	1	3	2.4	1.8	2.5	1.7	2.7	2.3	MH
Soil Quality	3	3	3	2	2.8	1	2	1	1	1.5	2	2	3	2	2.1	1	2	1	2	1.7	3	2	3	2	2.3	1	2	1	1	1.5	1.8	2.2	2.0	1.7	2.0	M
Soil Erosion	3	2	2	2	2.2	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	3	2	2	2	2.2	1	2	1	1	1.5	1.7	2.0	1.3	1.3	1.7	M
Land Use	3	3	1	3	2.8	1	2	1	3	1.9	3	2	1	3	2.3	1	2	1	3	1.9	3	2	1	3	2.3	1	2	1	3	1.9	2.0	2.2	1.0	3.0	2.2	MH
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	2	1	1	1	1.2	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.8	1.0	1.0	1.0	1.2	ML
Pressure on Existing Resources	3	3	3	3	3	2	2	2	2	2	2	3	3	3	2.8	2	2	3	3	2.3	3	3	3	3	3	2	2	2	2	2	2.3	2.5	2.7	2.7	2.5	MH
Micro-Climate	3	2	3	2	2.3	1	2	1	3	1.9	2	3	3	2	2.6	1	2	1	3	1.9	3	2	3	2	2.3	1	2	1	3	1.9	1.8	2.2	2.0	2.5	2.2	MH
Natural Drainage Pattern	2	3	3	2	2.6	1	2	1	1	1.5	2	2	1	2	1.9	2	2	3	2	2.1	2	3	2	2	2.5	1	2	1	1	1.5	1.7	2.3	1.8	1.7	2.0	M

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Kanpur Nagar: Major existing polluting sources in Kanpur Nagar are the 7 Nos. of Industrial areas which houses industries like tanneries, hosiery, textiles etc, 2 Nos. TPP, highly populated Kanpur town and various roads/highways like NH-91, 2, 29, 86 and SH-38 & 58. Kanpur was also classified as CEPI zone but moratorium has now been lifted from zone. Concentration of PM_{10} & $PM_{2.5}$ and noise levels are found to be higher than CPCB standards in commercial, residential and industrial areas as carried by UPPCB. Capacity of CSTP and CETP is already insufficient thus further developments may increase generation of sewage and effluent in the region thereby increasing surface water pollution. Ground water of the region is polluted due to leaching of industrial pollutants. Quality of River Ganga is also deteriorated. Further development of propose multipurpose SEZ, logistic hub, unloading & loading yard of DFCCIL, improvement of NH-2 & NH-86 and TPP of 660 MW etc will add on to pollution in the area. Baseline conditions of the area makes Kanpur Nagar a sensitive zone and also requires an adequate pollution prevention policy in the area for upcoming developments so that further impact on VECs can be minimized. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.10.**

Table 6.10: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Kanpur Nagar Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	3	2.8	1	2	2	2	1.8	3	3	3	2	2.8	1	2	1	1	1.5	1.8	2.5	2.2	2.0	2.2	MH
Water Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	3	2.8	2	2	3	2	2.1	3	3	3	2	2.8	1	2	1	1	1.5	2.0	2.5	2.3	2.0	2.3	MH
Water Resources	3	3	3	3	3	1	2	2	1	1.6	2	2	3	3	2.3	1	2	3	2	1.9	3	3	3	2	2.8	1	2	2	1	1.6	1.8	2.3	2.7	2.0	2.2	MH
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	2	1	2	1.7	1	2	2	2	1.8	1	2	3	2	1.9	1.0	2.0	2.0	2.0	1.8	M
Vibrations	1	2	1	1	1.5	1	2	2	2	1.8	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	2	1.7	1.0	2.0	1.2	1.3	1.6	M
Bio-Diversity	3	2	3	2	2.3	1	3	1	3	2.4	2	2	3	2	2.1	1	2	1	2	1.7	3	2	1	2	2.1	1	3	1	3	2.4	1.8	2.3	1.7	2.3	2.2	MH
Soil Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	2	2.6	1	2	1	2	1.7	3	2	3	2	2.3	1	2	1	1	1.5	1.8	2.3	2.0	1.8	2.1	MH
Soil Erosion	3	2	2	2	2.2	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	3	2	2	2	2.2	1	2	1	1	1.5	1.7	2.0	1.3	1.3	1.7	M
Land Use	3	3	1	3	2.8	1	2	1	3	1.9	3	3	1	3	2.8	1	2	1	2	1.7	3	2	1	3	2.3	1	2	1	2	1.7	2.0	2.3	1.0	2.7	2.2	MH
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	2	1	1	1	1.2	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.8	1.0	1.0	1.0	1.2	ML
Pressure on Existing Resources	3	3	3	3	3	2	2	2	2	2	3	3	3	3	3	2	2	3	3	2.3	3	3	3	3	3	2	2	2	2	2	2.5	2.5	2.7	2.7	2.6	H
Micro-Climate	3	2	3	2	2.3	1	2	1	3	1.9	2	3	3	2	2.6	1	2	1	3	1.9	3	2	3	2	2.3	1	2	1	2	1.7	1.8	2.2	2.0	2.3	2.1	MH
Natural Drainage Pattern	2	3	3	2	2.6	1	2	1	1	1.5	2	2	1	2	1.9	2	2	3	2	2.1	2	3	2	2	2.5	1	2	1	1	1.5	1.7	2.3	1.8	1.7	2.0	M

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Mugalsarai: Major pollution sources in Chanduali district are 2 industrial areas, highly populated areas are Mugalsarai, Chanduali, Ramnagar & Banaras Hindu University and major roads like NH-2, Sakaldiha Mugalsarai Hwy, Mugalsarai Chahaniya road and MDR 65 E. There are no major polluting industries in the area. This area is taken under consideration for study of cumulative impact as an inland water terminal is proposed at Ram Nagar, Varanasi for NW-1 by IWAI. This project can lead to several induced development in the area. Thus area near Ramnagar will experience major cumulative impact after development of EDFC & inland water terminal. Also various other developments like Allahabad Naini Bara Zone of 3000 ha, strengthening of SH-69, ROB etc are proposed in this region. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.11.**

Table 6.11: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Mugalsarai Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Inland Waterways					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	2	3	2	2.3	1	2	3	2	1.9	1	2	2	2	1.8	2	2	3	2	2.1	1	2	2	2	1.8	2	2	3	2	2.1	1	2	3	2	1.9	1.6	2.0	2.7	2.0	2.0	M
Water Quality	3	2	3	2	2.3	1	2	1	1	1.5	3	2	3	2	2.3	2	2	3	2	2.1	2	2	3	2	2.1	2	2	3	2	2.1	1	2	1	1	1.5	2.0	2.0	2.4	1.7	2.0	M
Water Resources	2	2	3	2	2.1	1	2	1	1	1.5	1	1	2	2	1.3	2	2	3	2	2.1	2	2	3	2	2.1	2	2	3	2	2.1	1	2	1	1	1.5	1.6	1.9	2.3	1.7	1.8	M
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	1	1	1.5	1	2	2	2	1.8	1	2	1	2	1.7	1	2	2	2	1.8	1	2	2	2	1.8	1.0	2.0	1.7	1.9	1.7	M
Vibrations	1	1	1	1	1	1	2	2	2	1.8	1	2	1	2	1.7	1	2	1	1	1.5	1	2	1	1	1.5	1	1	1	1	1	1	2	2	2	1.8	1.0	1.7	1.3	1.4	1.5	ML
Bio-Diversity	2	2	3	2	2.1	1	3	1	2	2.2	2	2	3	2	2.1	2	3	3	3	2.8	1	2	1	2	1.7	2	2	3	2	2.1	1	3	1	2	2.2	1.6	2.4	2.1	2.1	2.2	MH
Soil Quality	2	2	3	2	2.1	1	2	1	1	1.5	1	2	2	2	1.8	2	2	1	2	1.9	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	1	1.5	1.4	2.0	1.7	1.7	1.8	M
Soil Erosion	2	2	2	2	2	1	2	1	1	1.5	1	1	3	2	1.4	2	2	2	2	2	1	2	1	1	1.5	2	2	2	2	2	1	2	1	1	1.5	1.4	1.9	1.7	1.6	1.7	M
Land Use	3	2	1	3	2.3	1	2	1	2	1.7	1	2	1	2	1.7	2	3	1	3	2.6	1	2	1	2	1.7	3	2	1	3	2.3	1	2	1	2	1.7	1.7	2.1	1.0	2.4	2.0	M
Quality of Life	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1.0	1.0	1.0	1.0	1.0	L
Pressure on Existing Resources	2	2	3	2	2.1	2	2	3	3	2.3	2	1	1	1	1.2	2	2	3	2	2.1	2	2	3	3	2.3	2	2	3	2	2.1	2	2	3	3	2.3	2.0	1.9	2.7	2.3	2.1	MH
Micro-Climate	3	2	3	2	2.3	1	2	1	3	1.9	1	2	1	3	1.9	2	2	3	2	2.1	1	2	1	3	1.9	3	2	3	2	2.3	1	2	1	3	1.9	1.7	2.0	1.9	2.6	2.0	M
Natural Drainage Pattern	2	2	3	2	2.1	1	2	1	1	1.5	2	2	1	2	1.9	2	2	1	2	1.9	2	2	3	2	2.1	2	2	3	2	2.1	1	2	1	1	1.5	1.7	2.0	1.9	1.7	1.9	M

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Allahabad: There are 5 industrial areas in the area but the industries are non polluting type majorly. Concentration of PM_{10}, $PM_{2.5}$ is higher in the commercial, residential and industrial areas as monitored by UPPCB. Ground water in the area is highly exploited in few blocks. Ground water pollution is observed due to excess usage of fertilizers and pesticides. No major development is proposed at present in the district except Thermal power plant in Bara but Bara is not within the study area so cumulative impact are not expected due to TPP at Bara. However area has potential to cater the developments which may result from EDFC development. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.12.**

Table 6.12: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Allahabad Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	2	3	2	2.3	1	2	1	1	1.5	2	3	3	2	2.6	1	2	2	2	1.8	3	2	3	2	2.3	1	2	1	1	1.5	1.8	2.2	2.2	1.7	2.0	M
Water Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	3	2.8	2	2	3	2	2.1	3	3	3	3	3	1	2	1	1	1.5	2.0	2.5	2.3	2.2	2.3	MH
Water Resources	3	3	3	3	3	1	2	2	1	1.6	2	3	3	3	2.8	1	2	3	2	1.9	3	3	3	3	3	1	2	2	1	1.6	1.8	2.5	2.7	2.2	2.3	MH
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	2	1	2	1.7	1	2	2	2	1.8	1	2	2	2	1.8	1.0	2.0	1.8	2.0	1.8	M
Vibrations	1	2	1	1	1.5	1	2	2	2	1.8	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1.0	2.0	1.2	1.2	1.6	M
Bio-Diversity	2	2	3	2	2.1	1	3	1	2	2.2	2	2	3	2	2.1	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	2	1.7	1.5	2.2	2.0	2.0	2.0	M
Soil Quality	3	2	3	2	2.3	1	2	1	1	1.5	2	2	3	2	2.1	1	2	1	2	1.7	3	2	3	2	2.3	1	2	1	1	1.5	1.8	2.0	2.0	1.7	1.9	M
Soil Erosion	3	2	2	2	2.2	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	3	2	2	2	2.2	1	2	1	1	1.5	1.7	2.0	1.3	1.3	1.7	M
Land Use	3	2	1	2	2.1	1	2	1	2	1.7	3	2	1	2	2.1	1	2	1	2	1.7	3	2	1	2	2.1	1	2	1	2	1.7	2.0	2.0	1.0	2.0	1.9	M
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	2	1	1	1	1.2	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.8	1.0	1.0	1.0	1.2	ML
Pressure on Existing Resources	3	2	3	2	2.3	2	2	2	2	2	3	2	3	2	2.3	2	2	3	3	2.3	3	2	3	2	2.3	2	2	2	2	2	2.5	2.0	2.7	2.2	2.2	MH
Micro-Climate	3	2	3	2	2.3	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	3	1.9	3	2	3	2	2.3	1	2	1	2	1.7	1.8	2.0	2.0	2.2	2.0	M
Natural Drainage Pattern	2	2	3	2	2.1	1	2	1	1	1.5	2	2	1	2	1.9	2	2	1	2	1.9	2	2	3	2	2.1	1	2	1	1	1.5	1.7	2.0	1.7	1.7	1.8	M

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Mirzapur: Mirzapur to Varanasi area categorized as CEPI zone however moratorium has been lifted by MoEFCC on the zone. There are various industrial areas under operation and implementation phase in the area. Also a TPP is operational in the area and one TPP is under implementation. Air quality of the area is bad in terms of particulate matter concentration (more than NAAQS, 2009). High nitrate concentration is found in ground water in the area. No waste management facility is available at site. Major proposed development in the area is South Vindhyachal industrial area. Area further has potential to cater the developments which is anticipated due to development of EDFC. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.13.**

Table 6.13: Assessment of Significance of Cumulative Impacts Identified Along Hotspots Mirzapur Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	2	2.6	1	2	2	2	1.8	3	3	3	3	3	1	2	1	1	1.5	1.8	2.5	2.2	2.0	2.2	MH
Water Quality	3	3	3	3	3	1	2	1	1	1.5	2	3	3	3	2.8	2	2	3	2	2.1	3	3	3	2	2.8	1	2	1	1	1.5	2.0	2.5	2.3	2.0	2.3	MH
Water Resources	3	2	3	2	2.3	1	2	2	1	1.6	2	2	3	2	2.1	1	2	3	2	1.9	3	2	3	2	2.3	1	2	2	1	1.6	1.8	2.0	2.7	1.7	2.0	M
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	2	1	2	1.7	1	2	2	2	1.8	1	2	2	2	1.8	1.0	2.0	1.8	2.0	1.8	M
Vibrations	1	2	1	1	1.5	1	2	2	2	1.8	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1.0	2.0	1.2	1.2	1.6	M
Bio-Diversity	2	2	3	2	2.1	1	3	1	2	2.2	2	2	3	2	2.1	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	2	1.7	1.5	2.2	2.0	2.0	2.0	M
Soil Quality	3	3	3	3	3	1	2	1	1	1.5	2	2	3	2	2.1	1	2	1	2	1.7	3	3	3	2	2.8	1	2	1	1	1.5	1.8	2.3	2.0	1.8	2.1	MH
Soil Erosion	3	2	2	2	2.2	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	3	2	2	2	2.2	1	2	1	1	1.5	1.7	2.0	1.3	1.3	1.7	M
Land Use	3	3	1	2	2.6	1	2	1	2	1.7	3	2	1	2	2.1	1	2	1	2	1.7	3	2	1	2	2.1	1	2	1	2	1.7	2.0	2.2	1.0	2.0	2.0	M
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	2	1	1	1	1.2	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.8	1.0	1.0	1.0	1.2	ML
Pressure on Existing Resources	3	2	3	2	2.3	2	2	2	2	2	2	2	3	2	2.1	2	2	3	3	2.3	2	2	3	2	2.1	2	2	2	2	2	2.2	2.0	2.7	2.2	2.1	MH
Micro-Climate	2	2	3	2	2.1	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	3	1.9	2	2	3	2	2.1	1	2	1	2	1.7	1.5	2.0	2.0	2.2	1.9	M
Natural Drainage Pattern	2	2	3	2	2.1	1	2	1	1	1.5	2	2	1	2	1.9	2	2	1	2	1.9	2	2	3	2	2.1	1	2	1	1	1.5	1.7	2.0	1.7	1.7	1.8	M

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Kaushambi: There are majorly 2 industrial areas in the districts. Industries are non polluting types. The area is not very polluted but has potential to cater the growth which is expected to occur after development of industries. This may emerge out as a major industrial hub after development of EDFC. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.14.**

Table 6.14: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Kaushambi Stretch of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	2	3	2	2.3	1	2	1	1	1.5	2	2	3	2	2.1	1	2	2	2	1.8	2	2	3	2	2.1	1	2	1	1	1.5	1.7	2.0	2.2	1.7	1.9	M
Water Quality	2	2	3	2	2.1	1	2	1	1	1.5	2	2	3	3	2.3	2	2	3	2	2.1	2	2	3	2	2.1	1	2	1	1	1.5	1.7	2.0	2.3	1.8	1.9	M
Water Resources	2	2	3	2	2.1	1	2	2	1	1.6	2	2	3	2	2.1	1	2	3	2	1.9	2	2	3	2	2.1	1	2	2	1	1.6	1.5	2.0	2.7	1.7	1.9	M
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	2	1	2	1.7	1	2	2	2	1.8	1	2	2	2	1.8	1.0	2.0	1.8	2.0	1.8	M
Vibrations	1	2	1	1	1.5	1	2	2	2	1.8	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1	2	2	2	1.8	1.0	2.0	1.3	1.3	1.6	M
Bio-Diversity	2	2	3	2	2.1	1	3	1	2	2.2	2	2	3	2	2.1	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	2	1.7	1.5	2.2	2.0	2.0	2.0	M
Soil Quality	2	2	3	2	2.1	1	2	1	1	1.5	2	2	3	2	2.1	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	1	1.5	1.5	2.0	2.0	1.7	1.8	M
Soil Erosion	2	2	2	2	2	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	2	2	2	2	2	1	2	1	1	1.5	1.3	2.0	1.3	1.3	1.7	M
Land Use	2	2	1	2	1.9	1	2	1	2	1.7	3	2	1	2	2.1	1	2	1	2	1.7	2	2	1	2	1.9	1	2	1	2	1.7	1.7	2.0	1.0	2.0	1.8	M
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	2	1	1	1	1.2	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.8	1.0	1.0	1.0	1.2	ML
Pressure on Existing Resources	2	2	3	2	2.1	2	2	2	2	2	2	2	3	2	2.1	2	2	3	3	2.3	2	2	3	2	2.1	2	2	2	2	2	2.0	2.0	2.7	2.2	2.1	MH
Micro-Climate	2	2	3	2	2.1	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	3	1.9	2	2	3	2	2.1	1	2	1	2	1.7	1.5	2.0	2.0	2.2	1.9	M
Natural Drainage Pattern	2	2	3	2	2.1	1	2	1	1	1.5	2	2	1	2	1.9	2	2	1	2	1.9	2	2	3	2	2.1	1	2	1	1	1.5	1.7	2.0	1.7	1.7	1.8	M

* Average scoring is provided on the basis of weightage assigned to each parameter

Cumulative Impact Assessment for Hotspot Ludhiana: District is highly populated and highly industrialized. Nearby districts like Mandi Gobindgarh & Patiala also show similar kind of development. In all these districts various polluting industries like steel re rolling mills, foundry, furnace, galvanization, electroplating etc. are operating. Air Quality of area is bad with very high level of particulate matter concentration, however concentration of other pollutants like sulphur dioxide and oxides of nitrogen are within permissible limits of NAAQS. High noise levels are monitored in residential, commercial and industrial areas. Area was classified as CEPI zone but moratorium has now been lifted. Ground water and surface water are highly polluted and exploited. Insufficient waste and sewage management facility is in the area. However expansion of STP capacity to ensure treatment of 100% of sewage generated is under planning. Land resources of the area are highly utilized and area has high population density. A large mixed use area exists within the district. One textile park is under proposal in the area at Duraha and one industrial focal point is under planning at Tanansau. Also widening of NH-1 and construction of 4 nos. of ROB is under planning in the district. Thus it is anticipated this area will also experience cumulative impacts. Assessment of significance of impacts on VECs in this stretch has been made and is given in **Table 6.15.**

Table 6.15: Assessment of Significance of Cumulative Impacts Identified Along Hotspot Ludhiana Region of EDFC

VECs	Existing					Development of EDFC & IR Track					Development of Industries & Industrial Area/zones/parks					Development of Residential colonies/commercial areas/township					Urbanization					Road Development					Cumulative Impact					Type of Impact
	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	S	S	P	D	Av. Score*	
Air Quality	3	3	3	2	2.8	1	2	1	1	1.5	2	3	3	2	2.6	1	2	2	2	1.8	2	3	3	2	2.6	1	2	1	1	1.5	1.7	2.5	2.2	1.7	2.1	MH
Water Quality	3	2	3	3	2.5	1	2	1	1	1.5	2	3	3	3	2.8	2	2	3	2	2.1	2	3	3	3	2.8	1	2	1	1	1.5	1.8	2.3	2.3	2.2	2.2	MH
Water Resources	3	3	3	3	3	1	2	2	1	1.6	2	3	3	3	2.8	1	2	3	2	1.9	2	3	3	3	2.8	1	2	2	1	1.6	1.7	2.5	2.7	2.2	2.3	MH
Noise Level	1	2	2	2	1.8	1	2	2	2	1.8	1	2	2	2	1.8	1	2	1	2	1.7	1	2	2	2	1.8	1	2	2	2	1.8	1.0	2.0	1.8	2.0	1.8	M
Vibrations	1	2	1	1	1.5	1	2	2	2	1.8	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	1	2	2	2	1.8	1.0	2.0	1.3	1.3	1.6	M
Bio-Diversity	3	2	3	2	2.3	1	3	1	2	2.2	2	3	3	2	2.6	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	2	1.7	1.7	2.3	2.0	2.0	2.1	MH
Soil Quality	2	3	3	3	2.8	1	2	1	1	1.5	2	3	3	2	2.6	1	2	1	2	1.7	2	2	3	2	2.1	1	2	1	1	1.5	1.5	2.3	2.0	1.8	2.0	M
Soil Erosion	2	2	3	2	2.1	1	2	1	1	1.5	1	2	1	1	1.5	1	2	1	1	1.5	2	2	2	2	2	1	2	1	1	1.5	1.3	2.0	1.5	1.3	1.7	M
Land Use	2	3	1	3	2.6	1	2	1	2	1.7	3	2	1	2	2.1	1	2	1	2	1.7	2	2	1	2	1.9	1	2	1	2	1.7	1.7	2.2	1.0	2.2	2.0	M
Quality of Life	3	1	1	1	1.4	1	1	1	1	1	2	1	1	1	1.2	1	1	1	1	1	3	1	1	1	1.4	1	1	1	1	1	1.8	1.0	1.0	1.0	1.2	ML
Pressure on Existing Resources	3	3	3	3	3	2	3	2	2	2.5	2	3	3	2	2.6	2	2	3	2	2.1	2	3	3	2	2.6	2	3	2	2	2.5	2.2	2.8	2.7	2.2	2.6	H
Micro-Climate	2	3	3	3	2.8	1	2	1	2	1.7	2	3	3	2	2.6	1	2	1	3	1.9	2	3	3	2	2.6	1	2	1	2	1.7	1.5	2.5	2.0	2.3	2.2	MH
Natural Drainage Pattern	2	3	3	2	2.6	1	2	1	1	1.5	2	2	1	2	1.9	2	2	1	2	1.9	2	2	3	2	2.1	1	2	1	1	1.5	1.7	2.2	1.7	1.7	1.9	M

* Average scoring is provided on the basis of weightage assigned to each parameter

From above assessment we have got the average score and type of impact of all the developments on each VECs for zones considered for CIA study. **Table 6.16** summarizes the cumulative impact of all the developments on VECs in the identified zones. **Figure 6.9-6.21** depicts the identified impacts along the EDFC alignment.

Table 6.16: Summary of the Anticipated Impacts Identified in the Hot Spots (HS) Considered for CIA Study

S. No.	VECs	Average Scores									Remarks
		Khurja to Bodaki (HS)	Agra Firozabad TTZ (HS)	Kanpur Dehat, Auraiya & Etwah (HS)	Kanpur Nagar (HS)	Mugalsarai(HS)	Allahabad(HS)	Mirzapur (HS)	Kaushambi (HS)	Ludhiana (HS)	
1.	Air Quality	M	M	MH	MH	M	M	MH	M	¤	from M-MH
2.	Water Quality	M	M	MH	MH	M	MH	MH	M	MH	Impact variation from M-MH
3.	Water Resources	MH	M	MH	MH	M	MH	M	M	MH	Impact variation from M-MH
4.	Noise Level	M	M	M	M	M	M	M	M	M	Moderate Impact
5.	Vibrations	ML	ML	M	M	ML	M	M	M	M	Impact variation from ML-M
6.	Bio-Diversity	MH	MH	MH	MH	MH	M	M	M	MH	Impact variation from M-MH
7.	Soil Quality	MH	M	M	MH	M	M	MH	M	M	Impact variation from M-MH
8.	Soil Erosion	M	M	M	M	M	M	M	M	M	Moderate Impact
9.	Land Use	MH	MH	MH	MH	M	M	M	M	M	Moderate Impact
10.	Quality of Life	ML	ML	ML	ML	L	ML	ML	ML	ML	Impact variation from L-ML
11.	Pressure on Existing Resources	MH	MH	MH	H	MH	MH	MH	MH	H	Impact variation from MH-H
12.	Micro-Climate	MH	MH	MH	MH	M	M	M	M	MH	Impact variation from M-MH
13.	Natural Drainage Pattern	MH	M	M	M	M	M	M	M	M	Impact variation from M-MH

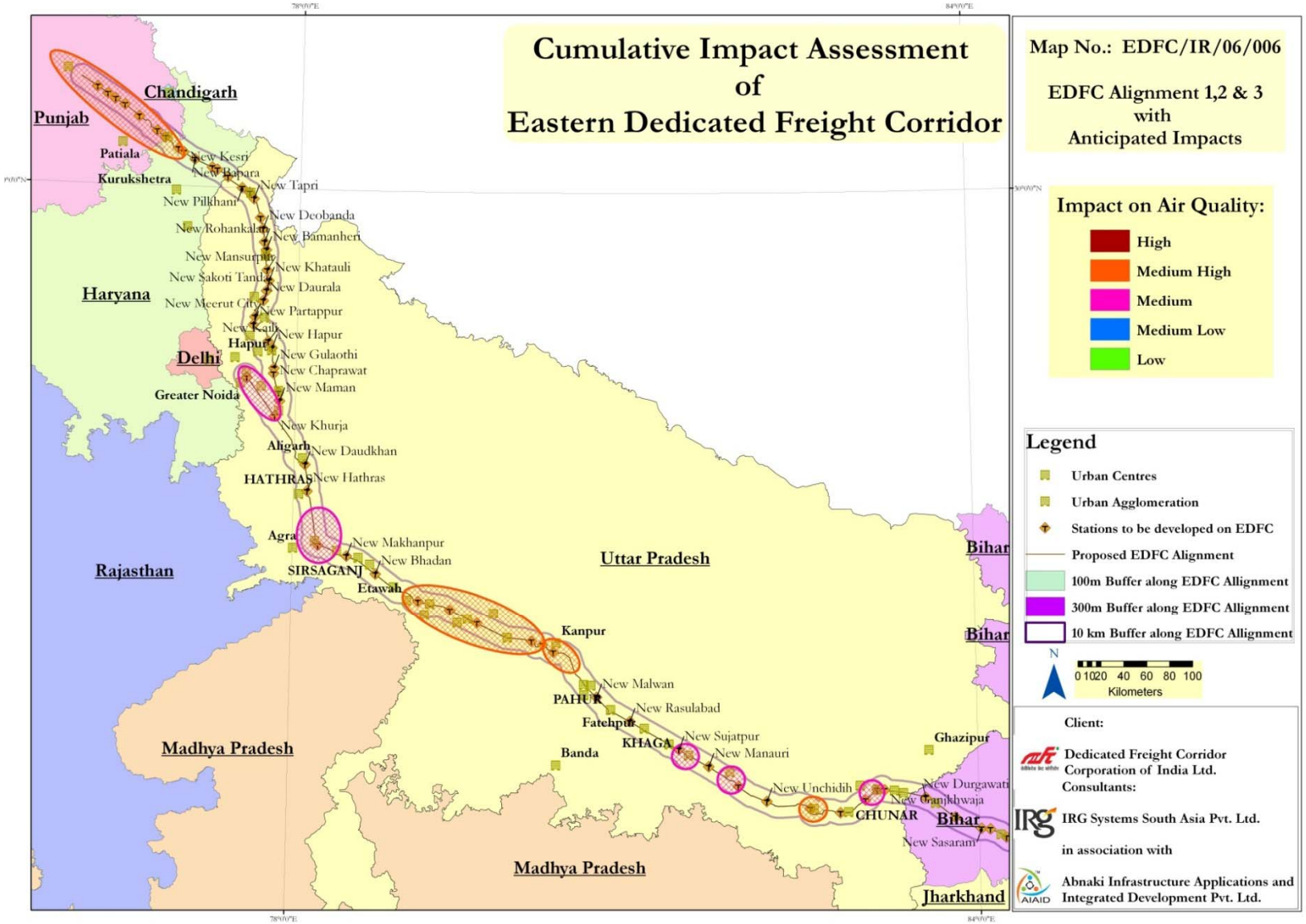


Figure 6.9: Map Depicting the Impact on Air Quality within Hotspots along EDFC Alignment

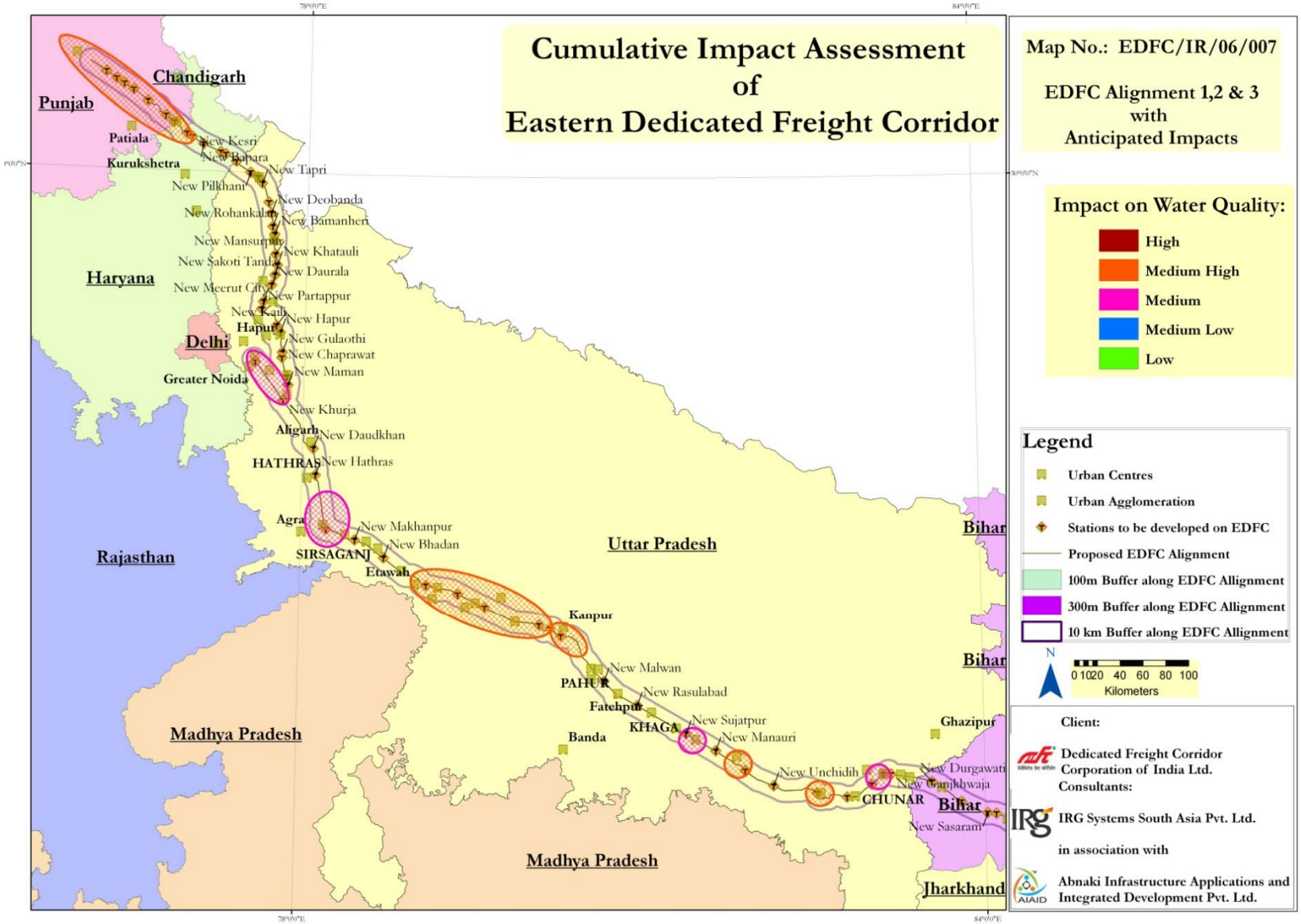


Figure 6.10: Map Depicting the Impact on Water Quality within Hotspots along EDFC Alignment

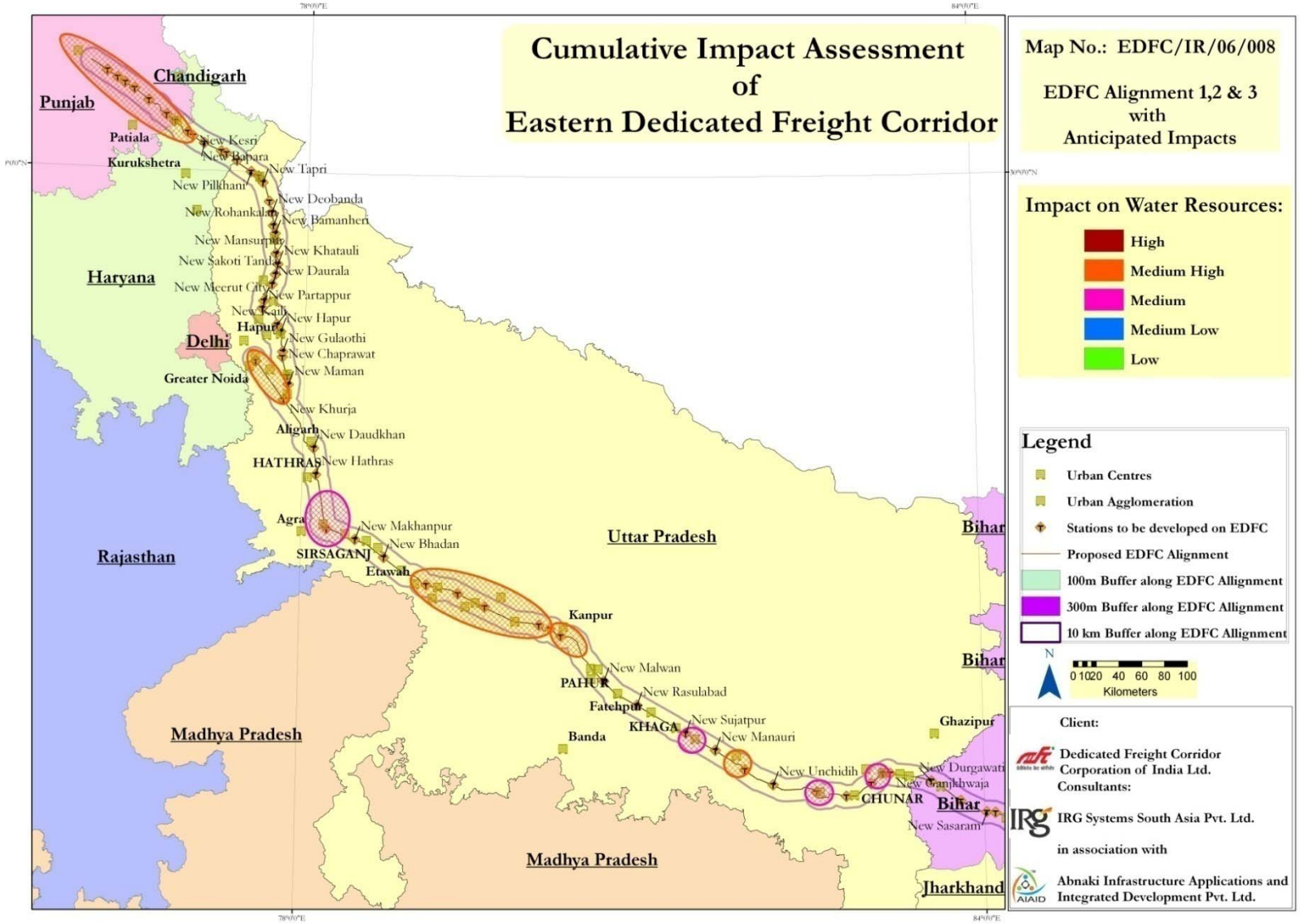


Figure 6.11: Map Depicting the Impact on Water Resources within Hotspots along EDFC Alignment

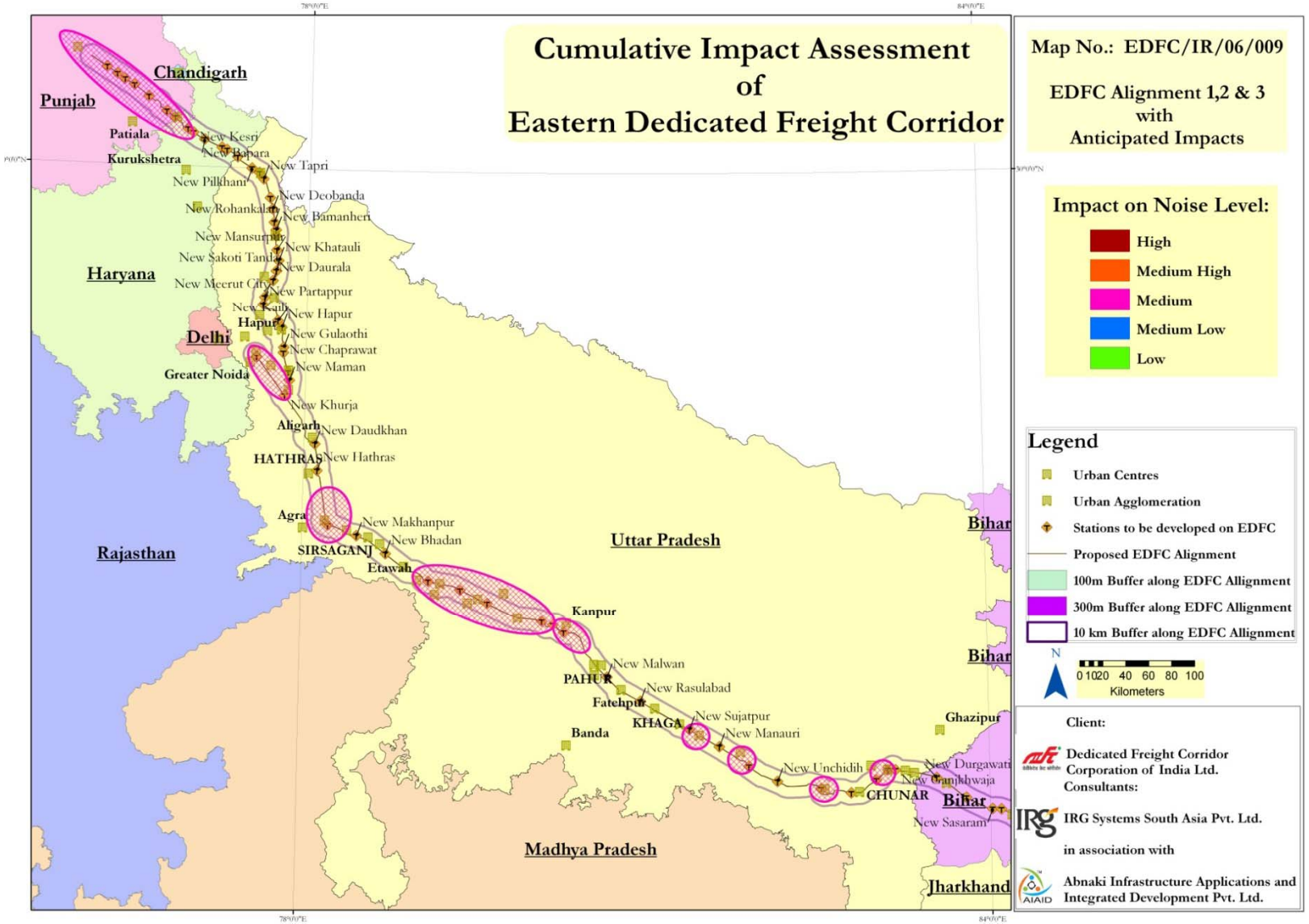


Figure 6.12: Map Depicting the Impact on Noise Level within Hotspots along EDFC Alignment

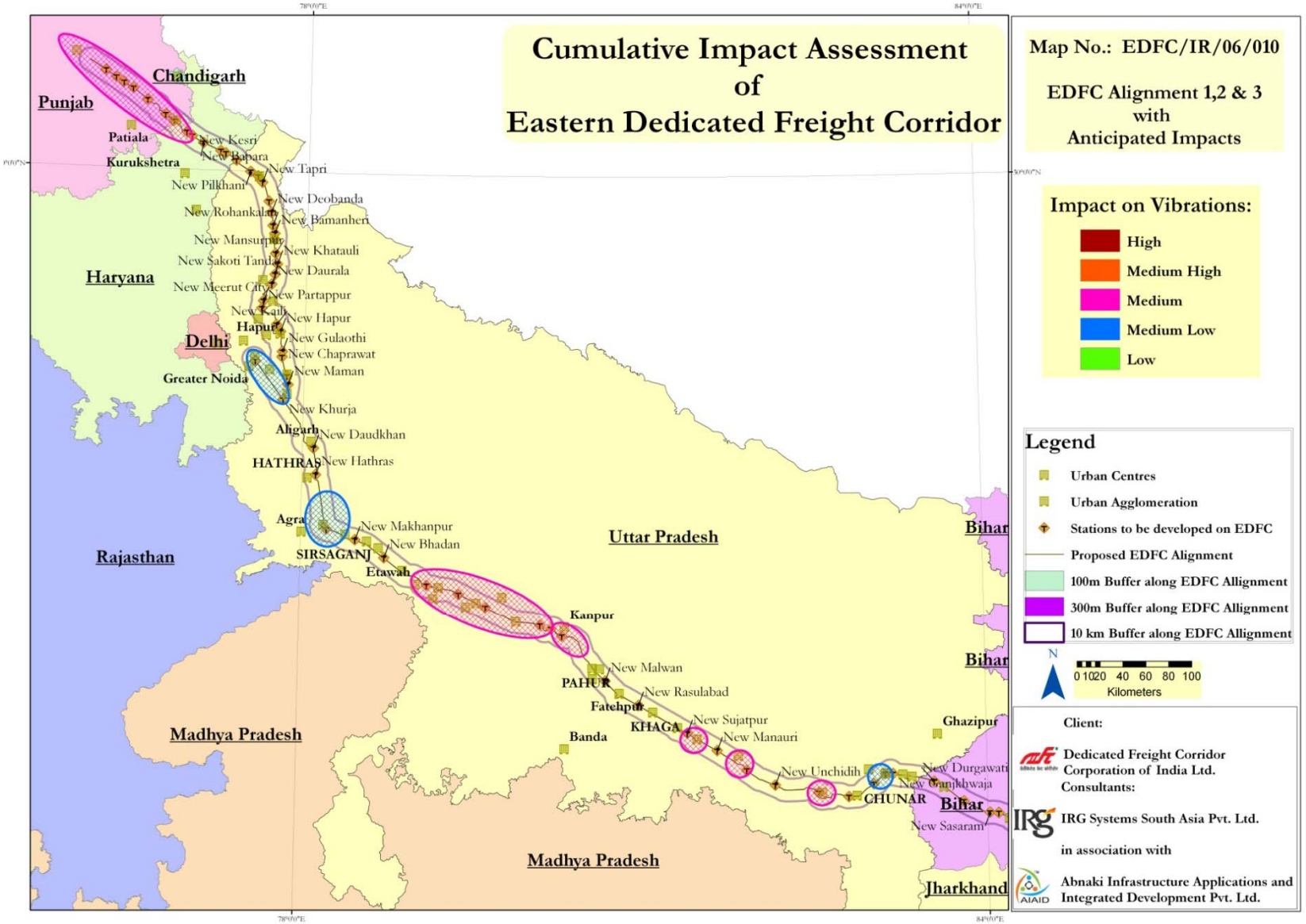


Figure 6.13: Map Depicting the Impact on Vibration within Hotspots along EDFC Alignment

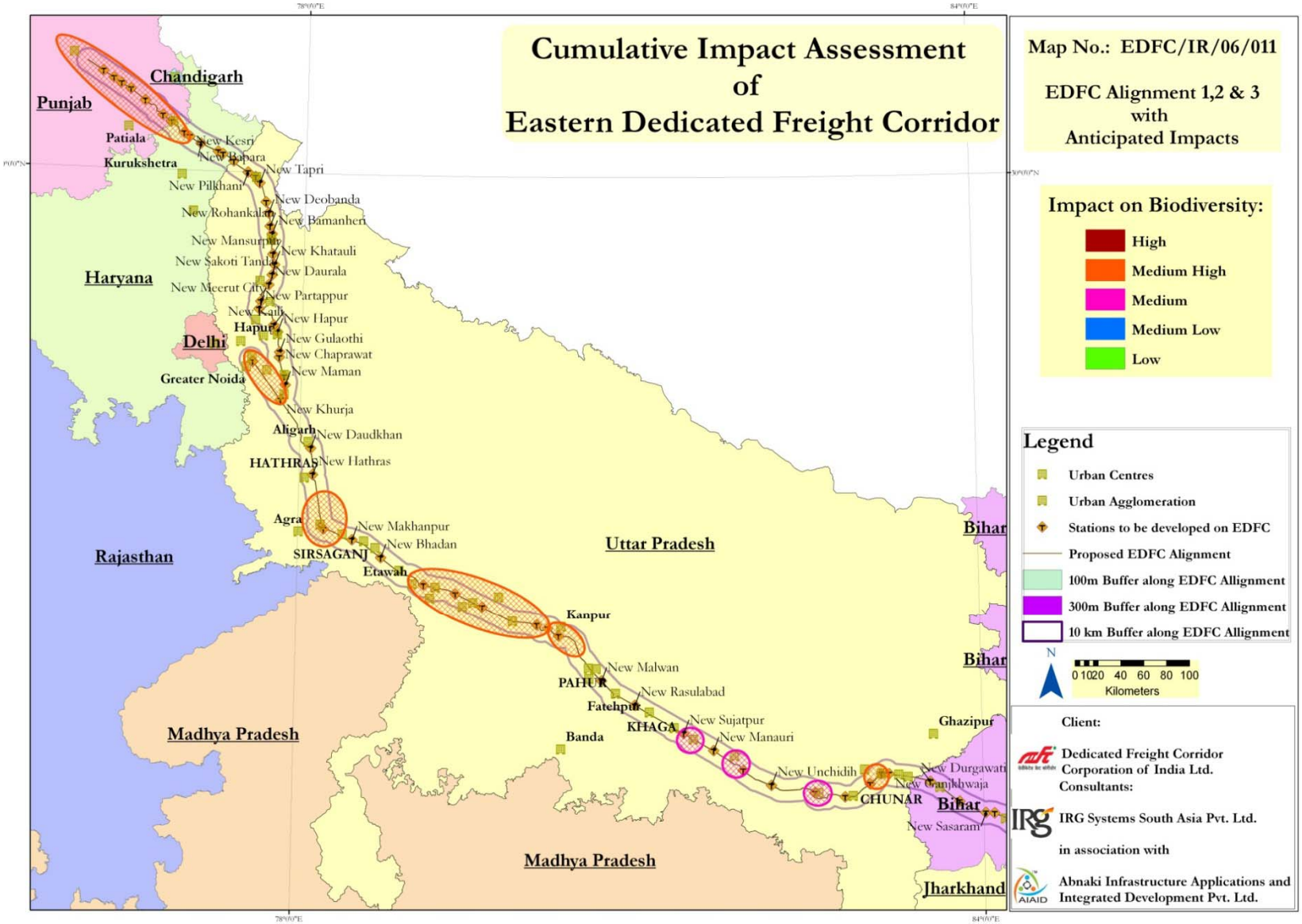


Figure 6.14: Map Depicting the Impact on Bio-diversity within Hotspots along EDFC Alignment

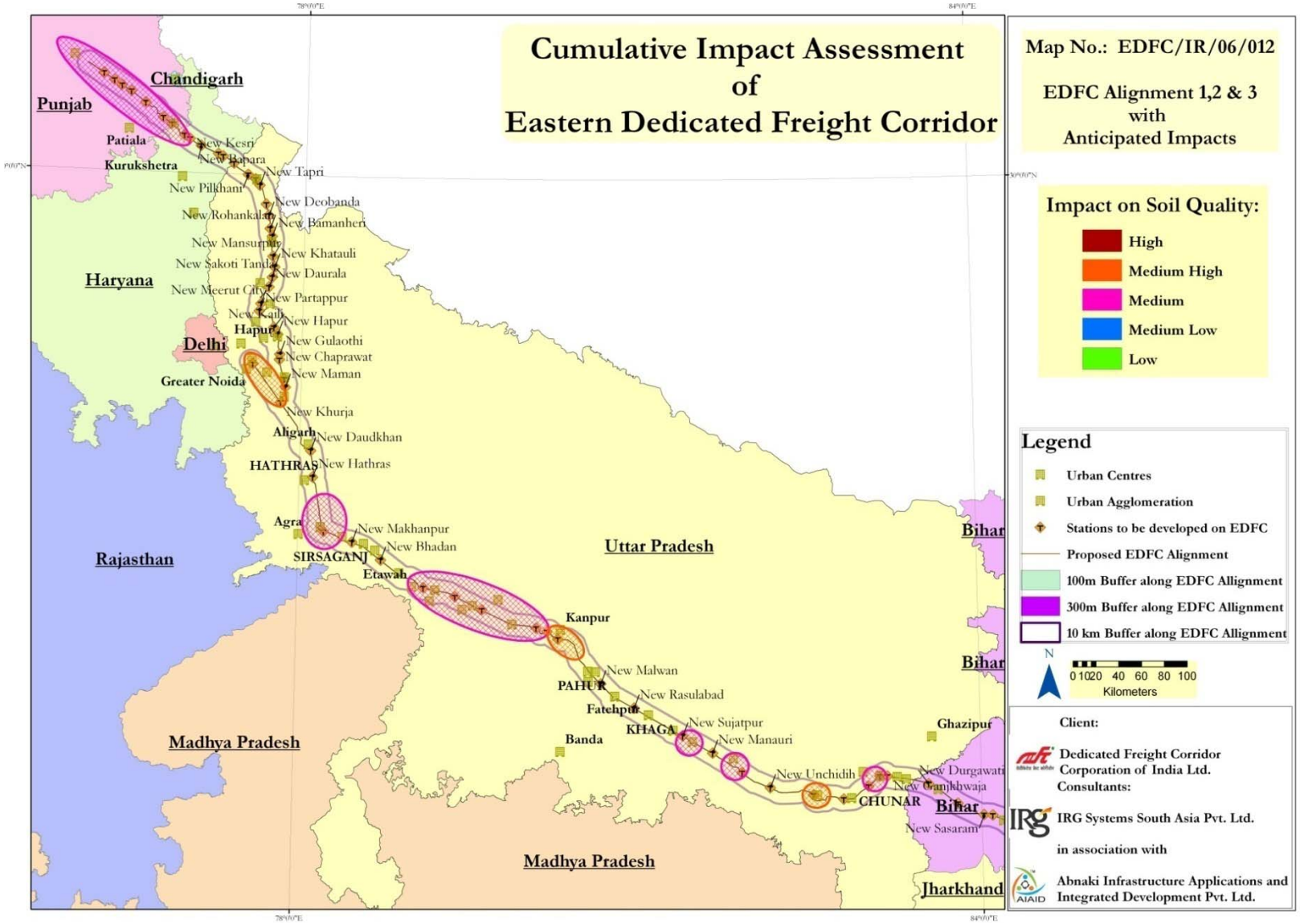


Figure 6.15: Map Depicting the Impact on Soil Quality within Hotspots along EDFC Alignment

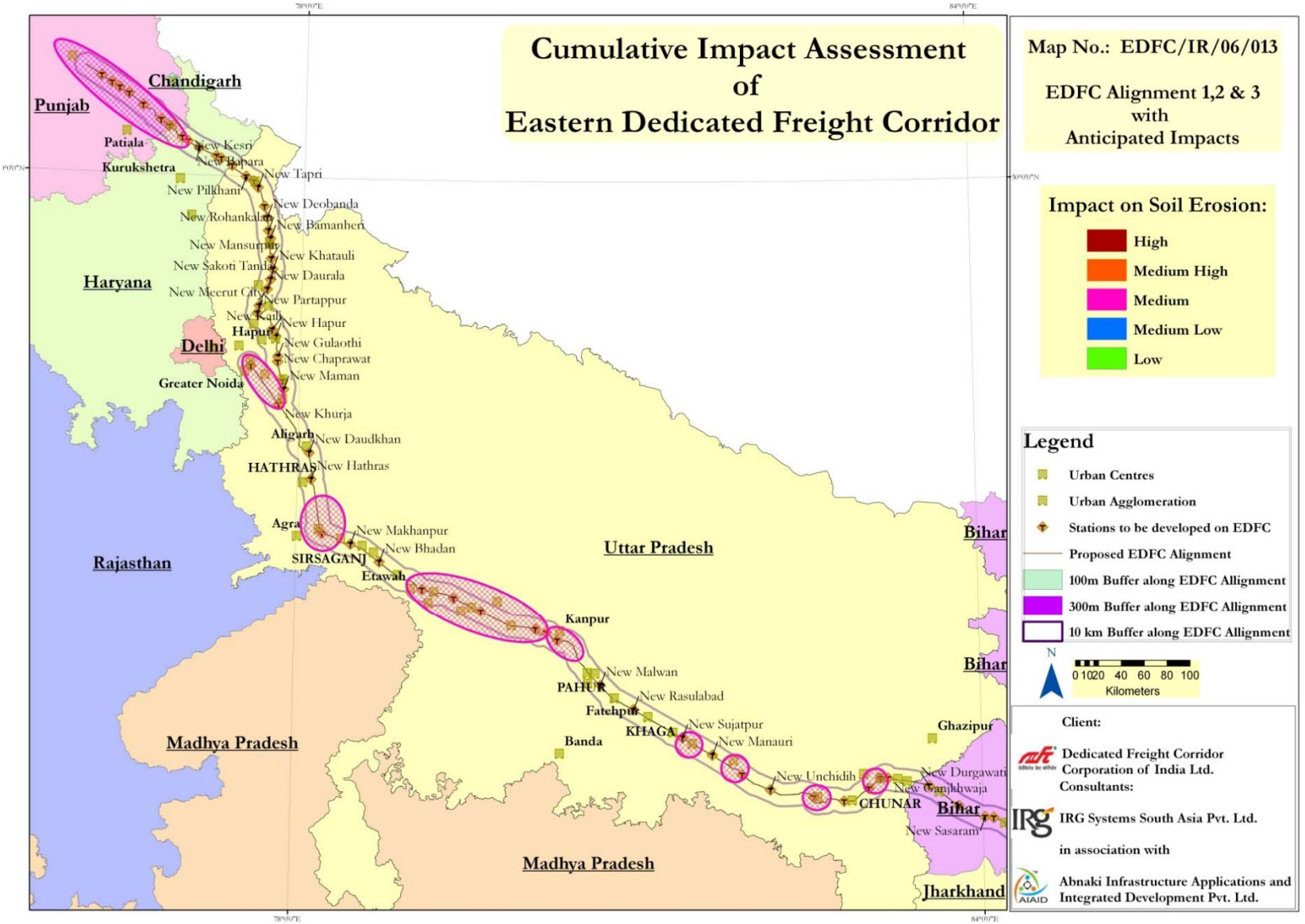


Figure 6.16: Map Depicting the Impact on Soil Erosion within Hotspots along EDFC Alignment

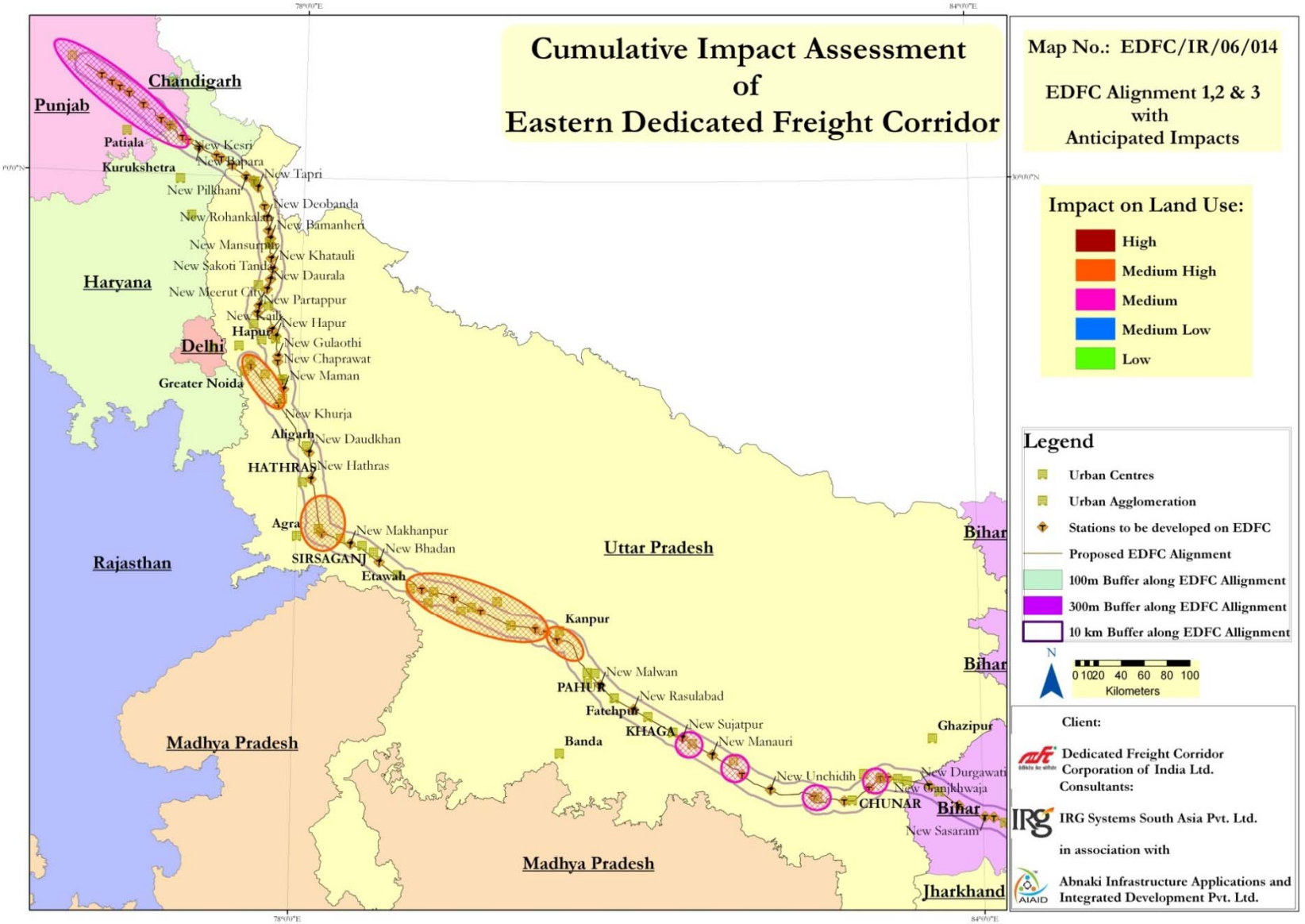


Figure 6.17: Map Depicting the Impact on Land Use within Hotspots along EDFC Alignment

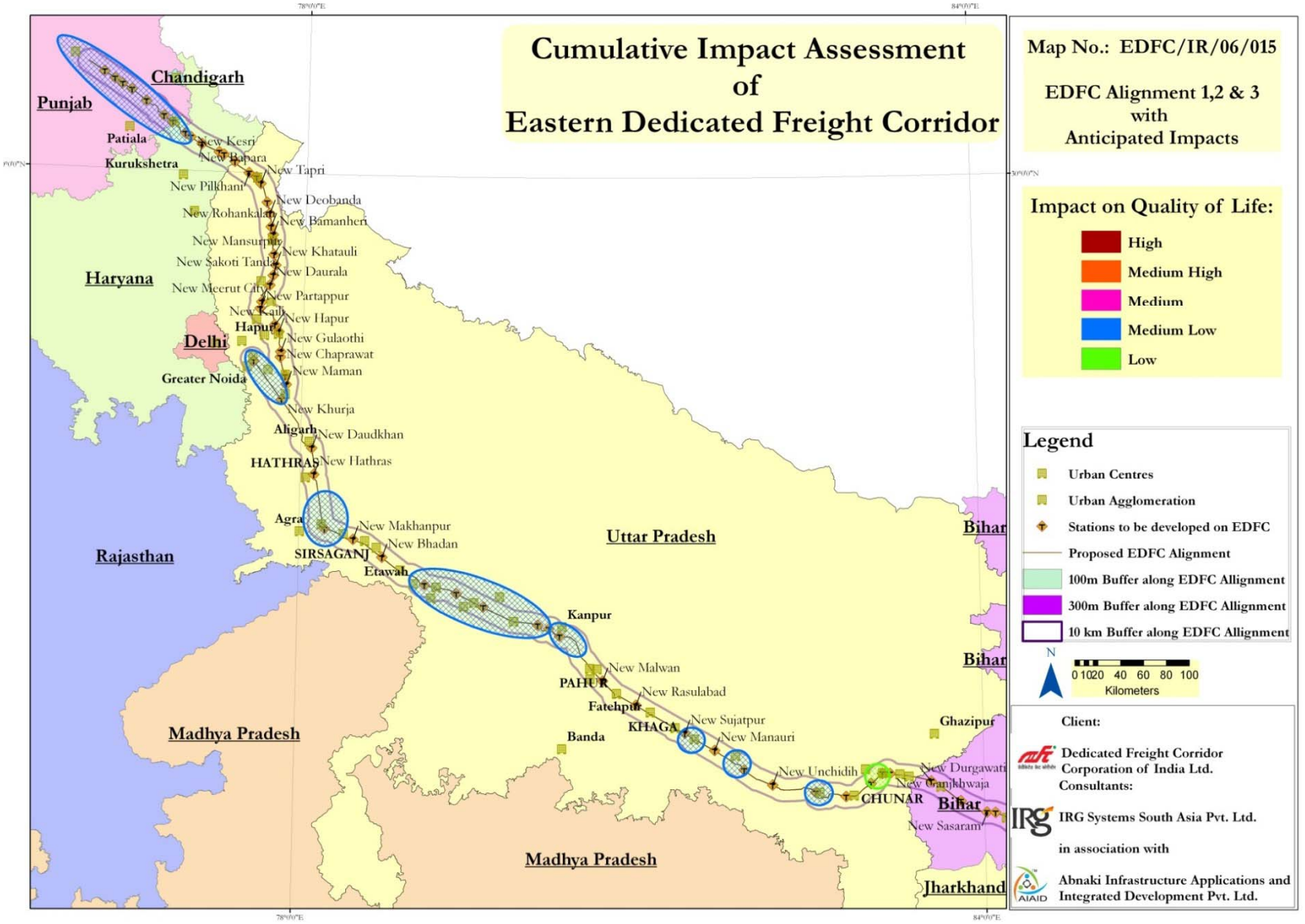


Figure 6.18: Map Depicting the Impact on Quality of Life within Hotspots along EDFC Alignment

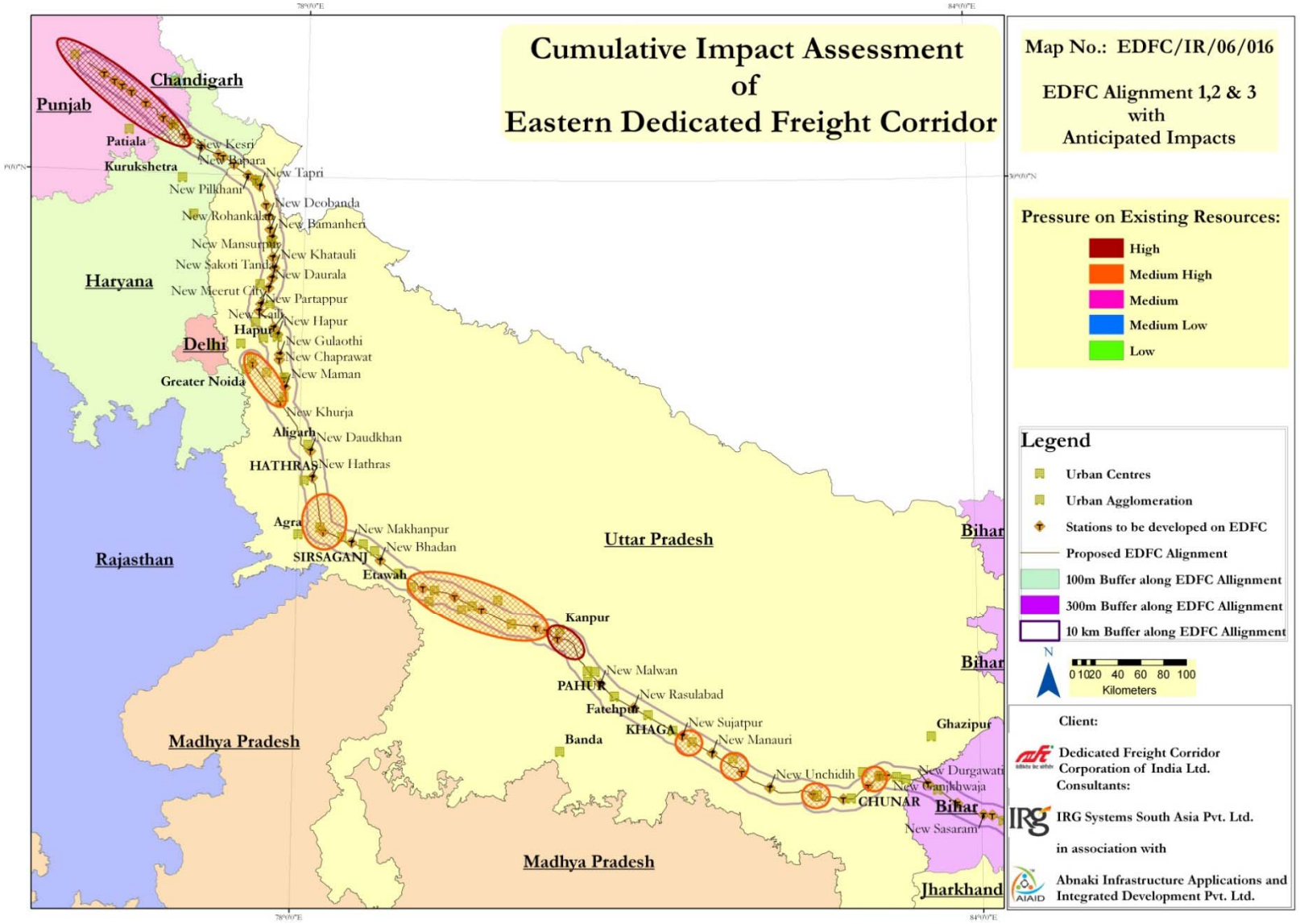


Figure 6.19: Map Depicting the Impact on Existing Resources within Hotspots along EDFC Alignment

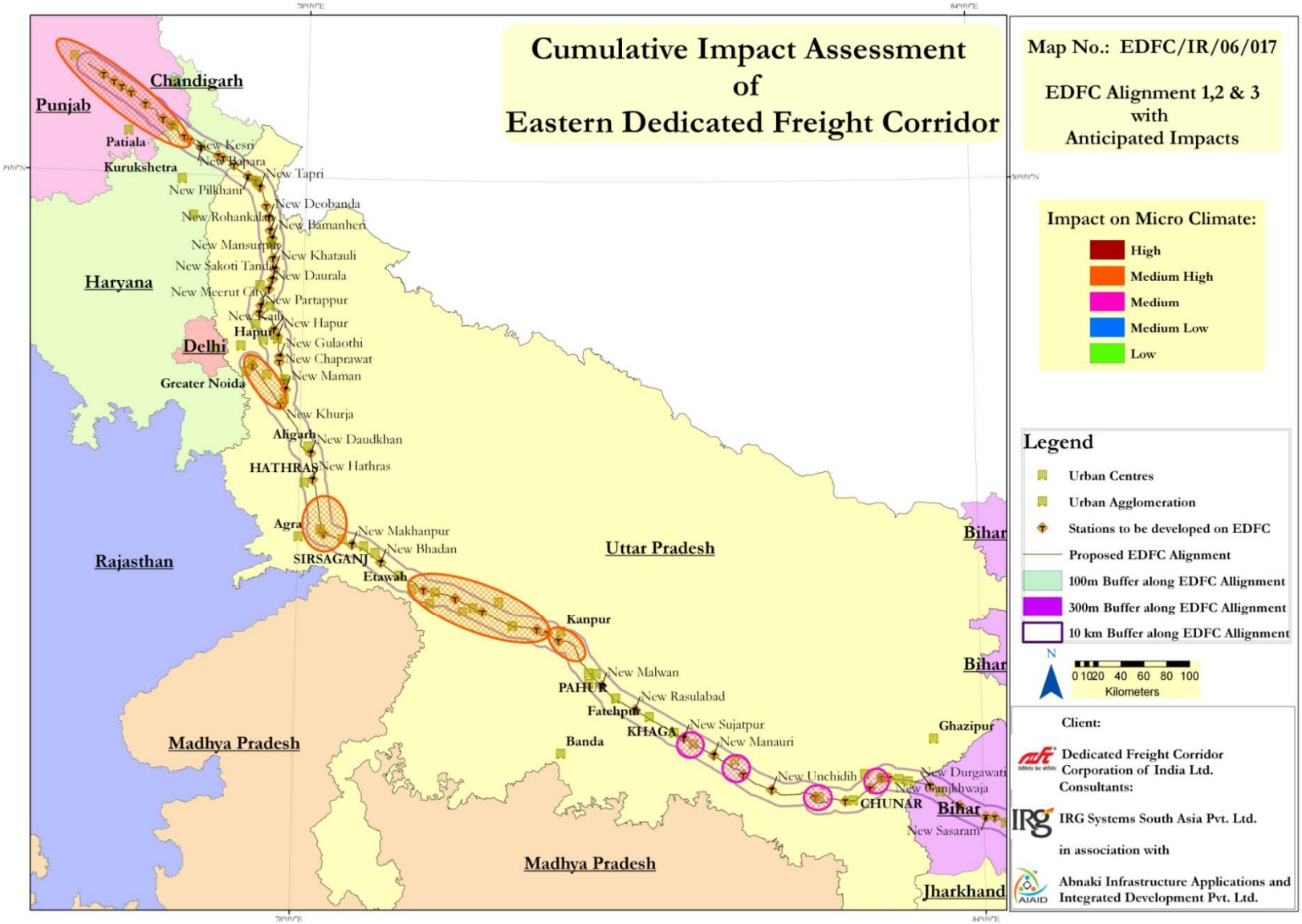


Figure 6.20: Map Depicting the Impact on Micro Climate within Hotspots along EDFC Alignment

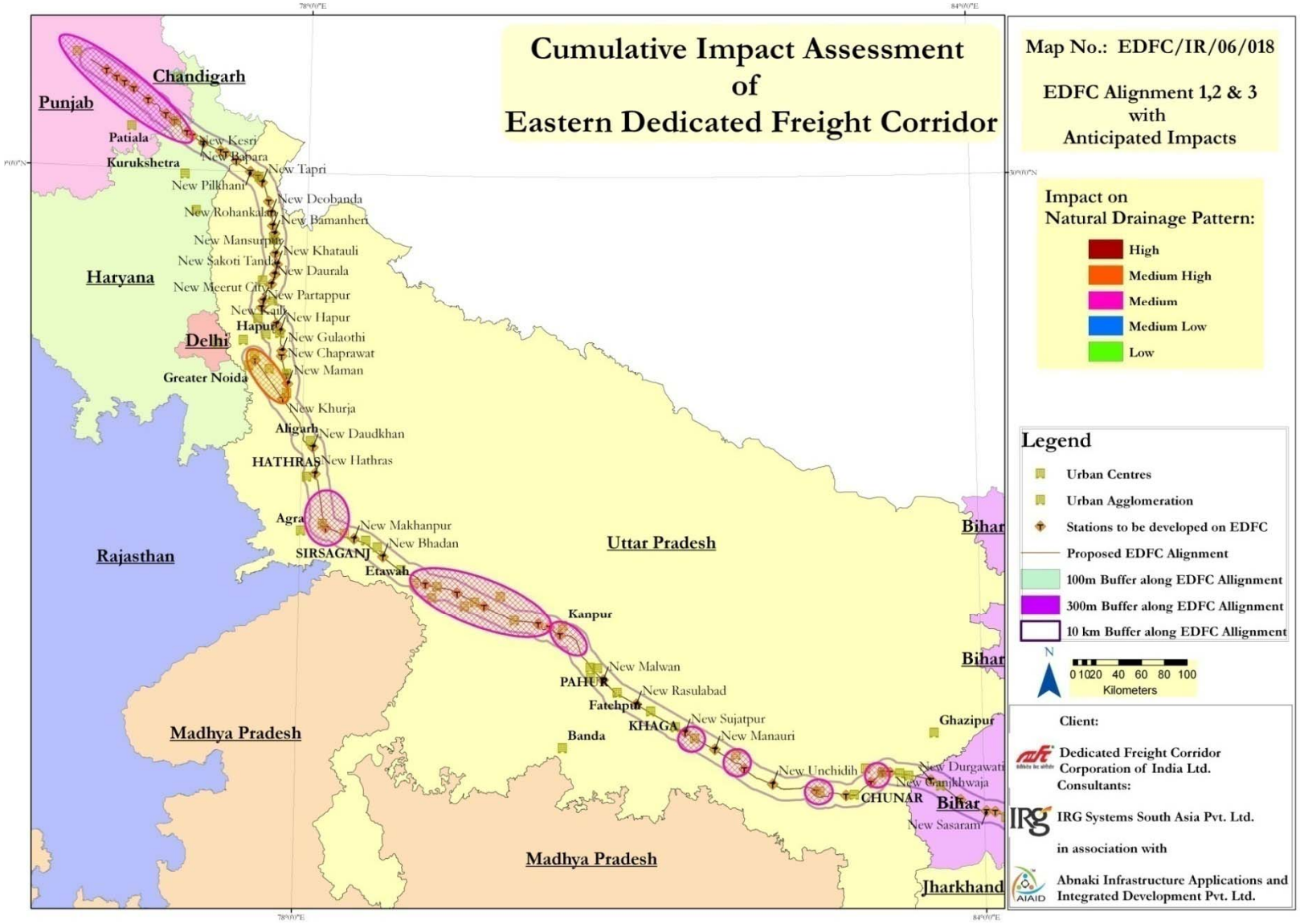


Figure 6.21: Map Depicting the Impact on Natural Drainage Pattern within Hotspots along EDFC Alignment

6.6 Summary of Cumulative Impact Assessment

The cumulative impacts have been assessed from the point of various projects that are being proposed or in the implementation stage across this DFCCIL corridor. However, the impacts along this entire section of the DFCCIL collectively indicate that there would be about 5529 ha of land being acquired with 39,912 families being affected. Along with this there are about 712 structures belonging to the BPL category being affected and 52,969 vulnerable project affected persons due to the project development. 1,03,457 trees are proposed to be felled.

Type and nature of the cumulative impact has been evaluated on all VECs in each hotspot. It has been identified that nature of impact varied from Moderately low to High. For example in Kanpur and Ludhiana existing resources is sensitive VECs thus for any new development, new infrastructure or enhancement in capacity of existing infrastructure is required to minimize the pressure on existing resources. Similarly in Kanpur Dehat, Kanpur Nagar, Mirzapur and Ludhiana it is assessed that air quality is sensitive VEC, thus appropriate measures are required to be taken for existing and proposed development to prevent any further degradation of air quality and improvement of air quality. It has been assessed these impacts are as being caused due to developments thus can be managed, if appropriate mitigation measures will be taken. All the impacts identified are mitigable and manageable. A detailed mitigation plan is required to be prepare at early stage of the project so as the mitigation of impact can be done due to project in all the project stage, i.e. pre-construction, construction and operation stage.

Major development within study area is EDFC development, associated facilities like loading and unloading yards, crossing & junction status, feeder lines, Road Over Bridges (ROBs) and Railway foot over bridges (RFOs) and EDFC induced developments like industrial belts/zones, logistic parks etc. Apart from this many other developments are anticipated in region which may occur due to induced effect of EDFC induced developments. DFCCIL being the agency responsible for EDFC development has major role in management of EDFC implementation project. However DFCCIL also has role of management in various EDFC induced developments and other anticipated developments within study area.

Thus DFCCIL will be involved directly and indirectly in majority of these developments. Developments which will be directly or indirectly linked with EDFC developments and will involve DFCCIL participation either directly or indirectly are listed in **Table 6.17** below.

Table 6.17: Role of DFCCIL in Various Developmental Projects in Study Area

S. No.	Developments	Authority Responsible Directly	Under Control/Influence of DFCCIL	Role of DFCCIL
1.	Development of EDFC	DFCCIL	Yes	To ensure implementation of project and operation of project as per proposed EMP
2.	Expansion of IR & DFC	IR & DFCCIL	Yes-directly for DFC, indirectly for IR	To carry out EIA study for expansion project and ensure implementation and operation as per proposed EMP. To learn from current development projects and include the learning from EDFC development projects in expansion

S. No.	Developments	Authority Responsible Directly	Under Control/Influence of DFCCIL	Role of DFCCIL
				project To coordinate with IR and sharing the experience for environmental protection during EDFC development project and suggesting the best methods they could take to minimize impact on environment
3.	Development of loading & unloading yards	DFCCIL	Yes	Area with good connectivity should be selected by DFCCIL for the unloading & loading yards. Also the area should not be close to sensitive locations and heavily populated areas. Roads connecting these yards to main markets should be wide enough to cater the emerging traffic from these yards. Else DFCCIL should coordinate with State Road development authorities, DTP & NHAI to include such developments in their planning.
4.	Logistic parks	SIDCs & DICs, State Governments	Yes- indirectly	DFCCIL should provide direct connectivity to such parks so as to minimize transportation of material to DFC alignment via road.
5.	Industrial Zones	SIDCs & DICs, State Governments	Yes-indirectly	DFCCIL should arrange to establish unloading and loading yards near such zones so that these zones can get direct benefit from development of EDFC. EDFC should establish their parcel booking office in such zones and should arrange for transportation system to collect bulk freight from such zones and transport to EDFC alignment in non-peak hours to minimize the traffic congestion and reduced emission by transporting material in non peak hours. Time management should be done by DFCCIL so as delays in transportation of material to these zones can be minimized. Also DFCCIL should coordinated with SIDC & Warehouse Development and Regulatory Authority to construct warehouses near the crossing and junction stations so as material carried by trains can be
6.	Industrial Corridors	SIDCs, DICS, State Government	Yes-indirectly	DFCCIL should assess the nature of industries proposed in industrial corridor and should be able to supply such material through railways. DFCCIL should coordinated with IR to ensure transportation of the DFCCIL material through feeder routes in these corridors, if these corridors are not along the alignment of proposed DFCs.
7.	Thermal Power Plants	NTPC, Ministry of Power	Yes-indirectly	DFCCIL should assess the demand of coal by existing, proposed and planned

S. No.	Developments	Authority Responsible Directly	Under Control/Influence of DFCCIL	Role of DFCCIL
				developments. Carriage of coal should be systemized by DFCCIL so as existing gap between the demand and supply of coal can be bridged after development of EDFC. DFCCIL should ensure transportation of coal in covered wagon only. DFCCIL should ensure that dust generation should be minimum while unloading coal. It should be ensured be DFCCIL by coordinating with TPP authority so as coal can be transported immediately after its unloading
8.	Improvement of existing roads & highways or development of new highways or roads	State road & bridge development corporation & NHAI	Yes-indirectly	DFCCIL should coordinate with these authorities especially for expansion of roads & highway connected to crossing & junction stations of proposed EDFC so as traffic congestion on these routes can be minimized and thus air pollution
9.	Waterways	IWAI	Yes-indirectly	DFCCIL can coordinate with IWAI for transporting material transported through inland waterways. DFCCIL should ensure transportation of material between IWAI and DFCCIL should be in environmental sound manner.

CHAPTER 7: MITIGATION MEASURES AND MANAGEMENT PLAN

7.1 Introduction

Mitigation measures includes the preventive measures which when taken can either eliminate or reduce the intensity of the impact on the VECs. These mitigation measures ensure the environmental sound implementation of the project and enhance social acceptability of the project. Mitigation plan should be prepared in early stage of the project so as the measures could be defined for all the pre-construction, construction and operation phase of the project to ensure minimum damage to environment and society at all the stages of project. Effectiveness of the mitigation measures proposed should also be assessed regularly via monitoring and supervision of the monitoring indicators which defines the status of the VECs. A cell or committee should be formed by the project proponent for the purpose of implementation of these measures and supervision of effectiveness of these measures. This cell should include the environmental, social & safety experts having complete knowledge of project action on the environment and society. Approach followed for describing the mitigation measures and formation of environmental management plan is given in **Figure 7.1** below.

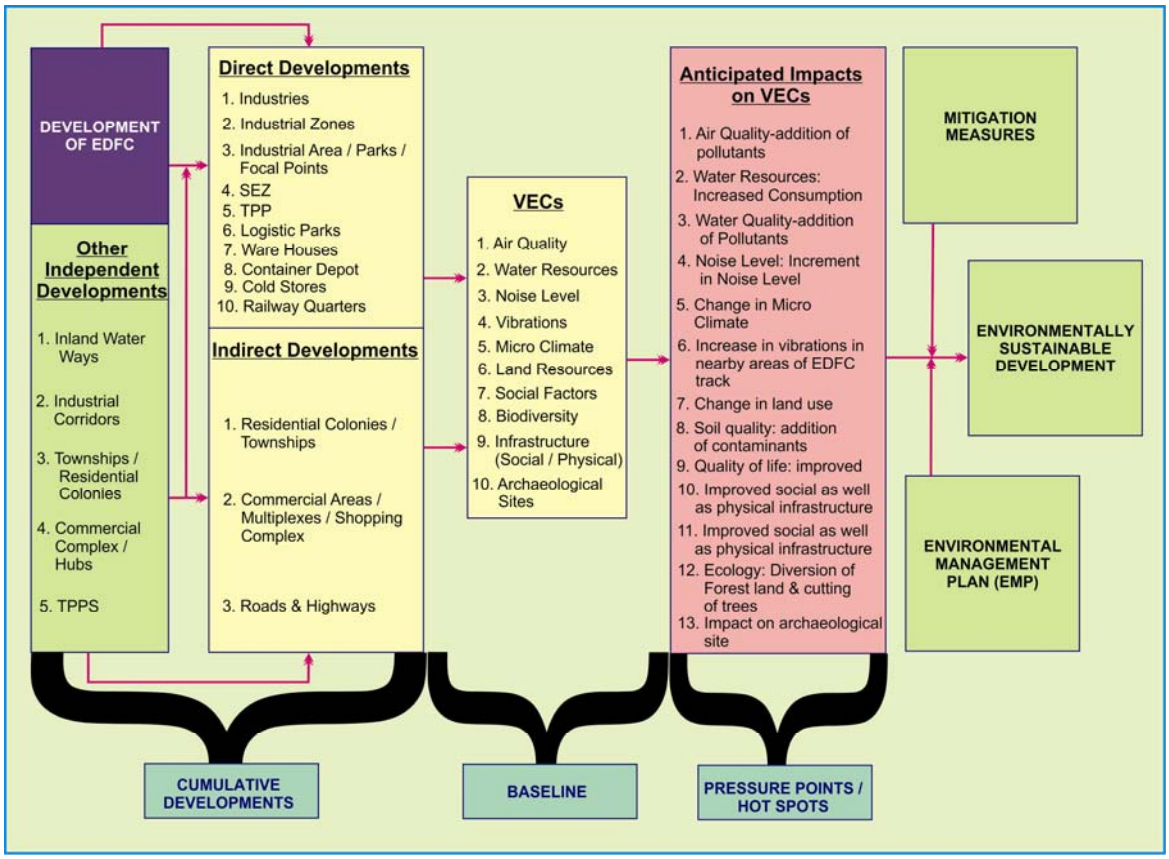


Figure 7.1: Approach Followed for Defining Mitigation Measures

7.2 Review of the Mitigation Measures Proposed in EIA/SIA Study of the EDFC

Mitigation measures as proposed in EIA/SIA studies have been reviewed in detail. It has been found that mitigation measures proposed are adequate and address all major and minor issues which may have an impact on environment and society. After carrying out the CIA study and assessment of the baseline condition of the areas through which proposed EDFC traverses and nature of developments which this area will experience after development of EDFC, it is learned that some of the measures should be further added to the Mitigation plans described in EMPs prepared for EDFC so as impacts not only due to EDFC development but also due to other developments in study area can be minimized. Assessment and description of enhancement measures required to be taken are given in **Table 7.1** below.

Table 7.1: Additional Mitigation Measures to Be Taken by DFCCIL for Implementation of EDFC Project

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
1.	**Land Resources**	Change in land use and soil contamination	**Direct:** - Change in geology - Change in landuse - Pressure on land resources on account of need for borrow areas and quarry sites for construction and maintenance works - Impacts on drainage (see point no.3 related to Water) **Indirect:** - Soil erosion - Soil contamination	- Soil Quality & Erosion Management Plan - Land acquisition should be minimized with provision of retaining walls - Any land acquired or used should be with the consent of land owner and appropriate compensations should be paid to the land owners as per law of land. - No blasting envisaged - Preparation of quarry redevelopment plan - Embankment protection including stone pitching for embankment higher than 3 m and turfing for embankment lesser than 3m height - Provision of silt fencing - Reclamation of quarries - Hazardous waste management plan need to be enforced - Oil interceptors to be provided for accidental spill of oil and diesel. - Construction of septic tanks for disposal of waste - Obtaining all necessary approvals from statutory authorities - Compliance to the conditions prescribed in the approvals granted - Compensatory plantation to be carried out in minimum ratio of 1:2 for every tree cut	**Yes**	**Yes** - Compensatory plantation should not be restricted to 1:2, and should be carried out as much as possible. - DFCCIL should monitor the plantation so as to assure the survival rate of minimum 70%. - Compensation to the land owners should be paid at market rates - Regular inspections, supervision and monitoring for smooth implementation of plans. - Adoption of practices like hydroseeding to control soil erosion and ensure slope stabilization - Borrow and quarry areas management and mitigation Borrow area: - Agricultural land should not be used as borrow areas, unless unavoidable, i.e. barren land is not available. Priority should be given to degraded land for excavation for borrow materials and rehabilitation of borrow areas may be taken under the project. - The borrow pits should not be located along the roads. - The loss of vegetation is almost nil or minimum. - Sufficient quality of soil is available.	DFCCIL, concerned PMUs of EFC1-3 and contractor. The recommended mitigation measures should be internalised as part of contract agreement with the contractor so that such measures are implemented and monitored effectively by PMUs/DFCCIL	Land & Revenue office, DM, DTP

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						- The Contractor shall obtain representative samples from each of the identified borrow areas and have these tested at the site laboratory following a testing programme as approved by the concerned Engineer. It shall be ensured that the fill material compacted to the required density *Management of Borrow Areas located in Agricultural Lands* (i) The preservation of topsoil will be carried out in stockpile, (ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal). (iii) Borrowing of earth will be carried out up to a depth of 1.5m from the existing ground level. (iv) Borrowing of earth will not be done continuously throughout the stretch. (v) Ridges of not less than 8m widths will be left at intervals not exceeding 300m. (vi) Small drains will be cut through the ridges, if necessary, to facilitate drainage. (vii) The slope of the edges will be maintained not steeper then 1:4 (Vertical: Horizontal). *Borrow Areas located in Agriculture Land in un-avoidable Circumstances:*		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						(i) The preservation of topsoil will be carried out in stockpile. (ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal). (iii) The depth of borrow pits will not be more than 30 cm after stripping the 15 cm topsoil aside *Borrow Areas located on Elevated Lands* (i) The preservation of topsoil will be carried out in stockpile (ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal). (iii) At location where private owners desire their fields to be leveled, the borrowing shall be done to a depth of not more than 1.5m or up to the level of surrounding fields. *Borrow Areas near Riverside* (i) The preservation of topsoil will be carried out in stockpile (ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical:		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						Horizontal). (iii) Borrow area near to any surface water body will be at least at a distance of 15m from the toe of the bank or high flood level, whichever is maximum. *Borrow Areas near Settlements* (i) The preservation of topsoil will be carried out in stockpile (ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical: Horizontal). (iii) Borrow pit location will be located at least 0.75 km from villages and settlements. If unavoidable, the pit will not be dug for more than 30 cm and drains will be cut to facilitate drainage. (iv) Borrow pits located in such location will be re-developed immediately after borrowing is completed. If spoils are dumped, that will be covered with a layers of stockpiled topsoil in accordance with compliance requirements with respect MOEFCC/PPCB guidelines. *Borrow Pits along the Road* (i) The preservation of topsoil will be carried out in stockpile (ii) A 15 cm topsoil will be stripped off from the borrow pit and this will be stored in stockpiles in a designated area for height not exceeding 2m and side slopes not steeper than 1:2 (Vertical:		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						Horizontal). (iii) Borrow pits along the road shall be discouraged. (iv) If permitted by the Engineer; these shall not be dug continuously. (v) Ridges of not less than 8m widths should be left at intervals not exceeding 300m. (vi) Small drains shall be cut through the ridges of facilitate drainage. (vii) The depth of the pits shall be so regulated that there bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of the final section of bank, the maximum depth of any case being limited to 1.5m. (viii) Also, no pit shall be dug within the offset width from the toe of the embankment required as per the consideration of stability with a minimum width of 10m. *Re-development of Borrow Areas* The objective of the rehabilitation borrow areas is to return the borrow pit sites to a safe and secure area, which the general public should be able to safely enter and enjoy. Securing borrow pits in a stable condition is fundamental requirement of the rehabilitation process. This could be achieved by filling the borrow pit approximately to the road level. The Borrow Areas should be		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						rehabilitated as follows; Borrow pits will be backfilled with rejected construction wastes (unserviceable materials) compacted and will be given a turfing or vegetative cover on the surface. If this is not possible, then excavation slope should be smoothened and depression is filled in such a way that it looks more or less like the original ground surface. Borrow areas might be used for aquaculture in case landowner wants such development. In that case, such borrow area will be photographed after their post-use restoration and Environment Expert of Supervision Consultant will certify the post-use redevelopment. The Contractor should keep record of photographs of various stages i.e. before using materials form the location (pre-project), for the period borrowing activities (Construction Phase) and after rehabilitation (post development), to ascertain the pre and post borrowing status of the area. **Quarry area management and mitigation:** LAND MANAGEMENT Land degradation is one of the major adverse impacts of quarrying in the form of excavated voids and also in the form of waste dumps.		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						Land reclamation plan should therefore, be prepared and implemented simultaneously with the quarrying activities. **Land Reclamation** The first step in a successful reclamation programme is to decide the post reclamation land use. In this case it is considered appropriate to convert the land under a cover of dense vegetation, keeping in view the following : – Area is rich in vegetation and further plantation would match with the existing environment; – Trees absorb CO_2, contribute oxygen, purify the air, conserve the soil and prevent its erosion. Trees promote precipitation and add to stabilization of slopes; – The disturbed land including the area disturbed due to excavation, dumping, construction of haul roads, ramps, structures etc would be fully reclaimed before finally abandoning the quarry. The reclamation process shall take : • One year for grading and top soil spreading;		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						• Another four years for landscaping and stabilization of plantation. – Thus the area shall be fully reclaimed within five years of completion of quarrying operations. – During post quarrying period, in the quarry area all the disturbed areas will be reclaimed before decommissioning/abandoning the quarry , The infrastructure set up for quarrying operations should be dismantled and reclaimed. **Soil Conservation Measures:** – To prevent soil erosion and wash-off of dump-fines from freshly excavated benches and dumps following measures shall be adopted : – Garland drains should be provided around the quarry wherever required to arrest any soil from the quarry area being carried away by the rain water; – Toe drains with suitable baffles should be provided all along the toe of the soil dumps to arrest any soil from the dump slopes being		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						carried away by the rain water; – Special local stone paved chutes and channels should be provided, wherever required, to allow controlled descent of water, especially from the top of the – slope along to the foothills; – Bench levels should be provided with water gradient against the general pit slope, to decrease the speed of storm water and prevent its uncontrolled descent. – Gully formations, if any, on sides of the benches shall be provided with check dams of local stone or sand filled bags. The inactive slopes should be planted with bushes, grass, shrubs and trees after applying top soil to prevent soil erosion; – Loose material slopes should be covered by plantation by making contour trenches at 2 m interval to check soil erosion both due to wind and rain; – Retaining walls (concrete or local stone) should be provided, around the stockpile or wherever required, to support the benches or any loose material as well as to – arrest sliding of loose debris.		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						AFFORESTATION PLAN – Development and implementation of green belt will be of paramount importance as it will not only add up as an aesthetic feature, but also act as a pollution sink. – The species to be grown in the areas should be dust tolerant and fast growing species so that a permanent green belt is created. – Apart from the green belts and aesthetic plantation for eliminating fugitive emissions and noise control, all other massive plantation efforts shall be decided and executed with the assistance and co-operation of the local community. Based on the community needs the forestation would mainly aim at : • Protection of soil erosion • Plantations or fuel wood blocks to meet the energy requirements. – The plantation of any of the above or combination of the		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						above should be decided in consultation with the local community. – Relevant forest authority should be consulted for successful reclamation/ afforestation programme. The plant species which are indigenous, fast growing, spreading roots, broad leaf base etc should be selected for plantation/afforestation with focus on the quarry problems. Monoculture should be avoided as it is not only expensive to maintain but is also vulnerable to diseases, pests and climatic changes.		
2.	**Air Quality**	Change in Concentration of PM_{10}, $PM_{2.5}$, SO_2, NO_x, CO and other pollutant in air	**Direct:** - Improvement of air quality and reduction of PM10, PM2.5, SO2, NOx, CO **Indirect:** - Air quality may deteriorate in areas where freight loading and areas where development and use of access roads will take place are	- Carry out Environment Impact Assessment Study for each development - Preparation of Air Quality Management Plan - Construction, implementation and operation as per prepared and approved air quality management plan - Regular monitoring of emissions to check air pollution - Obtaining all necessary approvals from statutory authorities - Compliance to the conditions prescribed in the approvals granted - Regular inspections , supervision and monitoring of performance of	**Yes**	**Yes** - Compensatory plantation should not be restricted to 1:2, and should be carried out as much as possible. - DFCCIL should monitor the plantation so as to assure the survival rate of minimum 70%. - Transportation of the material with potential to generate fugitive emissions should be avoided in open wagons. - Loading / unloading yards of DFCCIL should have wide roads, multiple entry exits and adequate parking facility to prevent traffic jams /	**DFCCIL**	MoEFCC, CPCB, SPCB

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
			proposed due to increased nos. of vehicular movements and unloading/loading activities	APC devices - Compensatory plantation to be carried out in minimum ratio of 1:2 for every tree cut - Area selected should be away from sensitive areas like forests, wetlands, sanctuaries etc. - Development of multi layered green belt all around the project boundary - Avenue plantation should preferably carried out - Minimizing the VOC emissions by providing enclosed working environment - Shifting towards the cleaner fuels like CNG, Natural gas, PNG, LPG etc - Adopting renewable energy options like solar, wind & hydel energy options - Usage of less energy embodied material like fly ash, slag etc		congestions. - DFCCIL should identify the roads which can be choked due to unloading / loading of freight and should coordinate with state road development authority for improvement of those roads. - DFCCIL should permit only PUC certificate carrying vehicles in their loading / unloading yards. - Loading and unloading areas and materials storing areas should be paved. - DFCCIL should promote Roll On Roll Off (RORO) service to carry loaded trucks on goods trains to reduce air emissions and drastically reduce loading and unloading of freight at junction stations - . - Controlling dust levels in quarry operations: - Dust would be generated during quarry operations, and also during handling and transportation of the material. Following control measures should be followed: - Dust suppression systems (water spraying) to be adopted at faces/sites while loading and use of sharp teeth for shovels; Stock-piles:		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						– Mist sprays should be provided at appropriate places for preventing dust pollution during handling and stockpiling of quarried materials Haulage – Regular water spraying on haulage roads during transportation of quarried material by water sprinklers. – Transfer points shall be provided with appropriate hoods/chutes to prevent dust emissions. – Dumping of quarried material should be done from an optimum height (preferably not too high) so as to reduce the dust blow. Crusher – Crusher should be provided with Bag Filters to arrest any dust emission. The dust emission level will be kept within the prescribed standard – Water sprinkling system should be provided to check any fugitive emissions from the crushing operation. Belt Conveyor – Close conduit type conveyor		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						belt should be used for transportation of crushed material. – The belt and idlers to be maintained in proper condition so as to avoid spillage of material and prevent any fugitive emissions. – Controlling CO and NO_X LevelsHeavy and light vehicles are the major sources of CO in the mine. All vehicles and their exhausts should be well maintained and regularly tested for pollutants concentration. – Safety of workers at site, engaged at the strategic locations/dust generation points like drills, loading & unloading points, crushing etc, dust masks should be provided. Dust masks should prevent inhalation of RPM thereby reducing the risk of lung diseases and other respiratory disorders. Regular health monitoring of workers and nearby villagers in the impacted area should be carried out.		
3.	**Water**	**Depletion of water resources and degradation** of water quality	**Direct:** - Water consumption	- Carry out Environment Impact Assessment Study for each development	**Yes**	**Yes** - Silt fencing should be provided to avoid surface	**DFCCIL**	MoEFCC, CPCB, SPCB, Irrigation Department, CGWB, DC

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
			during construction and operation phase - Discharge of wastewater into water bodies/land during operation/construction phase **Indirect:** - Increase in surface runoff due to EDFC track. - Siltation of water bodies & reduction in ground water recharge. - Increased sedimentation. - Contamination of water bodies due to spillage of loaded material during accidents of trains	- Carry out Environmental monitoring planning - Preparation of Air Quality Management Plan - Construction, implementation and operation as per prepared and approved water quality management plan - Obtaining all necessary approvals from statutory authorities - Compliance to the conditions prescribed in the approvals granted - Compensatory plantation to be carried out in minimum ratio of 1:2 for every tree cut - Avenue plantation should preferably be carried out - Water quality to be monitored as envisaged in EMP - Cross drainage structures should be provided at appropriate locations		runoff. - Rain water recharge wells to be provided at regular intervals to compensate the previous loss. - Proper management of RWH pits to be provided to check the clogging - Guidelines for sediment control to be enforced - Collection of rain water in sumps - Oil and grease traps to be provided at fuelling locations, to prevent contamination of water. - Slopes of embankment leading to water bodies to be modified and screened so that contaminants do not enter the water channel / water body. - Provision of drains for collecting the wastewater emerging due to washing of trains and station areas. This water should be disposed-off in septic/soak pits or to be treated in STP depending on the quantity of wastewater generation		
4.	**Noise**	Increase in noise pollution	**Direct:** - Increase in noise pollution **in** new freight corridors and the adjoining rail systems or feeder rail links	- Regular ambient noise level monitoring should be monitored and analysed with reference to baseline ambient noise levels in pre-project conditions - Temporary noise barriers should be provided at the locations where high levels of noise may generate. Construction activities should not	**Yes**	**Yes** - Noise standards for all vehicles, plants, equipments and machineries should be enforced - All machineries including industrial machinery and vehicles should be well maintained and particular	**DFCCIL**	MoEFCC, CPCB, SPCB

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
				be carried out during night time - Construction machinery should comply with standards prescribed by CPCB and should be regularly maintained and serviced. - Construction equipment & DG sets should be enclosed in acoustic enclosure - Noise barrier should be provided in the locations close to sensitive receptors like school & hospital during operation phase - All industries should manage the noise levels from their units as per CPCB standards		attention should be paid to silencers and mufflers - Workers in the vicinity of high noise levels should be provided earplugs and helmets - Form an effective sound buffer around the alignment and industrial areas by trees and shrub plantation for avenue plantations - Speed limits should be assigned within premises of the loading/unloading yards & other DFCCIL facilities - Controlling Noise levels in quarry operations: - To keep noise generation in control, latest sophisticated technology and equipment should be considered. Drills, loaders, dumpers etc with larger capacities possibly should be acquired to reduce the number of operational units at a time, thereby reducing the noise generating sources. - The equipment systems will include cabins should ensure that the operators and other work persons, in and around the operating equipment, have comfortable work stations. To keep the ambient noise levels within the permissible limits of 75 dB(A), the following measures should be adopted : – Innovative approaches of		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						using improvised plant and machinery designs, with in-built mechanism to reduce sound emissions like improved silencers, mufflers and closed noise generating parts. – Procurement of drill, loaders and dumpers and other equipment with noise proof system in operator's cabin. – Confining the equipment with heavy noise emissions in soundproof cabins, so that noise is not transmitted to other areas. – Regular and proper maintenance of noise generating machinery including the transport vehicles and belt conveyors, to maintain the noise levels. – Siting of quarry colony, if any, buildings and other infrastructure away from the noise sources with the probability of sound waves being directed towards them being least. – Provision should be made for noise absorbing pads at foundations of vibrating equipment to reduce noise emissions. – To protect the workers from exposure to high levels of noise, following measures should be adopted:		

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						– Provision of protective devices like ear muffs/ear plugs to workers who cannot be isolated from the source of high intensity noise, e.g. blasting. – Confining the noise by isolating the source of noise as discussed above. – Reducing the exposure time of workers to the higher noise levels by shift management.		
5.	**Bio Diversity**	Loss of habitat, flora and fauna	**Direct:** - Loss of habitat - Felling of 1,03, 547 trees **Indirect:** - Loss of dependent flora and fauna on account of loss of habitat and tree felling	- Carrying out plantation all along the EDFC alignment to the extent possible. - Development of thick green belt is suggested near stations and industries especially - Plantation of native floral species	**Yes**	**Yes** - Maintenance of green belt plantation should be enforced - Prohibition of hunting/killing of any animal at site and nearby areas by site workers & construction labour - Fencing of the construction labour camp, plant site and any hazardous material storage site to prevent trespassing of any animal in that area - Lighting should be carried out at site so as to prevent entry of wild animal at site during night time. - Any wild animal, if appear at site should be immediately informed to forest officials to take adequate action - Any illegal tree cutting, if	**DFCCIL**	Forest Department, MoEFCC, CPCB, NBWL

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						observed at site or nearby areas should be informed to forest officials. - Underpass for wild flora/fauna and cattle should be considered if intersecting any such zone. Such underpass should be camouflaged with the habitat required by such faunal species		
6.	**Socio Economic**	Urbanization, Industrialization, urban sprawl of existing urban areas, infrastructure development, economy upgradation & improved standard of living	**Direct:** - Acquisition of 5,529 ha. land - 39, 912 families affected -712 structures of-BPL affected 52,969 vulnerable project affected persons - Infrastructure development - Industrialization, - Employment generation **Indirect:** - Urban Sprawling - economy upgradation, - Improvement in existing standard of living,	- Provision of compensation as per law of land to all the land holders - Acquisition of agricultural land should be minimized - Resettlement & Rehabilitation should be carried out for displaced families as per the RAP formed - Acquisition of land to be carried out only with the consent of land owner	**Yes**	- Detouring should be avoided to the extent possible - Apart from providing compensation, NGOs should be contacted to give training to affected PAFs & PAPs loosing their livelihood due to land acquisition to adopt alternative livelihood options - Enhancement of infrastructure should be carried out in affected villages like strengthening of existing embankments of water bodies near to EDFC alignment, construction of bathing ghats, carrying out plantation, provision of sitting facilities at stations etc - Provision of fencing along the alignment in the populated areas - Soil should be taken preferably from barren land. At present mostly agricultural land along the alignment are being used to fulfill soil demand for construction.	DFCCIL	DTP, DM, NHAI, SR&BC, SIDS, DIC, line departments/agencies relevant to implementation of livelihoods and skill development programmes and projects (Details in **Annexure 7.1**).

S. No.	Cumulatively Impacted VECs (Refer Table 6.5)	Cumulative Impacts Anticipated (Refer Table 6.5)	Impact of EDFC development	Mitigation Measures	Whether addressed in EIA Reports (Y/N)	Enhancement Required (If Yes)	Authorities Responsible	
							Direct	Indirect
						Thus options like barren/waste land should be explored in region - Coordination with the state road & bridge development authorities & NHAI to develop and improve roads connecting stations of EDFC and the towns, cities & villages - Coordinate with SIDC to develop the industrial areas as per the siting guidelines in study areas to maximize utility of EDFC - In addition to the provisions given in Resettlement Plans, DFCCIL should also integrate Central and State Government livelihoods programmes like skill development programmes so that members of project affected families could be benefitted. A list of the schemes is provided in **Annexure 7.1**.		

7.3 Mitigation Measures for Proposed / Planned & Anticipated Developments within Study Area

As per the stakeholder consultation, developments which will and may come up in study area has been identified. Also impact due to each such development has been assessed in detail in previous chapter. Mitigation Plan has been prepared for each such development to minimize impact on the VECs. Such mitigation plan should be shared by DFCCIL with the authorities responsible for carrying out the development. This plan can be enhanced by those authorities, if required due to site specific reasons. Mitigation measures are detailed in **Table 7.2** below.

Table 7.2: Mitigation measures for anticipated developments

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL

1	Expansion of DFC network or IR network	• Essentially to carry out environment impact assessment study to assess the impacts of the project on the existing infrastructure and environmental quality during both construction & operation phase
		• To obtain all the environment and safety related approval as per applicability from concerned authorities
		• Alignment/site selected should avoid National Parks, Wildlife sanctuary, Reserve forests, Migratory Route of fauna, etc, if necessary, permission should be taken from SBWL/NBWL
		• Public consultations should essentially be undertaken
		• Promote RORO service and implement IRC Codes, as applicable
		Mitigation Measures for Management of Land Use, Soil Quality, Soil Erosion & People
		• Selection of borrow areas, plant site, construction labour camps and debris disposal site should be carried out carefully so as to avoid agricultural land and distance from habitation and sensitive location should be minimum 1000 m or as per norms.
		• Closure of borrow area, debris disposal site, plant site and construction labour camp site should be done so as to restore its original state by filling, relaying top soil and carrying out plantation
		• Any land acquired or used should be with the consent of land owner and appropriate compensations should be paid to the land owners as per law of land.
		• Adopt Hydroseeding to control soil erosion and slope stabilization.
		• Shifting of utilities, if any should be done immediately after removal
		• Workers must be trained and made aware to avoid wastage of resources by mishandling, conserve energy by following best practices, handle emergency situations
		• Cautionary and guiding signage should be displayed at site in local language at all required locations like fuel storage area, raw material storage, plant site and entry should be restricted to trained and authorized personnel in risk prone areas
		• Stone pitching should be carried out in embankments close to water body
		• Top soil removed should be stored separately and should be re-used for landscaping purpose or should be relaid on the same location after completion of activity
		• Personal protective equipment should be provided to workers
		• Safety officer must be deputed to ensure safety of all personnel at
			• Environment Management Plan
			  • Air Quality Management Plan
			  • Water Resources Management Plan
			  • Noise Level Management Plan
			  • Soil Quality & erosion Management Plan
			• Bio-diversity Management Plan
			• Quarry management plan
			• Plant Site/Labour camp Management Plan
			• Borrow Area Management Plan
			• Landscaping Plan
			• Disaster Management Plan
			• Occupational Health & Safety Management Plan
			• Traffic Safety Management Plan
			• Environment Monitoring Plan
				DFCCIL & Indian Railways, Forest Department, PMUs and contractors	MoEF/SEIAA, State Pollution Control Boards, Forest Department	Coordinate with Environment Directorate of Railway Board (set up vide letter no. 2015/Environ/6/1 dated 7-1-2015 in Planning, Implementation and Operation of the DFC project. Should ensure implementation of the EMP prepared.
						.
						DFCCIL should coordinate with IR to discuss the effectiveness of the EMP prepared and to learn from their experience. DFCCIL should share their experience with IR which may help them while expanding their network as well.
						
						This will help in institutional building, coordination and strengthening of IR and DFCCIL on matters related to environment management

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		the site all the time. Traffic managers should also be deputed to manage the traffic & minimize the accident hazards • First aid facilities including ambulance should be provided at the site. Also tie-ups with local hospital should be done to handle emergency case, if any • Labour camps should be provided with all facilities like drinking water, sanitation, kitchen facility (LPG fuel). Open burning of fuel should be prohibited. Six monthly health check up should be arranged for all workers **Mitigation Measures for Air Quality Management** • Construction material should be sourced from licensed quarry & authorized dealers, nearest to project site • Piling of material and debris at site should be avoided to prevent wastage, air, water and soil pollution • Dust emissions from the site should be managed by sprinkling water.Low sulhpur diesel should be used in construction vehicles, equipment & DG sets to minimize the emissions • Wheel washing facility should be provided at exit point of construction to minimize the emissions • Material Transportation Vehicles should be covered **Mitigation Measures for Water Resources & Drainage Management** • Construction site should be kept clean and debris should be removed regularly from the site • Storm water from construction site should be managed by providing garland drains, sediment traps etc. to protect the surface water bodies from pollution • Cross drainage structures like balancing culverts should be provided to maintain natural drainage pattern. Stone pitching should be provided for slope stabilization near water bodies • Waste management should be carried out at site. Different color bins should be provided to collect different type of waste. Recyclable waste should be sold off to authorized dealers and the remaining waste should be sent for land filling to sites identified by Municipal Corporation or to the site identified & approved by client for debris disposal. No waste should be disposed off in any water body • Any hazardous waste, if generated should be stored and disposed off as per Hazardous Waste (Management, Handling & Trans-boundary) Rules, 2008 • Wastewater from site should be managed by providing the septic				

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		tanks & soak pits. Construction wastewater should be collected and should be re-used for curing purpose & wheel washing • Curing should be carried out by spraying to conserve water. • Fuel storage and hazardous waste storage area should be located in isolated location and on paved surfaces • Oil interceptor will be provided for accidental spill of oil and diesel • All washing and maintenance effluent from the workshop area of vehicle maintenance area should drain to separate collection areas fitted with oil and grease trap and de- siltation chamber. The treated water shall be used for dust suppression and green belt development. This water shall not be discharged to river at all. **Mitigation Measures for Noise Level Management** • Temporary noise barriers should be provided at the locations where high levels of noise may generate. Construction activities should not be carried out during night time • Construction machinery should comply with standards prescribed by CPCB and should be regularly maintained and serviced. • Construction equipment & DG sets should be enclosed in acoustic enclosure • Noise barrier should be provided in the locations close to sensitive receptors like school & hospital during operation phase **Mitigation Measures for Bio-Diversity Management** • Alignment should be such selected to minimize the tree cutting • Compensatory plantation should be carried out in ratio of 1:2 minimum with assistance of Forest Dept.				

2	National Waterways Development	• Essentially to carry out environment and social impact assessment study including the interconnecting railway and road development as part of proposed multimodal terminal at Ramnagar to assess the impacts of the project on the existing infrastructure and environmental quality, including assessment of loading and reloading of freight during both construction & operation phase
		• To obtain all the environment and safety related approval as per applicability from concerned authorities. India is signatory of the IMO thus all the applicable conventions for inland water transport should be followed
		• Alignment/site selected should avoid National Parks, Wildlife sanctuary, Reserve forests, Migratory Route of fauna, etc, if necessary, permission should be taken from SBWL/NBWL
		• Public consultations should essentially be undertaken
		Mitigation Measures for Management of Land Use, Soil Quality, Soil Erosion & People
			• Environment Management Plan
			  • Air Quality Management Plan
			  • Water Resources Management Plan
			  • Noise Level Management Plan
			  • Soil Quality & erosion Management Plan
			• Bio-diversity Management Plan
			• Bio-diversity Conservation Plan
				Inland Waterways Authority of India, Forest Department	MoEF/SEIAA, State Pollution Control Boards, Forest Department	DFCCIl should coordinate with IWAI for development of connecting link between proposed terminal and proposed EDFC alignment so as unloaded material from cargo can directly be loaded in freight trains with minimum involvement of road transportation. This will reduce the air

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		• Selection of borrow areas (if any), plant site, construction labour camps and debris disposal site should be carried out carefully so as to avoid agricultural land and distance from habitation and sensitive location should be minimum 1000 m or as per norms. • Closure of borrow area, debris disposal site, plant site and construction labour camp site should be done so as to restore its original state by filling, relaying top soil and carrying out plantation • Any land acquired or used should be with the consent of land owner and appropriate compensations should be paid to the land owners as per law of land. • Workers must be trained and made aware to avoid wastage of resources by mishandling, conserve energy by following best practices, handle emergency situations • Cautionary and guiding signage should be displayed at site in local language at all required locations like fuel storage area, raw material storage, plant site and entry should be restricted to trained and authorized personnel in risk prone areas • Stone pitching should be carried out in upstream and downstream of the proposed civil interventions to prevent bank/soil erosion • Top soil removed should be stored separately and should be re-used for landscaping purpose or should be relaid on the same location after completion of activity • Personal protective equipment should be provided to construction workers • Safety officer must be deputed to ensure safety of all personnel at the site all the time. Traffic managers should also be deputed to manage the traffic & minimize the accident hazards • Dredged sand should be disposed after analysis as per its characteristics • First aid facilities including ambulance should be provided at the site. Also tie-ups with local hospital should be done to handle emergency case, if any • Labour camps should be provided with all facilities like drinking water, sanitation, kitchen facility (LPG fuel). Open burning of fuel should be prohibited. Six monthly health check up should be arranged for all workers **Mitigation Measures for Air Quality Management** • Construction material should be sourced from licensed quarry & authorized dealers, nearest to project site • Piling of material and debris at site should be avoided to prevent wastage and air, water and soil pollution	(endangered species) • Oil Spill Management Plan • Plant Site/Labour camp Management Plan • Borrow Area Management Plan • Landscaping Plan • Disaster Management Plan • Occupational Health & Safety Management Plan • Traffic Safety Management Plan • Environment Monitoring Plan			pollution and fuel requirement for transportation of goods. Should organize regular meetings with IWAI to enhance and improve the transportation of material between Inland waterways and DFC.

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		• Dust emissions from the site should be managed by sprinkling water. Low sulhpur diesel should be used in construction vehicles, equipment & DG sets to minimize the emissions • Wheel washing facility should be provided at exit point of construction to minimize the emissions • Material Transportation Vehicles should be covered • Parking and Unloading/loading space for expected vehicles should be provided to prevent idling of vehicles and thus to reduce air emissions **Mitigation Measures for Water Resources & Drainage Management** • Construction site should be kept clean and debris should be removed regularly from the site • Turbidity traps/curtains should be provided to prevent the generation of high turbid water • Restoration of changes in the stream, if any, made during construction to its original level. • Precautions shall be made that no nala or canal is clogged. • Substructure construction should be limited to the dry season and cofferdams may be constructed and utilized to lift the spoil directly out of it and carried to the riverbank for land disposal. • The piling work shall be undertaken during low flow period. • Provision shall be made for Geo Synthetic Screen for arresting silt flowing down stream. • Water from dewatering (if any) should pass through sediment bags before discharge into the river • Excavated area should be covered with tarpaulin during rains • Storm water from construction site should be managed by providing garland drains, sediment traps etc. to protect the surface water bodies from pollution • Cross drainage structures like balancing culverts should be provided to maintain natural drainage pattern. Stone pitching should be provided for slope stabilization near water bodies • Waste management should be carried out at site. Different color bins should be provided to collect different type of waste. Recyclable waste should be sold off to authorized dealers and the remaining waste should be sent for landfilling to sites identified by municipal corporation or to the site identified & approved by client for debris disposal. No waste should be disposed off in river/nearby water body				

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		• Any hazardous waste, if generated should be stored and disposed off as per Hazardous Waste (Management, handling & Trans-boundary) Rules, 2008 • Dredging should not be carried out in monsoon season • Wastewater from site should be managed by providing the septic tanks & soak pits. Construction wastewater should be collected and should be re-used for curing purpose & wheel washing • Curing should be carried out by spraying to conserve water. • Fuel storage and hazardous waste storage area should be located in isolated location and on paved surfaces • Oil interceptor will be provided for accidental spill of oil and diesel • All washing and maintenance effluent from the workshop area of vehicle maintenance area should drain to separate collection areas fitted with oil and grease trap and de- siltation chamber. The treated water shall be used for dust suppression and green belt development. This water shall not be discharged to river at all. • All vessels should abide by IWT Rules and applicable IMO convention regulations **Mitigation Measures for Noise Level Management** • Temporary noise barriers should be provided at the locations where high levels of noise may generate. Construction activities should not be carried out during night time • Construction machinery should comply with standards prescribed by CPCB and should be regularly maintained and serviced. • Construction equipment & DG sets should be enclosed in acoustic enclosure **Mitigation Measures for Bio-Diversity Management** • Alignment should be such selected to minimize the tree cutting • Compensatory plantation should be carried out in ratio of 1:2 minimum with assistance of Forest Dept. • Dredging should not be carried out during the breeding/spawning & migration season of aquatic organisms • Piling should not be carried out during breeding and spawning season and also to be carried out in low water season, i.e. pre-monsoon • Concrete and wood piling should be carried out in place of wood piling • Maintaining equipment in good condition to prevent leaks or spills of potentially hazardous materials like hydraulic fluid, diesel, gasoline and other petroleum products				

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		• Recovering waste or any miscellaneous unused materials for disposal in an appropriately certified facility or placed in storage. Maintaining emergency spill equipment available whenever working near or on the water • Positioning water borne equipment in a manner that will minimize damage to fish habitat. • Fish exclusion devices may be installed in the water column around the pile driving area to prevent fish access. The need for exclusion would be determined on the basis of installation timing, mitigation measures, the success of mitigation measures in the field etc • Bubble curtains (with frames acceptable to DFO) over the wetted length of the pile may be required to mitigate impacts on aquatic life • Turbidity traps/curtains should be provided or Geo-Textile synthetic sheet curtain shall be placed around piling and construction area to prevent movement of sediments and construction waste. • Visual and hydrophone monitoring will be conducted during pile driving, at a range of depths in the water column and at varying distances and directions from the pile being driven, to measure sound waves and determine if temporary work stoppages and / or additional mitigation strategies are required to maintain levels below 30 kPa • Hydrophone monitoring shall be carried out throughout the pile driving from beginning to end and particularly during periods of pile driving resistance or refusal • Using lighting as per need basis only especially during night time as lighting during night time may disturb the flora and fauna. Lighting should be oriented in a way that illumination of water body is avoided • No on shore excavation shall be carried out during monsoon • Run-off from the construction site & dewatered water should pass through the sediment bags prior disposal in river • Workers should be trained to handle the equipment and material at site so as to minimize the spillage of materials and contamination of water • All workers should be made aware of not throwing any waste in the river or any drain • No construction debris/ already accumulated solid waste at site or waste generated from labour camp should be thrown in river or				

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		any drain • Sewage generated from labour camp should not be directed into river but should be disposed off through septic tank/soak pit • In case any tortoise is sited, necessary caution notice shall be displayed and conveyed to all construction workers and officers.				

3	Access roads for DFCCIL to handle of multi-axle load	• Essentially to carry out environment impact assessment study to assess the impacts of the project on the existing infrastructure and environmental quality during both construction & operation phase
		• To obtain all the environment and safety related approval as per applicability from concerned authorities
		• Alignment/site selected should avoid National Parks, Wildlife sanctuary, Reserve forests, Migratory Route of fauna, etc, if necessary, permission should be taken from SBWL/NBWL
		• Analysis of alternative alignment should be carried out to minimize impact on environment & society
		• Public consultations should essentially be undertaken
		• Promote RORO service and implement IRC Codes, as applicable
		
		Mitigation Measures for Management of Land Use, Soil Quality, Soil Erosion & People
		• Selection of borrow areas, plant site, construction labour camps and debris disposal site should be carried out carefully so as to avoid agricultural land and distance from habitation and sensitive location should be minimum 1000 m or as per the norms.
		• Closure of borrow area, debris disposal site, plant site and construction labour camp site should be done so as to restore its original state by filling, relaying top soil and carrying out plantation
		• Any land acquired or used should be with the consent of land owner and appropriate compensations should be paid to the land owners as per law of land.
		• Shifting of utilities, if any should be done immediately after removal
		• Workers must be trained and made aware to avoid wastage of resources by mishandling, conserve energy by following best practices, handle emergency situations
		• Cautionary and guiding signage should be displayed at site in local language at all required locations like fuel storage area, raw material storage, plant site and entry should be restricted to trained and authorized personnel in risk prone areas
		• Stone pitching should be carried out in embankments close to
			• Environment Management Plan
			  • Air Quality Management Plan
			  • Water Resources Management Plan
			  • Noise Level Management Plan
			  • Soil Quality & erosion Management Plan
			• Bio-diversity Management Plan
			• Quarry management plan
			• Plant Site/Labour camp Management Plan
			• Borrow Area Management Plan
			• Landscaping Plan
			• Disaster Management Plan
			• Occupational Health & Safety Management Plan
			• Traffic Safety Management Plan
			• Environment Monitoring Plan
				National Highways Authority of India / Central Public Works Department / MoEF, State Public Works Department, Forest Department	MoEF/SEIAA/Department of Environment, State Pollution Control Boards, Forest Department	Should assess the status of roads connecting the stations, yards and other DFCIL facilities to major towns, villages & cities. Should organize quarterly meetings with State Road & Bridge Development Authorities & NHAI to provide their suggestion and requirement of construction/improvement of roads/highways.

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		water body • Top soil removed should be stored separately and should be re-used for landscaping purpose or should be relaid on the same location after completion of activity • Personal protective equipment should be provided to workers • Safety officer must be deputed to ensure safety of all personnel at the site all the time. Traffic managers should also be deputed to manage the traffic & minimize the accident hazards • First aid facilities including ambulance should be provided at the site. Also tie-ups with local hospital should be done to handle emergency case, if any • Labour camps should be provided with all facilities like drinking water, sanitation, kitchen facility (LPG fuel). Open burning of fuel should be prohibited. Six monthly health check up should be arranged for all workers **Mitigation Measures for Air Quality Management** • Construction material should be sourced from licensed quarry & authorized dealers, nearest to project site • Piling of material and debris at site should be avoided to prevent wastage, air, water and soil pollution • Dust emissions from the site should be managed by sprinkling water, low sulphur diesel should be used in construction vehicles, equipment & DG sets to minimize the emissions • Wheel washing facility should be provided at exit point of construction to minimize the emissions • Material Transportation Vehicles should be covered **Mitigation Measures for Water Resources & Drainage Management** • Construction site should be kept clean and debris should be removed regularly from the site • Storm water from construction site should be managed by providing garland drains, sediment traps etc. to protect the surface water bodies from pollution • Cross drainage structures like balancing culverts should be provided to maintain natural drainage pattern. Stone pitching should be provided for slope stabilization near water bodies • Waste management should be carried out at site. Different color bins should be provided to collect different type of waste. Recyclable waste should be sold off to authorized dealers and the remaining waste should be sent for landfilling to sites identified by Municipal Corporation or to the site identified & approved by				

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		client for debris disposal. No waste should be disposed off in any water body • Any hazardous waste, if generated should be stored and disposed off as per Hazardous Waste (Management, handling & Trans-boundary) Rules, 2008 • Wastewater from site should be managed by providing the septic tanks & soak pits. Construction wastewater should be collected and should be re-used for curing purpose & wheel washing • Curing should be carried out by spraying to conserve water. • Fuel storage and hazardous waste storage area should be located in isolated location and on paved surfaces • Oil interceptor should be provided for accidental spill of oil and diesel • All washing and maintenance effluent from the workshop area of vehicle maintenance area should drain to separate collection areas fitted with oil and grease trap and de- siltation chamber. The treated water shall be used for dust suppression and green belt development. This water shall not be discharged to river at all. **Mitigation Measures for Noise Level Management** • Temporary noise barriers should be provided at the locations where high levels of noise may generate. Construction activities should not be carried out during night time • Construction machinery should comply with standards prescribed by CPCB and should be regularly maintained and serviced. • Construction equipment & DG sets should be enclosed in acoustic enclosure • Noise barrier should be provided in the locations close to sensitive receptors like school & hospital during operation phase **Mitigation Measures for Bio-Diversity Management** • Alignment should be such selected to minimize the tree cutting • Compensatory plantation should be carried out in ratio of 1:2 minimum with assistance of Forest Dept.				

4	Industrial Area/SEZ/Growth Centers/Focal Points Development	• Environmental impacts of the project should assess in detail and environment clearance should be obtained, if applicable
		• To obtain all the environment and safety related approval as per applicability from concerned authorities
		• Structural approval for the buildings should be obtained as applied in NBC, 2005
		• Alignment/site selected should avoid National Parks, Wildlife sanctuary, Reserve forests, Migratory Route of fauna, etc, if
			• Environment Management Plan
			  • Air Quality Management Plan
			  • Water Resources Management Plan
			  • Noise Level Management Plan
				Ministry of Commerce & Industry, State Industrial Development Corporation, Forest Department	MoEF, SEIAA, State Pollution Control Boards, Forest Department	DFCCIL should coordinate with SIDC for development of these zones in close vicinity to EDFC so as to minimize the transportation of goods via road to these areas. DFCCIL

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		necessary, permission should be taken from SBWL/NBWL • Analysis of alternative alignment should be carried out to minimize impact on environment & society • Public consultations should essentially be undertaken **Mitigation Measures for Management of Land Use, Soil Quality, Soil Erosion & People** • All industries should take CLU, if required • Any land acquired or used should be with the consent of land owner and appropriate compensations should be paid to the land owners as per law of land. • Shifting of utilities, if any should be done immediately after removal • Workers must be trained and made aware to avoid wastage of resources by mishandling, conserve energy by following best practices, handle emergency situations • Cautionary and guiding signage should be displayed at site in local language at all required locations like fuel storage area, raw material storage, plant site and entry should be restricted to trained and authorized personnel in risk prone areas • Top soil removed should be stored separately and should be re-used for landscaping purpose or should be relaid on the same location after completion of activity • Personal protective equipment should be provided to workers • Safety officer must be deputed to ensure safety of all personnel at the site all the time. Traffic managers should also be deputed to manage the traffic & minimize the accident hazards • First aid facilities including ambulance should be provided at the site. Also tie-ups with local hospital should be done to handle emergency case, if any • Labour camps should be provided with all facilities like drinking water, sanitation, kitchen facility (LPG fuel). Open burning of fuel should be prohibited. Six monthly health check up should be arranged for all workers **Mitigation Measures for Air Quality Management** • Construction material should be sourced from licensed quarry & authorized dealers, nearest to project site • Piling of material and debris at site should be avoided to prevent wastage and air, water and soil pollution • Dust emissions from the site should be managed by sprinkling water, low sulhpur diesel should be used in construction vehicles,	• Soil Quality & erosion Management Plan • Bio-diversity Management Plan • Plant Site/Labour camp Management Plan • Landscaping Plan • Disaster Management Plan • Occupational Health & Safety Management Plan • Traffic Safety Management Plan • Environment Monitoring Plan			should have parcel booking and transportation centers in each such zone so as all the goods can cumulatively be transported to the loading area. Properly serviced & maintained, PUC certificate carrying vehicles should be allowed to enter in their premises.

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		equipment & DG sets to minimize the emissions • Wheel washing facility should be provided at exit point of construction to minimize the emissions • Material Transportation Vehicles should be covered All industries coming up along EDFC, should manage their emission levels **Mitigation Measures for Water Resources & Drainage Management** • Construction site should be kept clean and debris should be removed regularly from the site • Storm water from construction site should be managed by providing garland drains, sediment traps etc. to protect the surface water bodies from pollution • Cross drainage structures like balancing culverts should be provided to maintain natural drainage pattern. Stone pitching should be provided for slope stabilization near water bodies • Waste management should be carried out at site. Different color bins should be provided to collect different type of waste. Recyclable waste should be sold off to authorized dealers; compostable waste should be composted within the site. Rejected waste should go for landfilling • Any hazardous waste, if generated should be stored and disposed off as per Hazardous Waste (Management, Handling & Trans-boundary) Rules, 2008 • Wastewater from site should be managed by providing the septic tanks & soak pits. Construction wastewater should be collected and should be re-used for curing purpose & wheel washing • Curing should be carried out by spraying to conserve water. • Fuel storage and hazardous waste storage area should be located in isolated location and on paved surfaces • Oil interceptor should be provided for accidental spill of oil and diesel • All washing and maintenance effluent from the workshop area of vehicle maintenance area should drain to separate collection areas fitted with oil and grease trap and de- siltation chamber. The treated water shall be used for dust suppression and green belt development. This water shall not be discharged to river at all. • All industries shall install their own STP & ETP to treat effluent generated. **Mitigation Measures for Noise Level Management**				

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		• Temporary noise barriers should be provided at the locations where high levels of noise may generate. Construction activities should not be carried out during night time • Construction machinery should comply with standards prescribed by CPCB and should be regularly maintained and serviced. • Construction equipment & DG sets should be enclosed in acoustic enclosure • Noise barrier should be provided in the locations close to sensitive receptors like school & hospital during operation phase • All industries should manage the noise levels from their units as per CPCB standards **Mitigation Measures for Bio-Diversity Management** • Alignment should be such selected to minimize the tree cutting • Compensatory plantation should be carried out in ratio of 1:2 minimum with assistance of Forest Dept, if any tree cutting involved.				

5	Urbanization/Urban Agglomeration/Mega Projects/Townships/River Front Development Projects	• Environmental impacts of the project should assess in detail and environment clearance should be obtained, if applicable
		• To obtain all the environment and safety related approval as per applicability from concerned authorities
		• Structural approval for the buildings should be obtained as applied in NBC, 2005
		• Site selected should avoid National Parks, Wildlife sanctuary, Reserve forests, Migratory Route of fauna, etc, if necessary, permission should be taken from SBWL/NBWL
		• Analysis of alternative alignment should be carried out to minimize impact on environment & society
		• Public consultations should essentially be undertaken
		Mitigation Measures for Management of Land Use, Soil Quality, Soil Erosion & People
		• Any land acquired or used should be with the consent of land owner and appropriate compensations should be paid to the land owners as per law of land.
		• Shifting of utilities, if any should be done immediately after removal
		• Workers must be trained and made aware to avoid wastage of resources by mishandling, conserve energy by following best practices, handle emergency situations
		• Cautionary and guiding signage should be displayed at site in local language at all required locations like fuel storage area, raw
			• Environment Management Plan
			  ◦ Air Quality Management Plan
			  ◦ Water Resources Management Plan
			  ◦ Noise Level Management Plan
			  ◦ Soil Quality & erosion Management Plan
			• Bio-diversity Management Plan
			• Plant Site/Labour camp Management Plan
			• Landscaping Plan
			• Disaster Management Plan
			• Occupational Health & Safety Management Plan
			• Traffic Safety Management Plan
			• Environment
				Ministry of Urban Developments / Indian Railways / DFCCIL/ Municipal Corporations / Municipality / State Urban Development Authorities /	MoEF, SEIAA, State Pollution Control Boards, Forest Department	DFCCIL should coordinate with Warehousing Management & Development Authority to construct warehouses near such areas so as goods can be unloaded close to the point of consumption and cost & time of shipping of goods can be minimized. DFCCIL should also identify the sensitive locations like hospitals, schools, worship centers etc within the 100 m of the alignment crossing through these zones and take appropriate noise mitigation measures by providing noise barriers as

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		material storage, plant site and entry should be restricted to trained and authorized personnel in risk prone areas • Stone pitching should be carried out in embankments close to water body • Top soil removed should be stored separately and should be re-used for landscaping purpose or should be relaid on the same location after completion of activity • Personal protective equipment should be provided to workers • Safety officer must be deputed to ensure safety of all personnel at the site all the time. Traffic managers should also be deputed to manage the traffic & minimize the accident hazards • First aid facilities including ambulance should be provided at the site. Also tie-ups with local hospital should be done to handle emergency case, if any • Labour camps should be provided with all facilities like drinking water, sanitation, kitchen facility (LPG fuel). Open burning of fuel should be prohibited. Six monthly health check up should be arranged for all workers **Mitigation Measures for Air Quality Management** • Construction material should be sourced from licensed quarry & authorized dealers, nearest to project site • Piling of material and debris at site should be avoided to prevent wastage and air, water and soil pollution • Dust emissions from the site should be managed by sprinkling water, low sulhpur diesel should be used in construction vehicles, equipment & DG sets to minimize the emissions • Wheel washing facility should be provided at exit point of construction to minimize the emissions • Material Transportation Vehicles should be covered **Mitigation Measures for Water Resources & Drainage Management** • Construction site should be kept clean and debris should be removed regularly from the site • Storm water from construction site should be managed by providing garland drains, sediment traps etc. to protect the surface water bodies from pollution • Cross drainage structures like balancing culverts should be provided to maintain natural drainage pattern. Stone pitching should be provided for slope stabilization near water bodies • Waste management should be carried out at site. Different color	Monitoring Plan			suggested in EIA/EMP. Also adequate safety measures should be taken by DFCCIL in these areas to prevent accidents.

S. No.	Proposed / Planned / Anticipated Developments	Mitigation Measures	Environment Management Plan	Authorities Responsible	Monitoring Authorities /Agencies	Role of DFCCIL
		bins should be provided to collect different type of waste. Recyclable waste should be sold off to authorized dealers; compostable waste should be composted within the site. Rejected waste should go for landfilling • Any hazardous waste, if generated should be stored and disposed off as per Hazardous Waste (Management, handling & Trans-boundary) Rules, 2008 • Wastewater from site should be managed by providing the septic tanks & soak pits. Construction wastewater should be collected and should be re-used for curing purpose & wheel washing • Curing should be carried out by spraying to conserve water. • Fuel storage and hazardous waste storage area should be located in isolated location and on paved surfaces • Oil interceptor should be provided for accidental spill of oil and diesel • All washing and maintenance effluent from the workshop area of vehicle maintenance area should drain to separate collection areas fitted with oil and grease trap and de- siltation chamber. The treated water shall be used for dust suppression and green belt development. This water shall not be discharged to river at all. **Mitigation Measures for Noise Level Management** • Temporary noise barriers should be provided at the locations where high levels of noise may generate. Construction activities should not be carried out during night time • Construction machinery should comply with standards prescribed by CPCB and should be regularly maintained and serviced. • Construction equipment & DG sets should be enclosed in acoustic enclosure • Noise barrier should be provided in the locations close to sensitive receptors like school & hospital during operation phase **Mitigation Measures for Bio-Diversity Management** • Alignment should be such selected to minimize the tree cutting • Compensatory plantation should be carried out in ratio of 1:2 minimum with assistance of Forest Dept, if any tree cutting involved.				

7.4 Environment Management Plan

As per suggestions made in Table 7.1, DFCCIL should incorporate suggestive enhancement measures in their EMPs and should ensure all these suggestive measures are being complied with. DFCCIL should regularly monitor the status of the VECs in the study area on regular basis. The report should be uploaded on DFCCIL website so as any new developer or state authorities can know the status of the VEC in the study area and can plan the development accordingly. As per suggestions made in Table 7.2, environment management plan should be prepared for each development by respective responsible authority. Suggested environment management plans given above will help the agencies to include the cumulative impact in their mind while finalizing the mitigation plans. It is to be noted that CPCB has issued directives that SPCB/SPCC will conduct environment quality monitoring in Critically Polluted Areas, install Continuous Ambient Air Quality Monitoring Stations, and Continuous Water Quality Monitoring Stations[2]. Results of environment monitoring conducted by CPCB are made available in public domain.

7.5 Environment Monitoring Plan

As suggested above regular monitoring of the status of VECs should be done by DFCCIL in area of its intervention in EDFC-1, 2 & 3 to assess the condition/status of VECs. Monitoring parameters identified which should be monitored to assess the conditions of VECs and frequency and location of monitoring is given in **Table 7.3** below.

Table 7.3: Monitoring plan

S. No.	Valuable Environmental Components		Indicators	Location	Frequency	Coordination Agency
1	**Physical Features / Habitats**	**Urban Centers / Agglomerations**	Population	District Wise	Once in 10 years	ORGI & CC
			Literacy			
			WFPR			
			GDP			
			Standard of living			
			Pressure on existing resources			
		Land Resources	Soil Quality	District Wise	Six Monthly	Agriculture Departments
			Land Use Change		Yearly	DTP
2	**Ecological**	**Bio Diversity**	Inventory of flora & fauna	District Wise	Yearly	Forest Department

[2] *Vide CPCB letter no.B- 29012/ESS (CPA)/2015-2016 dated April 26, 2016 and Comprehensive Environmental Assessment of Industrial Clusters, Central Pollution Control Board, Ministry of Environment and Forests, 2009*

S. No.	Valuable Environmental Components		Indicators	Location	Frequency	Coordination Agency
	Profile	**Agriculture**	Agricultural production	District Wise	Yearly	Agricultural Department
3	**Physical Environmental Profile**	**Air**	Air Quality Index	District Wise & within 300 m of EDFC alignment	Six Monthly	SPCBs & CPCBs
		Noise	Noise Levels	District Wise & within 300 m of EDFC alignment	Six Monthly	SPCBs & CPCBs
		Water	Water quality	District Wise	Six Monthly	Irrigation Departments & SPCBs
			Vibrations	Within 300 m of EDFC alignment	Six monthly	IR
			Ground Water Resources	District Wise	Six Monthly	CGWB & State Jal Boards
		Climate Change	GHG	For EDFC and material transportation to & from EDFC	Yearly	All the agencies transporting and receiving material from EDFC
			Erratic Rainfall	District Wise	Yearly	IMD
			Flash Flooding	District Wise	Yearly	District Disaster Management Agency & IMD
			Temperature Change	District Wise	Five Yearly	IMD
4		**Infrastructure**	Roads	Within 10 kms of EDFC alignment	Yearly	State Road & Bridge Development Corporation & NHAI
			Traffic Congestion (Main Routes)	Within 10 kms of EDFC alignment	Yearly	Vehicle Registration Office & All the agencies transporting and receiving material from EDFC
			Traffic Congestion (Feeder Routes)	Within 10 kms of EDFC alignment	Yearly	All the agencies transporting and receiving material from EDFC
			Rails	Within 300 m from EDFC alignment	Yearly	IR
			Air Connectivity	Within 10 kms of EDFC alignment	Yearly	AAI, DGCA
			Health Facilities	District Wise	Yearly	DTP , ORGI &CC

S. No.	Valuable Environmental Components		Indicators	Location	Frequency	Coordination Agency
			Education Facilities	District Wise	Yearly	DTP , ORGI &CC
		Industry	Number of Industries	District Wise	Yearly	DTP, SIDCs & DIC
		Power Plants	Power production (Number)	District Wise	Yearly	NTPC, SIDCs & DIC
5	**Cultural Aspects**	**Archaeological Sites / Heritage Sites**	Impact on archeological Monuments	Within 300 m of EDFC alignment	Yearly	ASI

7.6 Recommendations and Best Practices

Impact, Hotspots, Critically Polluted Area and Criteria for proposed DFCCIL's project has been identified and given in **Table 7.4** for suggesting recommendations and best practices.

Table 7.4: Impact, Hotspots, Critically Polluted Area and Criteria in DFCCIL's project

Stretch	Areas	Proposed / Planned Development	1st Level Impact		2nd Level Quantification of Impact	Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
EDFC – 1 (344.16 Km)	Khurja, Bulandshahr	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC ▪ Dadri to Khurja				Khurja to Bodaki is major hotspot	Bulandhahar-Khurja (49.09	Zone is foreseeable as industrial hub/belt in future
		Development of EDFC Stations Without Unloading & Loading (New Maman, New Bulandshahr)	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for Car=4/day PCU flow for two wheeler=43.2/day			
			Road Connectivity					

Stretch	Areas	Proposed / Planned Development	1st Level Impact		2nd Level Quantification of Impact	Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		Unloading & Loading Yards with connecting Road New Khurja (Junction Station) New Khurja – 2000 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person =60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for truck=700 /day PCU flow for Car=4/day PCU flow for two wheeler=43.2/day **Air Pollution** **CO**=857 g/kwh **NOx**=2000g/Kwh **PM**=11.43 g/kwh			
		Independently Planned Developments	Increase in Commercial Area	Area=30 Acre Population=12141	Total Water requirement=546 KLD Waste Water Generation=437.07 KLD			

Stretch	Areas	Proposed / Planned Development	1st Level Impact		2nd Level Quantification of Impact	Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		▪ 1320 MW TPP by THDC India Ltd. under planning at Khurja	Increase in Residential Area	Area=100 Acre Population=21780	Total water required=2.94 MLD Waste water generated=2.35 MLD			
			Road Connectivity	380 Acre				
			Increase in Traffic Thermal power plants listed in 17 categories of highly polluting industries other than Red category industries categorized by CPCB.	Number of Bus=98 Number of Car=726	PCU flow for Bus=343/day PCU flow for Car=726/day			
		Industrial Development	Increase in Industrial Area	**90 Acre population = 36362**				
			Increase in Commercial	**1.79 Acre Population=728**	Water Requirement=32.73 KLD Waste Water generation=26.19 KLD			

Stretch	Areas	Proposed / Planned Development	1st Level Impact		2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
			Area	**person**					
			Increase in Residential Area	**4173 Acre Residential Population=181812**	Water Requirement= 24.54 MLD Waste Water generation=19.63 MLD				
			Road Connectivity	**22 Acre**					
			Increase in Traffic	Number of Car=1212 Number of Bus=233	PCU flow for car=1212/day PCU flow Bus=818/day				
	Aligarh	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC alignment crosses TTZ Area ▪ Potential sector for service industries ▪ **Crossing station & unloading/loading yard proposed at Daud Khan**					-	**Aligarh (63.83)**	-
		Development of EDFC Stations	Increase in Commercial Area		Area=0.074 Acre Population=30	Total Water Required=1.35 KLD			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		Without Unloading & Loading New Hathras			Waste Water Generated=1.08 KLD			
			Increase in Residential Area	Area 3 Acre Population=150	Total Water Required=20.6 KLD Waste Water Generated=16.48 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=2 Number Of two wheeler=27	PCU flow for Car=2/day PCU flow for two wheeler=21.6/day			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		Unloading & Loading Yards with connecting Road New Daudkhan (Junction Station) New Daudkhan – 5000 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person =60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Road Connectivity					
			Increase in Traffic	Number of trucks=500 Number of Cars**=4** Two Wheeler Motorcycle= 54	PCU flow for truck=1750/day PCU flow for Car=4/day PCU flow for 3 wheeler=43.2/day **Air Pollution** **CO**= 2142 g/kwh			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
					NOx= 5000g/Kwh **PM**= 28.57 g/kwh			
		Independently Planned Developments	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Industrial Development	Increase in Industrial Area	**90 Acre population = 36362**				
			Increase in Commercial Area	**1.79 Acre Population=728 person**	Water Requirement=32.73 KLD Waste Water generation=26.19 KLD			
			Increase in Residential Area	**4173 Acre Residential Population=181812**	Water Requirement= 24.54 MLD Waste Water generation=19.63 MLD			
			Road Connectivity	**22 Acre**				
			Increase in Traffic	Number of	PCU flow for			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Car=1212 Number of Bus	car=1212/day PCU flow Bus=818/day			
	Tundla, Khandauli & Firozabad	**DFCCIL Induced Developments (Direct)** Proposed development of Amritsar, Delhi, Kolkata Industrial Corridor (ADKIC) will be taken up in a band of 150-200 km on either side of EDFC, in a phased manner. Every state falling in the ADKIC area could promote 1 cluster of about 10 km² area in which 40% area would be earmarked permanently for manufacturing and processing activities. Each of the industrial				Major hotspot- Agra & Firozabad TTZ	Firozabad (60.51)	This zone is highly sensitive as it falls under TTZ. Any increase in pollutant concentration will show multiplied impact due to sensitivity as compared to other zones.

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		nodes will generate a minimum of two freight trains per day, which can go up to 7 to 8 trains per day following traffic levels are anticipated.						
		Development of EDFC Stations Without Unloading & Loading o New Firozabad o New Makkhanpur	Increase in Commercial Area	Area=0.14 Acre No. of person=60				
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for Car=4/day PCU flow for two wheeler=43.2/day			
		Unloading & Loading Yards with Connecting Road New Tundla (Junction Station), New Tundla – 2500 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person =60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre	Total Water			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				No. of person=300	Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Road Connectivity					
			Increase in Traffic	Number of trucks=250 Number of Cars**=4** Two Wheeler Motorcycle= 54	PCU flow for truck=875 /day PCU flow for Car=4/day PCU flow for 3 wheeler=43.2/day **Air Pollution** **CO**=1071.43 g/kwh **NOx**=2500g/Kwh **PM**=14.29 g/kwh			
		Independently Planned Development	Increase in Industrial Area	Firozabad (Indl.) Distt. Firozabad - 498.37 acres				
			Increase in Commercial Area	Area 4 Acre Population=1618	Total Water required=72.8 KLD			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
					Waste water generated=58.2 KLD			
			Increase in Residential Area	Firozabad (Housing) Distt. Firozabad - 62.68 acres	Total Water required=5.13 MLD Waste water generated=4.10 MLD			
			Road Connectivity					
			Increase in Traffic	Number of trucks=250 Number of Cars=**2013** Number of Bus= 362	PCU flow for truck=875 /day PCU flow for Car=2013/day PCU flow for Bus =1267 /day			
	Agra	**DFCCIL Induced Developments (Direct)**				Major hotspot- Agra & Firozabad TTZ	Agra (76.48)	This zone is highly sensitive as it falls under TTZ. Any increase in pollutant concentration will show multiplied impact due to

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
								sensitivity as compared to other zones.
		Development of EDFC Stations Without Unloading & Loading New Bhadan	Increase in Commercial Area	Area=300 m2 Population=30	Total Water Required=1.35 KLD Waste Water Generated=1.08 KLD			
			Increase in Residential Area	Area 3 Acre Population=150	Total Water Required=20.6 KLD Waste Water Generated=16.48 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=2 Number Of two wheeler=27	PCU flow for Car=2/day PCU flow for two wheeler=21.6 /day			
		Independently Planned Development	Increase in Industrial Area	Export Promotion Industrial Park, District Agra – 101.00 acres; Foundry Nagar, Distt. Agra - 180.404 acres;				

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Leather Park Distt. Agra - 283.20 acres and Sikandra Site – A & B Distt. Agra - 66.149 = Total 630.753 acres area acquired				
			Increase in Commercial Area	Area=12.60 Acre Population=5100	Water required=229 KLD Waste Water generated=183.61 KLD			
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic Leather processing including tanneries listed in 17 categories of highly polluting industries other than Red category industries categorized by CPCB. Foundries industries or process involving foundry operation are listed in 54 red categories industries categorized by CPCB.					
	Etawah	**DFCCIL Induced Developments**				Kanpur Dehat,	-	Zone caters varied kind of

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		(Direct) ▪ Development of EDFC				Auraiya & Etawah)		industries. These areas are identified for major developments like new industrial areas, plastic cities, townships, logistic hubs etc. Also land resources are available in Etawah and Auraiya area. These developments will impact already scarce existing infrastructure facilities in the area.
		Development of EDFC Stations Without Unloading & Loading ▪ New	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		▪ Achalda New Kachausi			KLD Waste Water Generated=32.40 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=4 Number Of two wheeler=54	PCU flow for Car=4/day PCU flow for two wheeler=43.2/day			
		Unloading & Loading Yards with Connecting Road o New Ekdil o Logistic parks on important EDFC stations like Bhaupur & Ekdil	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Independently Planned Developments ▪ Industrial belts proposed near every major	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		junction of DFCCIL (proposal for notifying 5 km strip near EDFC-1 sent to GoUP from UPSIDC to ensure organized industrial development and to prevent haphazard LA for development by private parties)						
	Aurayia	**DFCCIL Induced Developments (Direct)**				Kanpur Dehat, Auraiya & Etawah)	-	Zone caters varied kind of industries. These areas are identified for major developments like new industrial areas, plastic cities, townships, logistic hubs etc. Also land resources are available in

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
								Etawah and Auraiya area. These developments will impact already scarce existing infrastructure facilities in the area.
		Development of EDFC Stations without Unloading & Loading	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Independently Planned Developments	Increase in Industrial Area	G.C. Dibiyapur (Industrial) 274.45 acres				
			Increase in Commercial Area	1.97 Acre Population=801	Total Water Required=36.05 KLD Waste Water Generated=28.8 KLD			
			Increase in Residential Area	G.C. Dibiyapur	Total Water			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				(Housing) 84.93 acres	Required= 1.85 MLD Waste Water Generated=1.48 MLD			
			Road Connectivity					
			Increase in Traffic	Number of Cars=**1335** Number of Bus= 180	PCU flow for Car=1335/day PCU flow for Bus =630 /day			
	Kanpur Dehat	**DFCCIL Induced Developments (Direct)**				Kanpur Dehat, Auraiya & Etawah)	-	Zone caters varied kind of industries. **Infrastructure facilities in the area are poor and already stressed due to existing developments.** These areas are identified for major developments like new industrial areas,

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
								plastic cities, townships, logistic hubs etc. Also land resources are available in Etawah and Auraiya area. These developments will impact already scarce existing infrastructure facilities in the area.
		Development of EDFC Stations without Unloading & Loading	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Independently Planned Developments	Increase in Industrial Area	Rania Site – I, Kanpur Dehat – 7.35 acres; Rania Site – II, Kanpur				

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Dehat - 164.97 acres = Total 172.32 acres area acquired				
			Increase in Commercial Area	1.35 Acre Population=562	Total Water Required=25.84 KLD Waste Water Generated=20.80 KLD			
			Increase in Residential Area	Area= 3220 Acre No. of person=140280	Total Water Required=18.95 MLD Waste Water Generated=15.60 MLD			
			Road Connectivity	17.32 Acre				
			Increase in Traffic	Number of Cars=**935** Number of Bus= 126	PCU flow for Car=935/day PCU flow for Bus =441 /day			
EDFC – 2 (448.51 km)	Kanpur Nagar	**DFCCIL Induced Developments (Direct)**				**Kanpur Nagar**	**Kanpur (78.09)**	Kanpur Nagar is major industrialized area in Uttar

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		▪ Development of EDFC ▪ Connectivity of DFCCIL to Logistic hub at Kanpur (6000 ha) ▪ 660 MW TPP under planning ▪ Multi Model Logistic Park at New Bhaupur in 100 acre ▪ Two crossing stations and loading/unloading yard for DFCCIL at Kanpur Nagar						Pradesh known for tanneries/leather producing industries, which are highly polluting. Baseline conditions of area are already critical. Zone has also potential to absorb further proposed and anticipated developments like logistic hubs, industrial zones etc. These developments will significantly impact already stressed VECs
		Development of EDFC Stations Without Unloading & Loading	Increase in Commercial Area	Area=0.23 Acre No. of person=90	Total Water Required=4.05 KLD Waste Water Generated=3.24 KLD			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		▪ New Sujatpur ▪ New Malwan ▪ New Rasulabad	Increase in Residential Area	Area= 10.23 Acre No. of person=450	Total Water Required=60.3 KLD Waste Water Generated=48.24 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=6 Number Of two wheeler=81	PCU flow for Car=6/day PCU flow for two wheeler=64.8/day			
		Unloading & Loading Yards with Connecting Road ▪ New Bhaupur (Junction Station) New Bhaupur – 10,000 tonnes/day ▪ New Bhimsenpur (Junction Station) ▪ New Kanpur	Increase in Commercial Area	Area=0.44 Acre No. of person =180	Total Water Required=8.1 KLD Waste Water Generated=6.4 KLD			
			Increase in Residential Area	Area= 20 Acre No. of person=900	Total Water Required=121.5 KLD Waste Water Generated=97.2 KLD			
			Road Connectivity					
			Increase in Traffic	Number of truck 1000	PCU flow for Truck=3500/day			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		(Junction Station)		Number of Cars=**9** Two Wheeler Motorcycle= 117	PCU flow for Car=9/day PCU flow for 3 wheeler=117/day **Air Pollution caused due truck=** **CO=4285 g/kwh** **NOx=10000 g/kwh** **PM=57.14 g/kwh**			
		Independently Planned Developments ▪ Multi-purpose SEZ at Lakhanpur (Textile, Leather, Engineering Goods & FTWZ) ▪ 6 laning of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687	Increase in Industrial Area	Malwan, Fatehpur - 438.25; Panki Site – 2 - 211.69; Panki Site - 1, Kanpur Nagar - 240.809; Panki Site – III - 211.69 and Panki Site – IV - 27.42 = Total 1129.859 acres area acquired				
			Increase in Commercial Area	Acre 9.03 Acre Population 3658	Total Water Required=164.32 KLD Waste Water			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		▪ 2 laning with pave shoulder of Kanpur-Kabrai of NH-86. (PCOD issued on 5 May) ▪ 6-laning of Chakeri to Allahabad of NH-2 from km 483.687 to 628.753 ▪ Kanpur – Unnao Modern Industrial Project ▪ Mega Leather Cluster in Kanpur			Generated=132.54 KLD			
			Increase in Residential Area	Area=20790 Acre Population =914469	Total Water Required=123 MLD Waste Water Generated=98.76 MLD			
			Road Connectivity	Area 112.98 Acre				
			Increase in Traffic Leather processing including tanneries listed in 17 categories of highly polluting industries other than Red category industries categorized by CPCB.	Number of Cars=**6096** No. of Bus= 826	PCU flow for Car=6096/day PCU flow bus=2880/day			
	Kaushambi	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC				**Kaushambi**	**-**	It is anticipated with development of EDFC, immediate industrial & infrastructural growth is expected in this region due to

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
								availability of land resources. Also residential developments may come up within study area but in period of 4-5 years
		Developments of EDFC Stations Without Unloading & Loading	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		DFCCIL line from Khurja to Dadri (Construction Phase)	Resource Utilization (Land, Water, Ballast)					
		Independently Planned Developments ▪ New industries like rice mill ▪ Cold storage	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic Parboiled rice mills listed in 54 red category industries categorized by					

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
			CPCB					
	Mirzapur	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC				**Mirzapur**	**Varanasi-Mirzapur (73.79)**	Area has various industrial areas and also various industrial areas are under implementation. Also zone has potential to receive various developments. Thus this zone is anticipated to experience cumulative impacts
		Development of EDFC Stations Without Unloading & Loading New Dagmagpur	Increase in Commercial Area	Area=0.074m2 No. of person=30	Total Water Required=1.3 KLD Waste Water Generated=1.04 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Road Connectivity					

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
			Increase in Traffic	Number of Car=3 Number Of two wheeler=41	PCU flow for Car=3/day PCU flow for two wheeler=32.8/day			
		Unloading & Loading Yards with Connecting Road New Mirzapur, New Mirzapur – 2500 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Road Connectivity					
			Increase in Traffic	Number of truck=250 Number of Car=4	PCU flow for Truck=875/day PCU flow for Car=4/day PCU flow for two			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Number Of two wheeler=54	wheeler=43.2 /day CO=1071.43 g/kwh NOx=2500.00g/kwh PM=14.29 g/kwh			
		Independently Planned Developments ▪ South Vindhyachal Industrial Area	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
	Mugalsarai, Chandauli	**DFCCIL Induced Developments (Direct)** Proposed development of Amritsar, Delhi, Kolkata Industrial Corridor (ADKIC) will be taken up in a band of 150-200 km on				Mugalsarai is major hotspot	-	Mugalsarai lies within Chandauli District. District does not have major developments but its close vicinity to Varanasi, which is highly

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		either side of EDFC, in a phased manner. Every state falling in the ADKIC area could promote 1 cluster of about 10 km² area in which 40% area would be earmarked permanently for manufacturing and processing activities. Each of the industrial nodes will generate a minimum of two freight trains per day, which can go up to 7 to 8 trains per day following traffic levels are anticipated.						populated city and area for development of inland water terminal make it zone foreseeable for future development.
		Development of EDFC Stations Without Unloading & Loading o New Ganjkhawaja o New Durgawati o New Ahraura Road (Junction Station	Increase in Commercial Area	Area=0.22 Acre No. of person=90	Total Water Required=4.03 KLD Waste Water Generated=3.24 KLD			
			Increase in Residential Area	Area=10.33 Acre No. of person=450	Total Water Required=60.8 KLD			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
					Waste Water Generated=48.6 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=6 Number Of two wheeler=81	PCU flow for Car=6/day PCU flow for two wheeler=64.8 /day			
		Unloading & Loading Yards with Connecting Roads o New Mugalsarai (Junction Station) o Chandauli – 10,000 tonnes/day	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 13.22 Acre No. of person=600	Total Water Required=81 KLD Waste Water Generated=64.8 KLD			
			Road Connectivity					
			Increase in Traffic	Number of truck=1000	PCU flow for Truck=3500/day			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Number of Car=22 Number Of two wheeler=297	PCU flow for Car=22/day PCU flow for two wheeler=297 /day CO=4285.71 g/kwh NOx=10000g/kwh PM=57.14 g/kwh			
		DFCCIL Line from Khurja to Dadri (Construction Phase)	Resource Utilization (Land, Water, Ballast)					
		Independently Planned Developments ▪ Development of terminal and associated infrastructure at Ramnagar, Varanasi for inland navigation as part	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		of Jal Marg Vikas Project, NW-1 (Haldia-Allahabad)						
EDFC – 3 (445.71)	Ludhiana & Patiala	**DFCCIL Induced Developments (Direct)** ▪ Development of EDFC				Ludhiana is major hotspot	Ludhiana (81.66)	Ludhiana area is notified zone by CGWB. Baseline conditions of area are critical. Area supports large nos. of industries and both of polluting and non polluting types. Also various mega projects are under proposal in this zone. Thus impacts due to existing and anticipated developments in this zone will be severe and zone is thus considered for assessment of cumulative

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
								impacts.
		Development of EDFC Stations without Unloading & Loading o New Khanna o New Sarai Banjara o New Patiala	Increase in Commercial Area	Area=0.23 Acre No. of person=90	Total Water Required=4.05 KLD Waste Water Generated=3.24 KLD			
			Increase in Residential Area	Area= 10.23 Acre No. of person=450	Total Wa Required=60.3 KLD Waste Water Generated=48.24 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=6 Number Of two wheeler=81	PCU flow for Car=6/day PCU flow for two wheeler=64.8 /day			
		Unloading & Loading Yards with Connecting Road o New Chawapail (Junction Station) o New Sirhind (Junction Station)	Increase in Commercial Area	Area=0.29 Acre No. of person =120	Total Water Required=16.29 KLD Waste Water Generated=12.87 KLD			
			Increase in Residential Area	Area= 13.64 Acre No. of person=600	Total Water Required=81.64 KLD Waste Water			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
					Generated=64.28 KLD			
			Road Connectivity					
			Increase in Traffic	Number of truck 1000 Number of Cars=**8** Two Wheeler Motorcycle=108	PCU flow for Car=8/day PCU flow for 3 wheeler=86/day			
		Independently Planned Developments ▪ Industrial textile park proposed at Duraha and Industrial focal point at Tanansu ▪ Lining of two canals at Sirhind ▪ **Widening of NH-1 (Jalandhar-**	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic Yarn and textile processing involving scouring, bleaching, dyeing, printing or any effluent / emission – generating process are listed in 54 red category industries categorized by CPCB					

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		Ambala)						
	Mandi Gobindgarh	**DFCCIL Induced Developments (Direct)**				-	**Mandi Gobindgarh (75.48)**	-
		Development of EDFC Stations without Unloading & Loading	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Unloading & Loading Yards with Connecting Road	Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
		Independently Planned Developments Industrial Area	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
	Ambala	**DFCCIL Induced Developments (Direct)**				-	-	-
		Development of EDFC Stations without Unloading & Loading	Increase in Commercial Area	Area=0.44 Acre No. of person=180	Total Water Required=24.93 KLD Waste Water Generated=19.26			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		o New Ambala o New Dukheri o New Kesari o New Bapara o New Darajpur			KLD			
			Increase in Residential Area	Area= 34.23 Acre No. of person=1500	Total Water Required=202.32 KLD Waste Water Generated=162.36 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=16 Number Of two wheeler=216	PCU flow for Car=16/day PCU flow for two wheeler=172/day			
		Unloading & Loading Yards with Connecting Roads o New Shambhu (Junction Station) o New Kalanaur (Junction Station)	Increase in Commercial Area	Area=0.29 Acre No. of person =120	Total Water Required=16.29 KLD Waste Water Generated=12.87 KLD			
			Increase in Residential Area	Area= 13.64 Acre No. of person=600	Total Water Required=81.64 KLD Waste Water Generated=64.28 KLD			
			Road Connectivity					
			Increase in Traffic					

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Number of truck 1000 Number of Cars=**8** Two Wheeler Motorcycle=108	PCU flow for Car=8/day PCU flow for 3 wheeler=86/day			
		Independently Planned Developments	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
	Muzaffarnagar, Meerut, Hapur, Shamli & Modi Nagar	**DFCCIL Induced Developments (Direct)**				-	Meerut (59.38)	-
		Development of EDFC Stations without Unloading & Loading o New Tapari	Increase in Commercial Area	Area=0.90 Acre No. of person=360	Total Water Required=48.36 KLD Waste Water Generated=38.66 KLD			
		o New Talheri Bazar	Increase in Residential Area	Area= 81.84 Acre	Total Water			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		o New Deobanda o New Rohan Kala o New Bamanheri o New Manzurpur o New Khatauli o New Sakotitanda o New Daurala o New Meerut City o New Partappur o New Kaili		No. of person=3600	Required=486.23 KLD Waste Water Generated=388.23 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=36 Number Of two wheeler=486	PCU flow for Car=36/day PCU flow for two wheeler=388/day			
		Unloading & Loading Yards with Connecting Roads ▪ New Pilkhani (Junction Station) ▪ New Saharanpur – 5,000 tonnes/day ▪ New Muzaffarnagar – 5,000 tonnes/day	Increase in Commercial Area	Area=0.44 Acre No. of person =180	Total Water Required=8.1 KLD Waste Water Generated=6.4 KLD			
			Increase in Residential Area	Area= 20 Acre No. of person=900	Total Water Required=121.5 KLD Waste Water Generated=97.2 KLD			
			Road Connectivity					
			Increase in Traffic	Number of truck 1000	PCU flow for Truck=3500/day			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Number of Cars=**40** Two Wheeler Motorcycle= 540	PCU flow for Car=40/day PCU flow for 3 wheeler=432/day **Air Pollution caused due truck=** **CO=4285 g/kwh** **NOx=10000 g/kwh** **PM=57.14 g/kwh**			
		Independently Planned Developments	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					
	Ghaziabad & Gautam Budh Nagar	**DFCCIL Induced Developments (Direct)**				-	Ghaziabad (87.37) NOIDA (78.90)	-
		Development of EDFC Stations without Unloading	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		& Loading o New Hapur o New Gulaothi			Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water Generated=32.40 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=12 Number Of two wheeler=162	PCU flow for Car=12/day PCU flow for two wheeler=129/day			
		Independently Planned Developments o UPSIDC; Tronica City in Ghaziabad o Setting up a FAB Plant with an investment of Rs. 100,000 crore near Noida.	Increase in Industrial Area					
			Increase in Commercial Area					
			Increase in Residential Area					
			Road Connectivity					
			Increase in Traffic					

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		o Proposed metro rail link Noida and Greater Noida with an investment of Rs. 5533 crores.						
	Gautam Budh Nagar	**DFCCIL Induced Developments (Direct)** ▪ Crossing station, Unloading & loading yard & container depot at Dadri. ▪ Logistic Park at Dadri				-	NOIDA (78.90)	-
		Development of EDFC Stations without Unloading & Loading o New Chaprawat o New Chamrawali	Increase in Commercial Area	Area=0.14 Acre No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 6 Acre No. of person=300	Total Water Required=40.5 KLD Waste Water			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
					Generated=32.40 KLD			
			Road Connectivity					
			Increase in Traffic	Number of Car=12 Number Of two wheeler=162	PCU flow for Car=12/day PCU flow for two wheeler=129/day			
		Unloading & Loading Yards with Connecting Roads ▪ New Bodaki (Junction Station)	Increase in Commercial Area	Area=600 m2 No. of person=60	Total Water Required=2.7 KLD Waste Water Generated=2.1 KLD			
			Increase in Residential Area	Area= 13.22 Acre No. of person=600	Total Water Required=81 KLD Waste Water Generated=64.8 KLD			
			Road Connectivity					
			Increase in Traffic	Number of truck=1000	PCU flow for Truck=3500/day			

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
				Number of Car=22 Number Of two wheeler=297	PCU flow for Car=22/day PCU flow for two wheeler=297 /day CO=4285.71 g/kwh NOx=10000g/kwh PM=57.14 g/kwh			
		Independently Planned Developments o Bodaki to be developed as multimodal transit hub (DMIC & GNIDA). o 1200 MW (GMR) & 400 MW (Noida	Increase in Industrial Area	Area =1800 Acre				
			Increase in Commercial Area	Area 36 Acre Population=14568	Total Water Required=1.9 MLD Waste Water Generated=1.57 MLD			
			Increase in Residential Area	Area=100 Acre Population=21780	Total water required=2.94 MLD Waste water generated=2.35 MLD			
			Road Connectivity	Area=450 Acre				

Stretch	Areas	Proposed / Planned Development	1st Level Impact	2nd Level Quantification of Impact		Hotspot Identified in CIA study	Sensitive area Critically Polluted Area (CEPI Score)	Criteria
		Power Corporation) at Greater Noida. o Setting up a FAB Plant with an investment of Rs. 100,000 crore near Noida. o Proposed metro rail link Noida and Greater Noida with an investment of Rs. 5533 crores.	Increase in Traffic	Number of Car=632 Number Of Bus=85	PCU flow for Car=632/day PCU flow for two wheeler=298 /day			

Key recommendations for DFCCIL's project in Area of Influence including those which are identified as Hotspot (as per CIA study) and Critically Polluted Area (CPCB, 2009)

- Siting of Proposed Industries and manufacturing units should conform to State and district level Environment Atlas, State level siting guidelines, district specific siting guidelines, and Zoning atlas (e.g. Ghaziabad & Ludhiana) prepared by CPCB/SPCB related to the concerned area.
- Type and nature of proposed industries/manufacturing units should conform to Consent classification of Industries (Red, Orange and green) as applicable in the concerned area in consultation with CPCB/SPCB
- Type and nature of proposed industries/manufacturing units should conform to CEPI related guidelines/directions, in accordance with moratorium, if any, relating to the concerned area.
- Recommendations for planning and management of Railway Sidings in India as may be applicable to the DFCCIL project are summarized in **Table 7.5.**

Table 7.5: Recommendations for planning and management of Railway Sidings in India as may be applicable to the DFCCIL project

Serial number	Name of Railway siding	Recommendations
1.	Coal & mineral siding	– Sidings should be kept away from the residential area, school/colleges, Historical Monuments, Religious Places, Ecological sensitive area as well as forests area. – The sidings should have mechanized loading/ unloading from rolling stock, – The drop heights should be minimized to reduce dust during loading and unloading operations, – The stockpile should have adequate dimensions so that wind erosion from the stockpile will be minimum. The loading /unloading at stockpile should be done by mechanized means. – Sidings shall have paved approach roads with adequate traffic carrying capacity. The existing haul roads which are in bad condition should be repaired and maintained. – The roads should have proper camber to avoid the water logging on the roads, – The siding shall ensure regular sweeping of dust from internal road and it should be ensured that there is adequate space for free movement of vehicles.

		– The heavy loading and unloading traffic siding should have dust screen walls all along periphery of the premises with adequate height. – Water sprinkling system should be in practice along the haul roads either mechanized system or through water tankers, – Continuous water sprinkling shall be carried out for stockpile at regular intervals to prevent dusting. Water sprinkling shall be carried out at each and every stage of coal handling to avoid generation of dust within premises. – The sidings need to be provided with thick rows plantation having tall growing tress all along the periphery, inside & outside of the premises and along the road. – Proper waste water/drainage system shall be provided at sprinkling area of loading, unloading and at storage so that water drained is collected at a common tank and can be reused.
2	POL Siding	– All components of POL siding/ depot should be designed and maintained as per OISD standards, – Proper connection of the filling hose or loading arm to the wagon to avoid leakages, – The loading / unloading operation shall be carried out under close supervision of authorized person, – Loading gantry area including areas below railway tracks shall be paved for smooth draining and collection of spillages into drains, – A network of drainage system shall be provided along the rail track to collect oil drained from various equipments at gantry areas, pump houses etc. They should also collect surface drains from places where oil spillages are likely to occur. The drainage shall lead to OWS / ETP as per the case, – The receiving sump of the OWS shall have suitable arrangement for skimming off. – Open drains along the railway line/gantry shall be covered with gratings so as not to endanger movement of personnel, – Main railway track shall be isolated from wagon gantry siding, – Loading & unloading Pumps shall be located in the paved area with

		drainage facilities routed to OWS / ETP, – Loading points shall have quick shut-off valves to avoid the leakage, – -Roads should be provided to serve all areas requiring access for the operation, maintenance and fire fighting,
3	Other sidings	– Sidings should have paved approach roads, – Water sprinkling system through mechanized system or tankers should be provided as per requirement, – These siding shall ensure regular sweeping of dust from road and also ensure that there is adequate space for free movement of vehicles, – Proper godowns should be provided for storage of commodities, – Loading and unloading of packed materials should be carried out by counterbalance trucks/warehouse trucks to avoid leakage due to manual handling specially during lifting of bags by iron hooks, – The leaked materials should be collected properly, – Proper waste water/drainage system shall be provided at sidings/Goodsheds – The waste water should be collected at a common tank and can be reused after screening or providing effective treatment, – The siding area should have thick green belt cover to control the air and noise pollution.

Best Practices

The bulk freight is being transported through long network of track spread throughout the country. In Indian Railway freight traffic is operated through Sidings. A railway siding is a place/ area which are used to receive, temporarily store, load / unload material in the rakes. Sidings may be used for marshalling, stabling, storing, loading and unloading vehicles. The materials/commodities are loaded and unloaded here with the linked network of rail track and roads. The loading and unloading activities of pollution intensive commodities creates immense nuisance in and around the site. The pollution can be generated due to lack of infrastructure and negligence. No data on pollution due to various activities from siding is available. The activities related to the Railway Sidings if not managed properly results into generation of pollution & especially in the form of fugitive emissions. A study was taken up by Central Pollution Control Board (CPCB) and executed along with RITES Ltd.

Gurgaon[3], in view of frequent Public Complaints received from the nearby residents of the Railway Sidings regarding problems of Air Pollution mainly due to the loading/ unloading activities as well as transportation activities from Railway Sidings

Use of best available techniques for handling materials can reduce dust pollution significantly. Regular maintenance of handling equipments also plays an important role in pollution abatement. The optimum use of resources may also reduce the waste generation.

- Loading of coal and minerals should be carried out by Silos or Batch
- Weighing Systems,
- Unloading of coal should be carried out through mechanized way (tippling system),
- Mechanized water Sprinkling system all along the haul roads,
- Mechanized water Sprinkling system for stockpiles,
- Fogging system to remove dust from air is the most proven and cost effective technique,
- Use of Chemical Suppressant as per site specific for optimum use of sprinkling water,
- Wind screen wall surrounding the coal handling siding will be the best option for dust control due to wind erosion,
- Commodities like food grains, fertilizers and other packed materials should be stored in closed godowns,
- Adoption of counterbalance trucks/warehouse trucks at sidings other than coal & POL can avoid leakage,
- Proper waste water/drainage network should be provided at all sidings.
- Use direct transfer of commodities to wagons from trucks without unloading at siding wherever feasible.
- Promote RORO service to reduce air emissions by drastically reducing loading and unloading of freight at Junction stations. RORO would also enhance business prospects and beter freight management.
- Implement IRC Codes, as applicable. IRC codes with hyperlink for ease of ready reference is provided in **Annexure 7.2.**

As of now, there are no guidelines for the Environmentally Sound Management of the Railway Sidings in India. The study involved inventorization of all the major railway sidings across the country & subsequently development of Material/commodity specific guidelines for the environment management of the Railway Sidings in India. The CPCB report provides environmental management plan and guidelines for environmental management in sidings apart from listing of all railway sidings in India, sample survey of selected railway sidings to understand the present scenario along with nature of pollution and methods for waste collection, treatment and disposal as available.

The Guidelines provide description of existing operating system of coal sidings, cement sidings, food grain and fertilizer, POL, mineral, industrial materials, common material, container handling,

[3] Inventorization of Railway Sidings and Guidelines for their Environment Management, Central Pollution Control Board, 2015.

and environment management plan thereof. The guidelines include conclusions, challenges and recommendations. Broad outlines of these are given in **Table 7.6**

Table 7.6: Railway sidings, Existing Operating System and Environment Management

Serial number	Name of Railway siding	Existing operating system	Environmental management
1	Coal sidings	1.1.1 Operating System 1.1.2 Pollution 1.1.2.1 Pollution due to Operating System 1.1.2.2 Wind Erosion from Stockpile 1.1.2.3 Haul Road 1.1.3 Treatment System 1.1.3.1 Dust Suppression 1.1.3.2 Wind Screen 1.1.3.3 Waste Water Collection System 1.1.3.4 Solid Waste Disposal System 1.1.3.5 Vegetation	1.2.1 Air Pollution Control 1.2.1.1 Loading & Unloading 1.2.1.2 Haul roads 1.2.2 Noise Pollution Control 1.2.3 Waste Water Environment 1.2.4 Solid Waste & Hazardous Waste Management 1.2.5 Soil Erosion 1.2.6 Green Belt Development 1.2.7 Up-gradation of Existing Facilities 1.2.8 Land Use 1.2.9 Public Complaints 1.2.10 Environmental Monitoring 1.2.11 Implementation of Environmental Management 1.2.12 Education and Awareness Programs
2	Cement sidings	2.1.1 Operating system 2.1.1.1 Pollution due to operating system 2.1.1.2 Pollution due to Haul Road 2.1.2 Treatment System 2.1.2.1 Cement particle collection 2.1.2.2 Waste Water Collection System 2.1.2.3 Solid Waste	2.2.1 Air Pollution Control 2.2.1.1 Loading & Unloading 2.2.1.2 Haul roads 2.2.2 Noise Pollution Control 2.2.3 Waste Water Environment 2.2.4 Solid Waste & Hazardous Waste

Serial number	Name of Railway siding	Existing operating system	Environmental management
		Disposal System 2.1.2.4 Vegetation	Management 2.2.5 Soil Erosion 2.2.6 Green Belt Development 2.2.7 Up-gradation of Existing Facilities 2.2.8 Land Use 2.2.9 Public Complaints 2.2.10 Environmental Monitoring 2.2.11 Implementation of Environmental Management 2.2.12 Education and Awareness Programs
3	Food grain and fertilizer sidings	*Existing operating system of foodgrain siding* 3.1.1 Operating System 3.1.1.1 Pollution due to operating system 3.1.1.2 Pollution due to Haul Road 3.1.2 Treatment System 3.1.2.1 Foodgrain particle collection 3.1.2.2 Waste Water Collection System 3.1.2.3 Solid Waste Disposal System 3.1.2.4 Vegetation *Existing operating system of fertilizer siding* 3.2.1 Operating System 3.2.1.1 Pollution due to operating system 3.2.1.2 Pollution due to Haul Road 3.2.2 Treatment System 3.2.2.1 Fertilizer Leakage	3.3.1 Air Pollution Control 3.3.1.1 Haul roads 3.3.2 Noise Pollution Control 3.3.3 Waste Water Environment 3.3.4 Solid Waste & Hazardous Waste Management 3.3.5 Storage Facility 3.3.6 Soil Erosion 3.3.7 Green Belt Development 3.3.8 Up-gradation of Existing Facilities 3.3.9 Land Use 3.3.10 Public Complaints 3.3.11 Environmental Monitoring 3.3.12 Implementation of Environmental

Serial number	Name of Railway siding	Existing operating system	Environmental management
		collection 3.2.2.2 Waste Water Collection System 3.2.2.3 Solid Waste Disposal System 3.2.2.4 Vegetation	Management 3.3.13 Education and Awareness Programs
4	POL sidings	4.1.1 Operating System 4.1.1.1 Pollution due to operating system 4.1.1.2 Pollution due to Haul Road 4.1.2 Treatment System 4.1.2.1 Waste Water Collection System 4.1.2.2 Solid Waste Disposal System 4.1.2.3 Vegetation 4.1.2.4 Fire Fighting System	4.2.1 Noise Pollution Control 4.2.2 Waste Water Environment 4.2.3 Oil Water Separator 4.2.4 Solid Waste & Hazardous Waste Management 4.2.5 Soil Erosion 4.2.6 Green Belt Development 4.2.7 Up-gradation of Existing Facilities 4.2.8 Land Use 4.2.9 Public Complaints 4.2.10 Environmental Monitoring 4.2.11 Implementation of Environmental Management 4.2.12 Education and Awareness Programs
5	Mineral siding	5.1.1 Operating System 5.1.1.1 Pollution due to operating system 5.1.1.2 Pollution due to Haul Road 5.1.2 Treatment System 5.1.2.1 Collection 5.1.2.2 Waste Water	5.2.1 Air Pollution Control 5.2.2 Noise Pollution Control 5.2.3 Waste Water Environment 5.2.4 Solid Waste & Hazardous Waste

Serial number	Name of Railway siding	Existing operating system	Environmental management
		Collection System 5.1.2.3 Solid Waste Disposal System 5.1.2.4 Vegetation	Management 5.2.5 Soil Erosion 5.2.6 Green Belt Development 5.2.7 Up-gradation of Existing Facilities 5.2.8 Land Use 5.2.9 Public Complaints 5.2.10 Environmental Monitoring 5.2.11 Implementation of Environmental Management 5.2.12 Education and Awareness Programs
6	Industrial materials sidings	6.1.1 Operating System 6.1.1.1 Pollution due to operating system 6.1.1.2 Haul Roads 6.1.2 Treatment System 6.1.2.1 Waste Water Collection System 6.1.2.2 Solid Waste Disposal System 6.1.2.3 Vegetation	6.2.1 Air Pollution Control 6.2.1.1 Haul Roads 6.2.2 Noise Pollution Control 6.2.3 Waste Water Environment 6.2.4 Solid Waste & Hazardous Waste Management 6.2.5 Soil Erosion 6.2.6 Green Belt Development 6.2.7 Up-gradation of Existing Facilities 6.2.8 Land Use 6.2.9 Public Complaints 6.2.10 Environmental Monitoring 6.2.11 Implementation of Environmental Management 6.2.12 Education and

Serial number	Name of Railway siding	Existing operating system	Environmental management
			Awareness Programs
7	Common material sidings	7.1.1 Operating System 7.1.1.1 Pollution due to Operating System 7.1.1.2 Pollution due to Haul Road 7.1. 2 Treatment System 7.1.2.1 Leakage waste collection 7.1.2.2 Waste Water System 7.1.2.3 Solid Waste Disposal System 7.1.2.4 Vegetation	7.2.1 Air Pollution Control 7.2.1.1 Haul Roads 7.2.2 Noise Pollution Control 7.2.3 Waste Water Environment 7.2.4 Solid Waste & Hazardous Waste Management 7.2.5 Soil Erosion 7.2.6 Green Belt Development 7.2.7 Up-gradation of Existing Facilities 7.2.8 Land Use 7.2.9 Public Complaints 7.2.10 Environmental Monitoring 7.2.11 Implementation of Environmental Management 7.2.12 Education and Awareness Programs
8	Container handling siding	8.1.1 Operating System 8.1.1.1 Pollution due to Operating System 8.1.1.2 Haul Road 8.1.2 Treatment System 8.1.2.1 Haul Road 8.1.2.2 Waste Water Collection System 8.1.2.3 Solid Waste Disposal System 8.1.2.4 Vegetation	8.2.1 Air Pollution Control 8.2.1.1 Haul Roads 8.2.2 Noise Pollution Control 8.2.3 Waste Water Environment 8.2.4 Solid Waste & Hazardous Waste management 8.2.5 Soil Erosion 8.2.6 Green Belt Development 8.2.7 Up-gradation of Existing Facilities 8.2.8 Land Use

Serial number	Name of Railway siding	Existing operating system	Environmental management
			8.2.9 Complaints Management 8.2.10 Environmental Monitoring 8.2.11 Implementation of Environmental Management 8.2.12 Education and Awareness Program

7.7 Organizational Framework

DFCCIL has an organized framework of environment management cell which ensures implementation of project in environmental and socially sound manner. They also ensure all aspects of safety are being addressed at site as mentioned in the plan. Roles and responsibility of each of the person is defined. Further suggestions are made here to increase the scope of work of each of such person so as the cumulative impact on VECs can also be mitigated and is given in **Table 7.7** below.

Table 7.7: Roles and Responsibilities of Officers of EM Cell

Officer	Responsibility As Defined by DFCCIL	Suggestions by CIA Team
General Manager (SEMU)	• Overview of the project implementation • Ensure timely budget for the EMP. • Coordination with different state level committee, to obtain regulatory clearances. • Participate in state level meetings • Monthly review of the progress. • Reporting to various stakeholders (World Bank, Regulatory bodies) on status of EMP implementation	• Coordinate & meeting with NHAI, DTP, State Road & Bridge Development Authority, IWAI etc to enhance & improve the linkage of EDFC with other mode of transport and should discuss the status of existing infrastructure and required infrastructure to minimize stress on existing facilities and the related pollution sources
Chief Project Manager (DFCC)	• Overall responsible for EMP implementation • Coordination with PIU Staff. • Assisting GM (SEMU) to reporting various stakeholders (World Bank, Regulatory bodies) on status of EMP implementation • Responsible for obtaining regulatory Clearances • Review of the progress made by contractors • Ensure that BOQ items mentioned in EMP are executed as per Contract provisions.	• Identifying the various agencies that are and can be benefitted by EDFC • Suggesting the measures these agencies should take while developing their projects and transporting the goods to & fro from EDFC • Identifying the various renewable energy options and options for usage of low energy embodied

Officer	Responsibility As Defined by DFCCIL	Suggestions by CIA Team
		products for construction of the EDFC alignment • Should consult with IR and WDFC Engineers and Dy. CPM to discuss the issues and problems faced at site and green measures adopted by these agencies in their project.
Dy.CPM	• Assisting CPM in overall implementation of EMP • Review of periodic reports on EMP implementation and advising CPM in taking corrective measure. • Preparing environmental training program and conducting the same for field officers and engineers of contractor. • Conducting need-based site inspection and preparing compliance reports and forwarding the same to the Environmental Management Unit (DFCCIL)	• Should coordinate regularly with Engineer PMC to evaluate the status of implementation of EMP and monitoring plan at site • Should make visits to site to inspect the status physically • Should conduct monthly meeting with APMs and Engineer PMC to discuss site related issues • Should consult with IR and WDFC Engineers and CPM to discuss the issues and problems faced at site and green measures adopted by these agencies in their project.
Engineer (PMC)	• Act as an "Engineer" for supervising EMP implementation • Responsible for maintaining quality of EMP envisioned in detail Project Report • Maintaining progress reports on EMP implementation • Periodic reporting to PIU-DFCC about the status of EMP implementation • Work in close coordination with Asst. Project Manager (package unit) and contractor.	• Should ensure that no violation should take place at site in any circumstances • Should report violations to DFCCIL immediately • Should ask contractor to stop the activity related to violation immediately until the action of DFCCIL
Asst. Project Manager (Env)-designated	• Working as site-representative of APM(Env) • Conducting regular site inspection to all onsite and offsite works • Maintaining records of all necessary statutory compliance, to be obtained from contractor. • Maintaining records of EMP implementation including photographic records • Attending environmental and social training programs • Preparing periodic reports on EMP implementation and forwarding to CPM	• Regular coordination with contractors and Dy. CPM • Coordinating with site workers on weekly basis related to safety aspects • Coordinating with nearby villagers related to pollution aspects • Coordinating with SPCBs regularly related to pollution aspects

Officer	Responsibility As Defined by DFCCIL	Suggestions by CIA Team
Environment & Safety Manager of Contractor	• Directly reporting to the Project Manager of the Contractor; • Discussing various environmental/social issues and environmental/social mitigation, enhancement and monitoring actions with all concerned directly or indirectly; • Prepare Contractor's Checklist, traffic management plan and safety plan as part of their Work Program; • Ensure Contractor's compliance with the EMF/EMP stipulations and conditions of statutory bodies; • Assist the Project Manager to ensure social and environmentally sound and safe construction practices; • Conducting periodic environmental and safety training for contractor's engineers, supervisors and workers along with sensitization on social issues that may be arising during the construction stage of the project; • Preparing a registers for material sources, labour, pollution monitoring results, public complaint/grievance redress, and as directed by the Engineer; • Assisting the DFCC on various environmental monitoring and control activities including pollution monitoring; and • Preparing and submitting monthly/bio-monthly reports to DFCC on status of implementation safeguard measures. • Will be responsible for getting and maintaining the approvals or clearance for various departments and Environmental officer.	• Should explore the options of green building & construction material and use for construction purpose after obtaining approval from PMC and DFCCIL • Should follow all the environment, design and other norms to ensure construction of strong structures • Should take into account seismicity of the area while preparing structural design of the structure

Based on the above analysis, implementation plan recommendations and best practices, it is expected that the proposed project will lead to sustainable development.

Annexures

Annexure – 4.1: list of the stakeholders Identified & Consulted

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
20.	Irrigation Dept. PACT Office Lucknow 6/07/2015	Mr. Manohar Lal, PA, C. E 9918002143	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ He advised to meet C.E. Ramganga Command at Kanpur. EDFC 1 is coming in the Jurisdiction of Ramganga Command Kanpur.
21.	PWD, Lucknow 6/07/2015	Mr. Salil Yadev, Project Manager PWD 9451283252	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ He informed that the proposal of connectivity from DFCC track to state highway, MDR & ORDs is under process and also provided a list of selected roads under the project.
22.	DFCCIL, Kanpur 7/07/2015	Mr. Jariyal Dy. CPM, Mr. Sarang & Mr. Anurag 0512 2225124	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The Project Background, basic information and current status of the project were shared by them.
23.	UPSIDC, Kanpur 7/07/2015	Mr. Rakesh Jha, Regional Manager, UPSIDC, Kanpur 7080120005	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the UPSIDC along the EDFC 1 were also Investigated ▪ Three industrial clusters will be developed along the corridor at Allahabad, Auraiya/Etawah and Aligarh. Industrial corridor will be notify in 5 km radius near at major stations of the EDFC 1.
24.	DIC, Kanpur 7/07/2015	Mr. Ashok Yadav, GM DIC Kanpur 9839163990	▪ The Project Background, basic information and current status of the project, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the DIC along the EDFC 1 were also Investigated ▪ The proposal of projects along the EDFC 1 is under process and will be shared soon with concerned departments.
25.	UPSIDC, Kanpur 8/07/2015	Mr. BK Nanda, Project Director 99354441764	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the UPSIDC along the EDFC 1 were also Investigated. ▪ MMEZ and Logistic parks will be developed

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			at EDFC stations. Road Connectivity will be improved from NH 2 to EDFC stations.
26.	NHAI, Kanpur 8/07/2015	Mr. Naveen Mishra, Project director 0512 2580274	▪ The Project Background, ▪ Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the NHAI along the EDFC 1 were also Investigated ▪ The proposal for improvement of road connectivity from NH 2 to EDFC stations is under process. DFCC should have a mitigation management plan for negative impacts on Natural resources, ecological impacts, Air pollution, waste management due the project.
27.	Irrigation department, Kanpur 9/07/2015	RK Singh Yadev E.E. Auraiya	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the Irrigation department along the EDFC 1 were also Investigated ▪ Mr. RK Singh has informed that due to construction of DFCC track their canals are being damaged between Fafund and Samoh stations and some other locations also. The mitigation measures were not taken by the contractor and DFCC also. C.E. has instructed to their officials to large a FIR against contractor an DFCC officials also.
28.	GM DIC, Raniya Kanpur 9/07/2015	Mr. Ashok Yadev, 9839163990	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the DIC along the EDFC 1 were also Investigated ▪ Road connectivity should be improved between DFCC stations and NH 2 and state highways also. Logistic parks, Ware houses freight depots will be required for industries convenience.
29.	Warehouse SAIL, Kanpur 10/07/2015	Mr. Rajaram, Manager	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the SAIL along the EDFC 1 were also Investigated. ▪ Faster Transportation will be better and it will reduce time and cost. They will also plan to receive their goods by DFCC services.
30.	Industrial Association Raniya Kanpur and other industrialist	Mr. Hardeep Singh, Chairman 9336213421	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ The existing and proposed projects of the

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			Industrial Association along the EDFC 1 were also Investigated ▪ Industrial development will better due to the project. Employment opportunities will be increased due to industrial development. Time and cost will be reduced due to faster transportation. Logistic parks and ware houses should be provided. Road connectivity from the DFCC stations should be improved. Dust, Air and Noise pollution will be increased due to construction of the project. Natural resources, water, Air, environment and ecology will be negatively impacted due to the project.
31.	Hind Lamps Shikohabad 14/07/2015	Mr. H O Sharma Asst. GM Mr. Shashikant CSR expert 9760007362	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ Socio-cultural impacts will be negatively increased. Barren land should be acquired for logistic parks and other industrial developments instead of agriculture land. Environmental guidelines must be followed.
32.	DIC, Firozabad 14/07/2015	Mr. Sudhirl Srivastava GM 9839253111	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders. ▪ Industrial area will be positively impacted due to DFCC such as development of industries, transportation cost and time. Employment generation, environment safety, industrial development, revenue generation, economic growth will increase due to logistic parks & industrial hubs. More improvement of glass industries. DIC is planning for glass expo and glass trade fare in Firojabad. Industries are using green gas for their production since 1996.
33.	U.P. P.C.B. Firozabad 14/07/2015	Mr. Rajendra Prasad, Regional Officer U.P. P.C.B. Firozabad 9412130003	▪ The Project Background, Environmental, Social issue and benefit from the project were explained to the Stakeholders ▪ All kind of pollution will be increased due to industrial development and transportation. New Industrial corridor cannot be established due to TTZ area. UPSIDC has acquired land near Lucknow – Agra expressway for industrial development.
34.	Shramik Bharati (an NGO working in the affected villages of Kanpur Dehat)	Mr. Rakesh Pandey, Manage-CSR	▪ Mr. Rakesh Pandey was explained about the DFCCIL corridor and the purpose of Cumulative Impact Assessment. Mr. Pandey shared that there are few villages of Akbarpur Tehsil where the land acquisition has already taken place. He shared that the villagers of the area are largely engaged in agriculture and it is the only source of livelihoods for them. He pointed out that the

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			development projects that are proposed to come up after the DFCCIL corridor are likely to agricultural lands around the DFCCIL tracks. The indiscriminate acquisition of agriculture land holdings in the Akbarpur, Phaphund and Bharthna areas in future for development projects such as Industrial cluster or/and logistics parks may adversely affect the livelihoods of the villagers. ▪ With regard to the impacts of the EDFC-I, Mr. Pandey shared following points: ▪ The villagers are not capable of identifying alternative livelihoods (do not have much exposure to perceive the kinds of livelihoods they can switch to) in case of loss of agriculture land holdings. This may generate negative impacts on the villagers in case they do not use/ invest the amount received as compensation for their land holdings. ▪ The proposed development projects along the EDFC would create growth centres around the villages and attract a good numbers of outsiders including labours. This influx of the outsiders would pose burden on the resource base and also create pollution such as land, water, indiscriminate defecation by the outsiders around villages. It is necessary that the agencies that are likely to develop the projects should generate awareness so as to facilitate villagers to evolve suitable coping mechanisms to adapt with the proposed development. ▪ The GoUP has seems to be apathetic towards the famers as the proposed development projects are likely to take these villagers away from the traditional livelihoods (as agriculture and agro based activities are the main livelihoods of these villages). The agriculture land holdings are very fertile in this area and the villagers have been dependent on the agriculture from generations. ▪ The proposed development projects in the area are likely to generate employment opportunities to the youth of the neighbouring villages. The skilled workforce that is working outside the villages (migrated earlier for wage employment in other cities) might come back to these projects in future. ▪ In absence of the skilled labour force in the villages around the proposed development projects, the local youth may only get wage labour. In order to mitigate this impact, the

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			Industries association may start some skill development courses so that the potential for employability for these youth may increase. ▪ With the influx of outsiders, there are positive impacts likely to be observed in the form of the reduction in the social evils like untouchability, orthodox practices; illiteracy etc will be observed in the villages. There would be change in socio-culture practices, peer learning of safe practices resulting in decline in water-wash diseases in the area, reduction in rigid conservatism and improvement in literacy profile of these villages. ▪ Some suggestions that have given in order to minimize the negative impacts of the development projects in various districts along the DFCCIL corridor are: ▪ The Industries associations in the proposed project area may plan skill development initiatives from their CSR funds so that the villagers in the working age-groups could be given skill trainings that may subsequently increase their prospects of employability in upcoming development projects. ▪ The construction activities that are being done by DFCCIL should be monitored in a way that indiscriminate extraction of mud/ top soil from the agricultural fields and leaving behind pits of 15-20 meters depth could be prevented. ▪ The proposed industrial development projects by UPSIDC in and around the villages should be systematically planned from socio-cultural perspective and suitable mechanisms be brought in place prior to the land acquisition so that the community is prepared for the heavy traffic of trucks carrying construction materials. There have been some accidents due to heavy trucks movements in the village roads (that are congested and not fit for such traffic) during the construction activities on DFCCIL corridor. ▪ The suitable emphasis should be laid on the construction of ground water recharge structure along the DFCCIL corridor and the areas where the proposed development projects are coming up. The over-extraction of ground water during the construction activities and operating these development projects may have detrimental effect on the ground water resources.

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			▪ The agencies that are involved in the development projects may have to take cognizance of the potential threats to the environment in the form of diverse pollutions such as land, vehicular, solid, noise and air. Suitable mechanisms to regulate the developmental activities to prevent the externalities should also be planned in the proposed projects.
35.	Society for Conservation of Nature, Etawah (SCON)	Dr. Rajeev Chauhan	▪ Dr. Chauhan shared about the how the construction of DFCCIL corridor has caused damages to the natural habitats of cranes, water birds and stalks by destroying the wetlands in the way of the corridor. He mentioned that the DFCCIL should develop other wetlands sites as natural habitats for these endangered birds. ▪ In view of the proposed development projects along the DFCCIL corridor, Dr. Chauhan asserted that sufficient care to prevent excessive damages to the micro climate and over extraction of the resources such as ground water and top soil from agriculture fields be taken at the planning level. He also cautioned that these development projects are likely to create diverse pollutions that would in times to come effect the world's heritage monument-Taj Mahal due to the proximity to the TTZ area. ▪ He also mentioned about the socio-cultural negative impacts that are likely to emerge with these proposed development projects at the community level. He predicted the possibilities of the wage employment for the local workforce but there need to sufficient skill development programmes as majority of the community members do not possess any kind of skills and have been dependent on agriculture as their livelihoods.
36.	Hind lamps	Mr. Shashikant Pandey, Manager-CSR	▪ Mr. Shashikant is aware about the proposed development projects subsequent to DFCCIL corridor planned in the region. He said that there are high possibilities of employment opportunities and that would also attract the migrated workforce in future. He mentioned that there need to some efforts from the GoUP to develop the villagers of the working age-group so that they could take up the opportunities for employment in these development projects. ▪ He also suggested that suitable mechanisms to prevent various crimes in and around the villages after the proposed development

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			projects are operational and when there is heavy influx of the outsiders in the area. He assumed that there would be transformation in the socio-cultural beliefs and religious system of the villages where the proposed projects are likely to come up. Suitable NGOs should be hired to generate awareness and facilitate the communities to evolve coping mechanisms to adapt to these changes.
37.	Hind lamps	Mr. H O Sharma, Assistant General Manager	▪ The DFCCIL corridor is certainly likely to create positive impacts on the industrial growth of the region. The small and medium industries in the region will be benefitted not only by way of procuring machinery, equipments and semi-finished but also using the freight corridor for sending their produce. He said that the upcoming proposed development projects in the region would also generate high potential for employment generation, development of growth centres and improve the infrastructural facilities in the region. ▪ He cautioned that there are high possibilities of over burdening of resources, degeneration of micro-climates if suitable mechanisms and planning to prevent negative impacts are not taken in advance. The development projects that are likely to come up in the region should also plan sufficient environmental management safeguards so that the habitats of the endangered species and fragile ecosystem are not negatively impacted.
38.	GAIL	Mr. Rubin Panicker, Chief Manager-Marketing, GAIL	▪ The DFCCIL corridor would bring tremendous possibilities for industrial growth in the region. There are high potential for the locals to get employment opportunities. The Gail also would use the corridor for porting out the products from GAIL.

Summary of Stakeholders Consultation
EDFC-2

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
1.	Agriculture Department 08.07.2015 Chandauli	Mr. Dhananjay Singh/ Additional Agriculture Officer/ 9532547915	▪ He was not aware of the project corridor but appreciated the project corridor. He shared that their department takes care of crops related works and they have only crop related data of district. He further told that they will extend any possible help to the DFCC anytime.
2.	U.P. Power Transmission Corporation Limited (U.P.P.T.C.L) 08.07.2015 Chandauli	Mr. A.K. Singh/ Executive Engineer/ Mr. Raj Kumar/SDO 132 KV Upkender Near Vikas Bhawan, Chandauli	▪ He was not aware of the project corridor but appreciated the project corridor. He shared that there are two substations works are ongoing in Chandauli are as follows: ▪ 1. 132 kv s/s Mughalsarai (Jeonath-pur) ▪ 2. 132 kv s/s Bhupauli
3.	District Industries Centre Ward No.11, Sanjay Nagar Chandauli 16.07.2015	Mr. Harish Pratap Singh/ Deputy Commissioner/ 9839507118 Mr. Prem Singh/ Additional Statistical Officer/ 9450506744	Following information were shared by the department during consultations: 1. Industrial has been divided into parts i.e. Industrial Area Phase-I and Phase-II along the DFCC corridor in Chandauli. 2. Some of the village along the Industrial area corridor are as follows: Simra, Jiwadhipur, Jivnathpur, Vasant Nagar, Patanwa, Katarya, Hamidpur, Milkypur and Gangehra etc. 3. Some of the name of industries which are ongoing in Chandauli district are as follows: Matrix Roller Mill-Jivnathpur, Rampur Coke Industries, S.A. Iron-Junadpur, M.K. Biscuits-B-18, Alaknanda Cement Pvt. Ltd.-Industrial Corridor, Swastic Cement Products-Industrial Area-Patnva Ramnagar. 4. Some of the name of industries which are proposed in Chandauli district are as follows: (i) D.K. Engineering Works, Phase-II Industrial Area, (ii) Ganesh Plastic Udyog, Patanwa, (iii) Shanda Punj Fuel Coke Pvt. Ltd., Patanwa.
4.	Irrigation Department Chandauli 16.07.2015	Md. Isa / Executive Engineer / 9454414780	He told that this is a tube well division. There is a separate department for Canal/Dam. This office is in Varanasi.
5.	Public Works Department Dakbangla, Ward No.5, Tilak Nagar, Chandauli 16.07.2015	E. Rajeshwar Singh / Executive Engineer 9336416230 Amit Kumar Shukla/ Junior Engineer/ 7376563963	They shared some ongoing and proposed projects in Chandauli district are as follows: <u>Ongoing Projects</u>: 3. Six laning of NH-2, Client: NHAI

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			4. Widening of Sayyed Raza Jamnia road, Client: NH Division, Banaras Proposed Projects: 1. Strengthening of Chandauli-Sakaldiha-Saidpur road SH-69. 2. Widening works of ROB Bichhyya crossing, CDO office to Sakaldiha road.
6.	District Industries Centre Office of the Deputy Commissioner Pathrayya, Mirzapur Ph: 05442-245569 16.07.2015	Mr. P.C. Sharma 9453608481	Following information were shared by the department during consultations: Ongoing Projects: – Mini Industrial Estate in Pathrayya – Mini Industrial Estate in Chunar – Mini Industrial Estate in Khimaipur – Mini Industrial Estate in Ghatampur – Mini Industrial Estate in Rajgarh – Mini Industrial Estate in Marhyan – Mini Industrial Estate in Ram Nagar – Mini Industrial Estate in Sikri – Mini Industrial Estate in Sadar Proposed Projects: South Vidhyanchal Industrial Area to be developed but it is yet not finalized.
7.	NH Division Office of the Executive Engineer PAC Gate, Barodha, Mirzapur 16.07.2015	Mr. Birender Pratap Singh Executive Engineer 9415306391	▪ He appreciated the proposed project corridor. He further told that they will extend any possible help to the DFCC anytime.
8.	Irrigation Department Mirzapur 16.07.2015	Mr. E.O.P. Shrivastava Chief Engineer +915442245083	▪ He appreciated the proposed project corridor. He further told that they will extend any possible help to the DFCC anytime.
9.	U.P. Transmission Corporation Ltd. Pathrayya Road, Mirzapur 16.07.2015	Mr. Chander Vishal/ Adhikchan Abhiyanta Mr. E.S.C. Tiwari Executive Engineer 9415311059	▪ He appreciated the proposed project corridor. He further told that they will extend any possible help to the DFCC anytime.
10.	Dedicated Freight Corridor Corporation of India Ltd., A Government of India (Ministry of Railway) Enterprise Project Office: 328/15, Ashok Nagar, Old GM Building, Valmiki Chauraha, Nawab Yusuf Road, Allahabad-211001 Phone: 0532-2560326, Fax: 0532-2560316, Website: www.dfccil.org 15.07.2015	Mr. Anamul Haque/ Chief Project Manager/ Engineer 7897000790	▪ Met with Chief Project Manager/Engineer DFCC in Allahabad. Detailed discussions were held with him regarding project corridor, concerns of the villagers, community consultations, land acquisition and compensations. He told that villagers are demanding compensation as per new ordinance but they will be paid compensation as per previous policy because the project was started before 2014. He further told that carry out the Cumulative Impact Assessment (CIA) in proposed project corridor.
11.	District Industries Centre	Mr. Rishie Ranjan Goel	▪ He appreciated the proposed project

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
	5, New Katra, Allahabad E-mail: grrishi1976@yahoo.com 15.07.2015	P.C.S. (A), Deputy Commissioner Industries 9415690127 / 7398856636	corridor. He further told that they will extend any possible help to the DFCC anytime. He has handed over the list of ongoing / proposed industrial projects in soft copy to us.
12.	Nagar Nigam Civil Lines, Allahabad 15.07.2015	Mr. Sanjeev Pradhan/ Environmental Engineer/ 7408422379	▪ He appreciated the proposed project corridor. He further told that they will extend any possible help to the DFCC anytime. He told that their department have been doing maintenance of old roads of city. He told that there is a proposed SWM plant in Baswar village.
13.	Public Works Department Civil Lines, Allahabad 15.07.2015	Mr. Akhilesh Kumar/ Assistant Engineer/ 9532571810 Mr. T.N. Dubey, Assistant Engineer	▪ He was aware of the proposed project corridor. He told that he did not get any letter from DFCC regarding impacts of city roads. He told that there are not any 4-lane/expressway ongoing/proposed in district. He further told that some of the ongoing projects are as follows: ▪ 1. Yamuna bridge new section starts from 4.878 to 458.000 in Allahabad. ▪ 2. 2-lane with paved shoulder (both side widening each 1.5m).
14.	Power Grid Corporation of India Limited (A Government of India Enterprise), Northern Region-1 6th Floor, Indira Bhawan, Civil Lines, Allahabad, PIN-211001 Phone: 0532-2408083 E-mail: pgcilaid@gmail.com 15.07.2015	Mr. Suresh Kumar/ Dy. General Manager/ 8650508643	▪ He told that all the information related to land acquisition, number of power substation and transmission lines will be impacted due construction of proposed corridor with DFCCIL. DFCCIL inform us through letter regarding relocation of transmission lines and power substations. He informed that this is a regional office and we do not have information regarding impacts. He suggested that all the details regarding impacts will be collected from our Head Office, Gurgaon. Right now we do not have any proposed power grid projects within 10 km radius of the corridor.
15.	Office of the General Manager cum Project Director National Highway Authority of India (Ministry of Shipping Road Transport and Highways) PIU - Allahabad & PIU - Naini Bridge, 18-C/28A, Sarojni Naidu Marg, Civil Lines, Allahabad-211001; 15.07.2015	Mr. Abdul Basid/ GM cum Project Director/ 0532-2422035	▪ He was aware of the proposed project corridor. He did not shared with us their ongoing and proposed projects. He told that kindly come with a letter addressed to GM cum PD and request him to provide a list of ongoing and proposed projects of NHAI to consultants along the proposed DFCC corridor.
16.	Irrigation Department	Mr. R.S. Mishra/ Assistant	▪ He appreciated the proposed project

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
	Govindpuram Allahabad 15.07.2015	Engineer/ 9450061402	corridor. He told that right now there are not any ongoing and proposed project along the proposed project corridor. He further told that they will extend any possible help to the DFCC anytime.
17.	U.P. State Industrial Development Corporation Ltd. Division Office: Executive Engineer, CD-9, 21, Lawder Road (Near Bhola Hospital), Allahabad 15.07.2015	Mr. Dinesh Sonkar/ Manager/ Ph: 0532 2462432	▪ He was aware about the project and appreciated the proposed project corridor. He informed and suggested that this is a divisional office, you may collect the required information from our head office at Kanpur. He further told that they will extend any possible help to the DFCC anytime.
18.	Office of the General Manager District Industries Centre Kaushambi 14.07.2015	Mr. Rishi Ranjan Goyal/ General Manager/ 05331-212290 Mr. D.R. Mishra/ Steno to GM/9621186120	▪ Some of the ongoing, proposed and existing industries suggested by them are as follows: ▪ Shiv Rice Mill, Sirathu - Ongoing ▪ New Shiv Rice Mill, Sirathu - Ongoing ▪ Raj Coal storage, Sayara, Mithapur (Permission has not been given by the railway)-Proposed ▪ Kaushambi Rice Mill, Rosulpur, Girsa- Proposed ▪ Vivek brick Sheld (Bhatta), Dhuayan ▪ Flour Mill, Bharwarig
19.	Agriculture Production Mandi Committee Manjhanpur Kaushambi 14.07.2015	Mr. Atul Pathok/ Committee President/ 9918002523 Mr. Nem Chand Agrahri Committee Deputy President/ 9807433045	▪ They shared their experience with us and told that they have been fetching their vegetable, grains etc. from Allahabad railway junction. There are no stoppage of train in Kaushambi and the Kaushambi railway station is 17 km away. So, they bear extra transportation cost that's why rate of the vegetables and grains are increased in Mandi. He suggested that stoppage of the train should be in Kaushambi.
20.	Office of the Executive Engineer Irrigation Department Kaushambi 14.07.2015	Mr. Rajeev Kumar Niranjan/ Executive Engineer/ 8934075115 Mr. P.M. Pandey/ Senior Clerk	▪ He told that there is a existing Nahar in Sirathu Tehsil flowing towards Fatehpur to Kaushambi. He further told that there are no existing, ongoing and proposed Canal/Dam in Kaushambi district.
21.	Office of the Chief Medical Officer (C.M.O.) Fatehpur 14.07.2015	Dr. V.K. Pandey/ Chief Medical Officer/ 8005192654 Dr. Fateh Bahadur/ Additional C.M.O. 9415184118 Dr. L.R. Chand/ Additional C.M.O. 9451222077	▪ He told that there are no medical services like AIIMS is ongoing/proposed in town. Common disease in town are fever, gastro, typhoid, T.B. and diarrhoea etc. Major disease have been found in Udaisarai, Betarwa tehsil. Some AIDS cases are also exist in town. Actually AIDS patient migrate from

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			metros/big city like Delhi, Mumbai and Kolkata etc. in Fatehpur. They have been taking treatment and they are well. He appreciated the proposed project corridor and told that it will increase the transportation. Patients of the Fatehpur town will take benefits from this corridor. They will easily reach to their neighbouring cities like Kanpur and Allahabad and take advantage of better medical facilities.
22.	Public Works Department Fatehpur 14.07.2015	Mr. Ashok Kumar Verdia/Executive Engineer/ 9415084531	▪ He told that their department looks after rural roads, links roads and maintenance of the district roads. He further told that there are no expressway proposed/ongoing in district.
23.	Nagar Palika Prishad Fatehpur 14.07.2015	Mr. Rajender Verma/ Junior Engineer/ 9919981456 Md. Akib Babu / 9792929000	▪ He told that their department looks after and limited to only town related activities. He further told that major impact may be seen due to proposed project corridor in Deviganj, Sadipur, Naka, Telephone exchange areas. Some of the ongoing projects in town are as follows: ▪ Construction of RCC road ▪ Malaka Trenching ground plant
24.	Agriculture Department Patel Nagar Chowraha, Nahar Colony Fatehpur 14.07.2015	Mr. A.K. Singh/ Executive Engineer/ 9454434760	▪ He was not aware of the project corridor but appreciated the project corridor. He shared that their department takes care of crops related works and they have only crop related data of district. He further told that they will extend any possible help to the DFCC anytime.
25.	Minor Irrigation Department Vikas Bhawan Fatehpur 14.07.2015	Mr. Abhay Kumar Gupta/ Junior Engineer/ 9198986870	▪ He shared with us that their department looks after only minor irrigation components like tube wells. He shared that recently they do not have any ongoing projects in these areas. They do not have any knowledge of future projects. Only existing tube wells may be impacted due to proposed project. He told that almost 250-300 tube wells may be impacted.
26.	UPSIDC 13.07.2015	Mr. Manish Kumar General Manager, Development/ 9415020300/ Mr. Pankaj Pandey Senior Manager/ Ph: 0512-2581810	▪ He told that impact zones are Fatehpur, Kanpur and Jainpur. Project corridor is not started yet, it is in notification period. They have identified 18-20 villages along the corridor and sent notification to the project affected families also.

Sr. No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
27.	National Highways Authority of India Kanpur Nagar-208021 13.07.2015	Mr. R.K. Verma / Manager 9453781166	▪ He shared some of the ongoing/proposed project in Kanpur are as follows: ▪ 6-lane of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687 ▪ 2-lane with paved shoulder of Kanpur-Kabrai of NH-86. (PCOD issued on 5 May) ▪ 6-lane of Chakeri to Allahabad of NH-2 from km 483.687 to 628.753. ▪ He further told that concessioner and drawings are yet not finalized. 3D for Kanpur and Kaushambi have been sent. Fatehpur 3D has yet not been sent.
28.	Power Grid Corporation of India Limited Chakarpur, Kanpur 13.07.2015	Mr. Kaushik/ General Manager/ Mr. A.K. Singh/ Deputy Manager/ 9415311733	▪ He told that all the information related to land acquisition, number of power substation and transmission lines will be impacted due construction of proposed corridor with DFCCIL. DFCCIL inform us through letter regarding relocation of transmission lines and power substations. He informed that this is a regional office and we do not have information regarding impacts. He suggested that all the details regarding impacts will be collected from our Head Office, Gurgaon. Right now we do not have any proposed power grid projects within 10 km radius of the corridor. He further told that electric lines will be diverted towards Delhi line from Sen Paschim Para to Kharam Nagar.
29.	Minor Irrigation Department Vikas Bhawan, Kanpur 13.07.2015	Mr. Sandeep Saksena/ Junior Engineer/ 9450371359	▪ He shared with us that their department looks after only small drains overflow and minor irrigation components like tube wells. He shared that recently they do not have any ongoing projects in these areas. They do not have any knowledge of future projects.

Summnary of Stakeholders' Consultation
EDFC-3

No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
1	Ludhiana grain association Sanehwala	Mr Amrish Sharama S/o Sh Vinod Sharma (Vice President)	▪ No profit from proposed project for grain market in Snehwala ▪ Transpiration facilities may be provided to grain market from proposed terminals of DFCCIL.
2.	FCI	Mr Harminder Singh Manager FCI Ludhiana (9646700832)	▪ It will increase transportation facilities ▪ It will be time saving transportation ▪ Import and export of goods in timely manner ▪ Timely delivery of the goods ▪ Wastage of grain will be less ▪ Less chances of theft of grain during the transportation ▪ It will increase the capacity of FCI storages due to timely transportation
3.	DIC	Darshan Singh Manager	▪ Two proposed projects Industrial park and Industrial Focal Points in Ludhiana ▪ Duraha: Industrial Textile Park near existing industrial point ▪ Tanansu : Industrial Focal Point where 350 ha land is acquired ▪ It will increase business and import and export ▪ Easy way of transportation ▪ Time saving mode of transportation
4.	Chamber of Industrial and Commercial Undertakings (CCIU)	Mr Upkar singh General Secretary 9815800622	▪ Wanted provision of local transportation from railway side up to their industries from proposed terminals ▪ Safe way of transportation ▪ Time saving ▪ Door to door service should be provided by the railway to industries
5	Irrigation	Superintendent	▪ NOC from Irrigation department is given to DFCCIL ▪ No project of irrigation is affected ▪ No project near the proposed alignment
6	PWD	Mr Baljeet SDE	▪ The DFCCIL alignment is near the NHAI 1 ▪ Road widening of the NHAI is in progress ▪ PWD project is not there
7	Agriculture department	District Agriculture officer Ludhiana Dr Sukhpal Singh sikhoo 8872200567	▪ No project is in planning along with the corridor ▪ May help to maintain cold chain of grain ,vegetable and other products ▪ Timely delivery ▪ May decrease the cost of transportation ▪ Timely delivery
Patiala			
1	PWD	Mr Vipin Bansal ExEn	▪ Three proposed ROB along with the corridor for better connectivity and safety of villagers ▪ No Proposed Project In Future
2	DTO	Kulwant Rai Garg(ADTO) 9646900658	▪ Will help in transportation ▪ Road traffic due to trucks will be less ▪ No project along the corridor ▪ Safe, easy, Time saving way of transportation

No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
3	Irrigation	Mr. Jagtar Singh DHD 9501013833	▪ NOC is provided ▪ No irrigation project is near the corridor ▪ Good step taken by Railway for DFCCIL
4	Agriculture	Chief District Agriculture officer Mr Harvinder singh	▪ No project is in planning along with the corridor ▪ May help to maintain cold chain of grain, vegetable and other products ▪ Timely delivery ▪ May decrease the cost of transportation ▪ Loss of agriculture due to land acquisition ▪ Easy to export wheat and rice
5	DIC	Mr Ram singh GM	▪ No proposed project in their area ▪ Govt. does not acquire land for industries ▪ Water table is going very deep so farmers are not interested in agriculture ▪ Other neighboring states are tax free for new industries, so industrialists are shifting there for new plants.
Fatehgarh Sahib.			
1	PWD	Kuldeep Singh(Super indent) Arun kumar DHD 0176 233966	▪ Project is along NH ▪ No proposed project ▪ No existing project affected due to EDFCCIL.
2	Agriculture	Balwinder singh Superintendent Parmamjeet Sandhu	▪ No loss of agriculture projects ▪ Agriculture research centers are 1 km away from corridor
3	Food and civil supply department	Ms. Harjeet Kaur, DFSC Mr. Pankaj, Accounts officer	▪ It will save the wastage of the grain during to hold. ▪ Timely and safe transportation will lead to timely payment from FCI as at present 30% payment is blocked till the full material reaches the destination. Any theft enroute is also billed to FSD. ▪ Will increase the overall quantity of procurement.
4	Fishery	Mr Gurpreet Singh CEO (Fishery)	▪ Do not have production for export ▪ Farmers have direct links to sell their products ▪ Ludhiana is main terminal for fishes imported from various part of the country ▪ Sarhind station will be beneficial for this district for farmers and allied industries.
5	Town Planning	Mr. Harminder singh (SDE) Assistant Town Planner	▪ No project planned in future along the corridor. Current master plan is for 10 years. ▪ DFCC corridor has already been taken into the current master plan a 200 mtr width on both sides of the corridor and allotted the same under mixed land use.
6	PWD-2	Mr Mandeep Singh (SDO) 01763222275	▪ 6 RUB are proposed along the DFCC corridor. ▪ 1 ROB is proposed at Madapur Majari, 141C Sadhuwal Wadali. ▪ Kotla pai pind road is affected and should be constructed by the project implementing agency.
Ambala			
1	NHAI	Mr K Sachdeva Manager	▪ Road widening of NHAI is in progress along with the corridor ▪ Widening work is started from Jalandhar to Ambala

No.	Stakeholders/Date of Consultation	Name and designation	Remarks / Consultation outcome
			near corridor.
2	Irrigation	Jai Bhagwaan SDO	▪ No minor or major project at the existing corridor ▪ NOC is already given to the PIA.

Annexure – 4.2: Questionnaire

1. Name o f the Authority
   ……
   ……
2. Date of Meeting
   ……
   ……
3. Name of the
   Officer……
   …….
4. Designation
   ……
   ……..
5. Contact No / Mail
   ID……
   ……
6. Current / Future development plans and its time period (if any)
   ……
   ……
   ……
   ……
7. Development guidelines / norms to be followed
   ……
   ……
   ……
   ……
8. Designated area of major concern (if any)
   ……
   ……
   ……
   ……
9. Industries to be catered / Type / their connectivity (available or not)
   ……
   ……
   ……
   ……
10. Source of raw materials
    ……
    ……

……
……

11. Major VECs (Urban areas, Ecology, CEPI, Religious/Archaeological Site)

……
……
……
……

12. Any plans for set up of Common Effluent Treatment Plant (For SIDC)

……
……
……
……

13. Installation of pollution control equipments? (For SIDC)

……
……
……
……

14. Any plans to facilitate modal shift

……
……
……
……

15. Future proposals for Connectivity of freight stations to the nearby settlements

……
……
……
……

16. Authority undertaking responsibility of future developments

……
……
……
……

17. Objections and suggestions

……
……
……
……
……
……
……

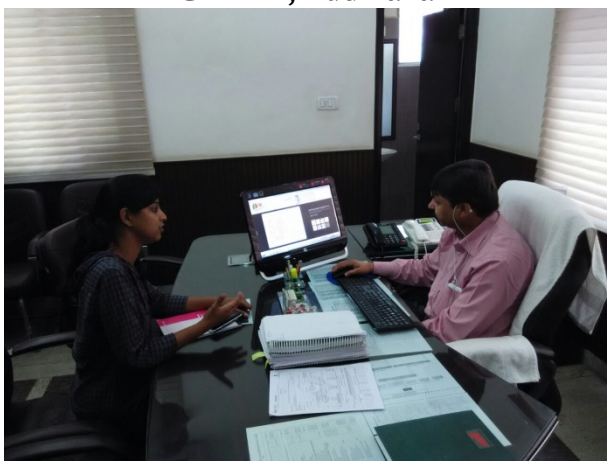
Annexure - 4.3: Photographs of Stakeholders Consultations in EDFC / Village Level Public Consultations in EDFCC-I / Village Level Public Consultations in EDFCC-II / Village Level Public Consultations in EDFCC-III

Photographs of Stakeholders Consultations in EDFC

NHAI, Panchkula

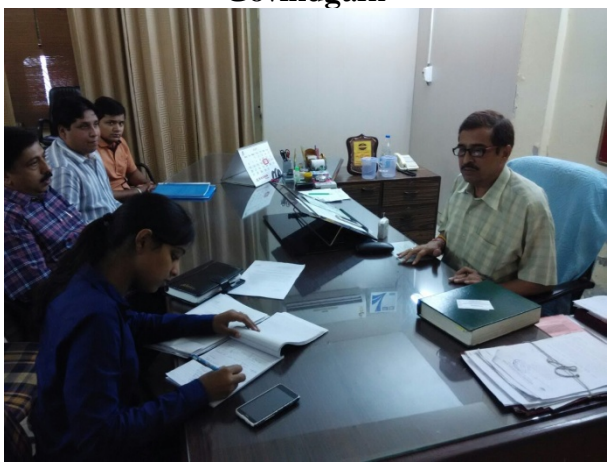
GLADA, Ludhiana

SIDC, Punjab



DFCCIL, Ambala

Punjab Pollution Control Board, Mandi Govindgarh



Zonal Office PPCB, Ludhiana

DTP, Ambala

HSIDC Office, Ambala (Saha)

PSIEC, Ludhiana

Photographs of Village Level Public Consultations in EDFCC-I

Consultation with GM DIC Raniya Kanpur

Consultation with Chairman Industrial Association and other Industrialist

Consultation in Kanno village


Consultation in Bijhari village


Consultation in Kanjari village


Consultation in Pali Khurd village


Consultation in Samoh village


Consultation in Sonai Village


Consultation in Ladhpura village


Consultation in Rasulpur village

Photographs of Village Level Public Consultations in EDFCC-II

Jafarpur village (Chandauli) Consultation-1

Singhitali village (Chandauli) Consultation-2

Shivpur Koiran (Mirzapur) Consultation-1

Birohi (Mirzapur) Consultation-2

Bibhani Hetar village (Allahabad) Consul-1

Maska village (Allahabad) Consultation-2

Adullahpur Rohi village (Kaushambi) Consul-1

Kanwar village (Kaushambi) Consul-2

Haswa village (Fatehpur) Consultation-1

Sikrodhi village (Fatehpur) Consultation-2

Badagaon village (Kanpur Nagar) Consultation-1

Hathipurgaon (Kanpur Nagar) Consultation-2

Sinhpur Debni village (Ramabainagar) Consultation-1

Photographs of Village Level Public Consultations in EDFCC-III

Village Rupaloo Samrala, Distt Ludhiana

Village Fareedpur gujra, Rajpura, Patiala District


Village Harbanspur, TEHSIL Gobindgarh, Fatehegarh sahib


Village Nahari, Ambala, Haryana

Annexure – 5.1: Ambient Quality Monitoring

Ambient Quality Monitoring, Kanpur Nagar (2014)

Pollutant		CO	O3	NO	NO2	NOX	SO2	PM10	PM2.5	B	T	X
Unit		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
JANUARY		2.07	17	27	76	308	10	226	NA	2.8	6.6	2.2
FEBRUARY		1.93	23	36	75	339	11	NA	112	2.7	6.0	2.4
MARCH		1.91	37	18	69	251	12	117	NA	2.4	6.1	2.6
APRIL		2.15	37	26	72	293	15	NA	93	3.3	7.3	3.6
MAY		1.68	46	14	54	196	8	190	NA	3.1	6.0	3.3
JUNE		1.54	34	19	61	238	12	NA	122	3.2	6.2	3.2
JULY		1.26	23	6	36	117	5	93	NA	3.0	4.8	2.6
AUGUST		SF	19	11	29	120	10	NA	51	2.8	6.4	2.8
SEPTEMBER		SF	21	9	37	132	8	103	NA	2.7	5.6	2.7
OCTOBER		SF	35	16	44	179	7	231	73	2.7	5.7	2.6
NOVEMBER		3.54	35	27	83	326	15	NA	278	2.8	7.1	3.0
DECEMBER		2.4	19	30	69	300	7	308	NA	2.8	4.9	2.3
Average		**2.06**	**29**	**20**	**59**	**233**	**10**	**181**	**122**	**2.9**	**6.1**	**2.8**
Minimum		**1.26**	**17**	**6**	**29**	**117**	**5**	**93**	**51**	**2.4**	**4.8**	**2.2**
Maximum		**3.54**	**46**	**36**	**83**	**339**	**15**	**308**	**278**	**3.3**	**7.3**	**3.6**
Standard	**1 Hr.**	**4.00**	**100**									
	8 Hr.	**2.00**	**180**									
	24Hr.	**NA**	**NA**		**100**		**100**	**100**	**60**			

Source: UPPCB

Ambient Air Quality Monitoring, Kanpur Nagar (2015)

Pollutant		CO	O3	NO	NO2	NOX	SO2	PM10	PM2.5	B	T	X
Unit		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
JANUARY		1.84	13	33	51	265	6	NA	199	2.7	5.1	2.2
FEBRUARY		1.79	20	34	53	275	10	250	NA	2.7	6.2	2.8
MARCH		1.82	24	25	49	226	11	NA	93	2.4	4.5	2.3
APRIL		2.11	25	24	67	270	15	233	NA	2.3	4.7	2.4
MAY		2.74	23	41	78	367	12	NA	126	2.7	5.3	3.1
Average		**2.06**	**21**	**31**	**60**	**281**	**10**	**242**	**139**	**2.6**	**5.2**	**2.6**
Minimum		**1.79**	**13**	**24**	**49**	**226**	**6**	**233**	**93**	**2.3**	**4.5**	**2.2**
Maximum		**2.74**	**25**	**41**	**78**	**367**	**15**	**250**	**199**	**2.7**	**6.2**	**3.1**
Standard	**1 Hr.**	**4.00**	**100**									
	8 Hr.	**2.00**	**180**									
	24Hr.	**NA**	**NA**		**100**		**100**	**100**	**60**			

Source: UPPCB

Ambient Air Quality Monitoring, Firozabad (2014)

Pollutant		NO2	SO2	PM10
Unit		µg/m³	µg/m³	µg/m³
JANUARY		34	13	285
FEBRUARY		32	11	241
MARCH		34	13	249
APRIL		34	13	266
MAY		36	13	289
JUNE		31	12	167
JULY		24	9	106
AUGUST		23	10	89
SEPTEMBER		27	11	146
OCTOBER		31	14	222
NOVEMBER		35	12	303
DECEMBER		34	13	282
Average		**31**	**12**	**220**
Minimum		**23**	**9**	**89**
Maximum		**36**	**14**	**303**
Standard	**1 Hr.**			
	8 Hr.			
	24Hr.	**100**	**100**	**100**

Source: UPPCB

Ambient Air Quality Monitoring, Bulandshahr (2014)

Year/Land Use	2011			2012			2013		
	RSPM	SO2	NOX	RSPM	SO2	NOX	RSPM	SO2	NOX
Industrial	173	30	30	178	27	27	177	28	28
Residential	155	26	26	158	23	22	149	21	21

Source: UPPCB

Ambient Air Quality Monitoring, Allahabad (2014)

	Mixed Use Area-Square Crossing Station-Laxmi Talkies			Residential-Bharat Yantra Nigam Ltd.		
Date	RSPM	SO_X	NOx	RSPM	SO_X	NOx
1/1/2014	309	5.8	24.8	263	4.1	18.9
6/1/2014	352	4.9	24.6	307	4.5	17.2
8/1/2014	242	6.2	31.6	254	4.3	25.2

	Mixed Use Area-Square Crossing Station-Laxmi Talkies			Residential-Bharat Yantra Nigam Ltd.		
Date	**RSPM**	**SO_X**	**NOx**	**RSPM**	**SO_X**	**NOx**
13/01/2014	294	2.4	33.4	259	2.2	25.7
15/01/2014	266	3.5	34.7	269	2.8	24.7
21/01/2014	303	3.4	39.9	236	3.6	28.8
22/01/2014	321	4.2	32.9	298	2.1	23.4
28/01/2014	312	5.6	39.1	299	4.6	22
29/01/2014	370	4.5	31.6	278	2.1	21.7

Source: UPPCB

	Mixed Use-Alopibagh			Commercial-JohnstonGanj			Commercial-Rambagh		
Date	**RSPM**	**SO_X**	**NOx**	**RSPM**	**SO_X**	**NOx**	**RSPM**	**SO_X**	**NOx**
2/1/2014	146.88	1.46	38.76	200.39	1.96	44.83	174.63	1.96	28.44
7/1/2014	181.6	1.99	35.84	151.94	3.21	45.62	180.95	2.72	36.09
9/1/2014	195.63	0.94	58.99	225.91	1.04	61.48	201.99	1.19	50.51
14/01/2014	180.68	2.25	56.45	168.81	2.15	55.67	171.17	2.51	51.76
16/01/2014	222.25	2.17	55.35	186.92	2.89	59.73	217.6	2.81	57.18
21/01/2014	235.96	2.01	76.64	151	2.3	74.87	217.15	2.32	63.14
23/01/2014	212.07	2.11	51.06	203.08	2.7	52.58	184.43	2.53	36.39
28/01/2014	306.27	2.87	52.52	223.22	2.91	46.56	239.94	3.42	46.54
30/01/2014	251.62	3.24	51.41	203.74	3.52	53.23	231.81	2.67	43.09

Source: UPPCB

Ambient Air Quality Monitoring, Varanasi (2013-2014)

Station type	**Comm**	**Johnstonganj**	
Month	**RSPM**	**SOX**	**Nox**
Oct, 2013	137.75	19.59	31.23
Nov, 2013	141.06	19.14	29.04
Dec, 2013	144.48	19.66	33.4
Jan, 2014	140.7	18.73	31.3
Average	141.00	19.28	31.24

Source: UPPCB

Ambient Air Quality Monitoring, Ghaziabad (2014)

		NOX	SO2	PM10	NOX	SO2	PM10	NOX	SO2	PM10
Unit		µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
JANUARY		31	27	361	31	26	364	31	27	362.5
FEBRUARY		28	24	336	29	25	349	29	25	342.5
MARCH		29	25	346	28	25	348	29	25	347.0
APRIL		29	25	346	30	25	352	30	25	349.0
MAY		30	26	349	29	27	341	30	27	345.0
JUNE		28	25	294	27	25	281	28	25	287.5
JULY		32	24	222	31	24	210	32	24	216.0
Average		**30**	**25**	**322**	**29**	**25**	**321**	**29**	**25**	**321**
Minimum		**28**	**24**	**222**	**27**	**24**	**210**	**28**	**24**	**216**
Maximum		**32**	**27**	**361**	**31**	**27**	**364**	**32**	**27**	**363**
Standard	1 Hr.									
	8 Hr.									
	24Hr.	100	100	100						

Source: UPPCB

Ambient Air Quality Monitoring, Panchkula (2015)

Pollutant	CO	O3	NOX	SO2	PM10	PM2.5
Unit	mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
01/07/15	0.75	39.63	25.15	2.62	NA	59.83
02/07/15	0.71	44.36	31.33	4.66	NA	56.34
03/07/15	0.88	35.64	31.15	1.16	NA	44.16
04/07/15	0.85	39.32	24.17	3.04	NA	48.25
05/07/15	0.69	35.37	33.10	4.49	NA	44.49
06/07/15	0.60	29.87	23.01	5.88	NA	20.67
07/07/15	0.55	29.77	23.13	2.14	NA	23.07
08/07/15	0.42	31.05	25.12	3.00	NA	25.63
09/07/15	0.35	26.98	26.27	5.30	NA	24.43
10/07/15	0.35	23.48	25.07	4.05	NA	13.64
11/07/15	0.53	22.52	24.74	3.56	NA	11.77
12/07/15	0.46	19.13	17.24	3.38	NA	15.82
13/07/15	0.27	25.45	26.11	6.06	NA	35.79
14/07/15	0.28	34.75	24.19	6.22	NA	48.88
15/07/15	0.59	36.84	28.27	6.31	NA	48.47
16/07/15	0.49	27.65	26.71	2.94	65.64	NA
17/07/15	0.48	33.16	26.35	2.83	76.58	NA

Pollutant		CO	O3	NOX	SO2	PM10	PM2.5
Unit		mg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
18/07/15		0.46	33.19	28.52	4.18	81.27	NA
19/07/15		0.38	37.18	29.09	3.72	89.71	NA
20/07/15		0.47	29.97	32.92	5.34	73.68	NA
21/07/15		0.80	32.13	31.68	4.15	76.66	NA
22/07/15		0.56	30.16	31.43	3.14	73.03	NA
23/07/15		0.51	33.85	30.97	6.85	65.84	NA
24/07/15		0.60	30.29	28.59	2.24	82.84	NA
25/07/15		0.69	36.07	32.83	4.86	83.17	NA
26/07/15		0.52	42.95	34.57	4.05	62.67	NA
Average		**0.55**	**32**	**28**	**4**	**76**	**35**
Minimum		**0.27**	**19**	**17**	**1**	**63**	**12**
Maximum		**0.88**	**44**	**35**	**7**	**90**	**60**
Standard	**1 Hr.**	**4.00**	**100**				
	8 Hr.	**2.00**	**180**				
	24Hr.	**NA**	**NA**		**100**	**100**	**60**

Source: HSPCB

Ambient Air Quality, Ludhiana (2014)

	Milk Plant			Vishwakarma Chowk			Nahar Spinning Mall			Zonal Office			Averages		
Months	**RSPM**	**SO_2**	**NOx**	**RSPM**	**SO_2**	**NOx**	**RSPM**	**SO_2**	**NOx**	**RSPM**	**SO_2**	**NOx**	**RSPM**	**SO_2**	**NOx**
Jan, 2014	157	8	21	220	11	29	227	14	31	187	12	30	197.75	11.25	27.75
Feb, 14	155	9	21	248	10	21	196	13	30	120	10	25	179.75	10.5	24.25
March,2014	86	8	16	197	9	26	161	13	29	82	9	22	131.5	9.75	23.25
April, 2014	65	7	19	186	11	26	158	14	31	93	10	24	125.5	10.5	25
May, 2014	117	9	26	230	11	28	215	14	32	129	12	29	172.75	11.5	28.75
June, 2014	137	8	24	186	12	29	186	14	31	163	11	27	168	11.25	27.75
July, 2014	76	6	17	185	7	24	169	13	29	116	10	26	136.5	9	24
August, 2014	56	7	19	167	9	25	132	13	30	111	11	27	116.5	10	25.25
Sept. 2014	58	8	23	124	9	25	100	11	28	147	10	23	107.25	9.5	24.75
Oct., 2014	122	10	26	216	11	30	159	12	27	123	12	27	155	11.25	27.5
Nov., 2014	113	10	27	161	11	30	224	13	31	132	12	33	157.5	11.5	30.25
Dec., 2014	112	9	26	176	10	26	183	13	35	242	13	28	178.25	11.25	28.75
Average	**104.5**	**8.25**	**22.08**	**191.33**	**10.08**	**26.58**	**175.83**	**13.08**	**30.33**	**137.08**	**11**	**26.75**	**152.1875**	**10.60417**	**26.4375**

Source: PPCB

Ambient Air Quality, Ludhiana 2015)

Months	RSPM	SO_2	NOx	RSPM	SO_2	NOx	RSPM	SO_2	NOx	RSPM	SO_2	NOx	RSPM	SO_2	NOx
Jan, 2015	116	10	27	173	10	28	208	13	30	120	10	27	154.25	10.75	28
Feb., 2015	114	10	29	176	10	29	212	13	31	98	11	29	150	11	29.5
March, 2015	61	9	26	128	10	27	231	13	21	66	9	27	121.5	10.25	25.25
April, 2015	98	10	26	142	9	28	167	13	30	71	9	26	119.5	10.25	27.5
May, 2015	107	10	31	236	10	32	205	12	32	92	11	27	160	10.75	30.5
June, 2015	84	9	29	165	11	33	138	29	13	83	10	26	117.5	14.75	25.25

Source: PPCB

Annexure - 5.2: Ambient Noise Levels

Ambient Noise Levels, Bulandshahr (2013-2014)

Date	Period o Monitoring	Commercial Area						Residential Area		Silence Area	
		Ansari Road		Kala Aam		Bhoor Chauraha		Hari Enclave		Govt. (Male) Hospital	
		Range	Avg. Value	Range	Avg. Value	Range	Avg. Value	Range	Avg. Value	Range	Avg. Value
24.08.13	06 to 14	48.50-70.1	59.3	52.3-68.5	60.4	58.0-67.5	62.75	40.5-50.10	45.3	32.5-57.3	44.9
	14 to 22	55.9-79.1	67.5	69.2-80.8	70.0	68.5-69.3	68.9	52.5-69.5	61.10	33.5-53.5	43.5
24.09.13	06 to 14	46.25-66.25	56.25	55.58-82.26	68.92	58.35-68.25	63.30	39.10-48.20	43.65	34.20-46.50	40.35
	14 to 22	57.20-74.10	65.65	61.35-69.55	65.45	60.20-79.40	69.80	45.10-57.50	51.30	33.54-47.30	40.42
15.10.13	06 to 14	46.30-65.40	55.85	56.50-81.30	68.90	59.30-67.50	63.40	39.40-49.30	44.35	34.40-46.30	40.35
	14 to 22	60.40-78.10	69.25	63.30-70.10	66.70	61.30-78.34	69.82	44.30-56.40	50.35	34.20-53.30	43.75
21.12.13	06 to 14	50.25-66.25	58.25	56.68-70.32	63.5	58.50-70.50	64.3	40.20-50.30	44.25	35.20-46.30	40.7
	14 to 22	60.30-75.20	67.75	51.50-70.25	60.87	60.50-70.50	65.5	40.50-58.50	49.25	35.54-48.30	41.92
01.01.14	06 to 14	50.25-66.75	58.5	57.8-80.5	69.15	56.25-69-15	62.70	40.20-50.30	45.25	35.25-47.00	41.12
	14 to 22	56.75-72.5	64.75	55.15-70.35	67.75	57.15-70.20	63.67	49.1-57.25	53.17	34.2-50.2	42.2

Source: UPPCB

Ambient Noise Levels, Allahabad (2011-2012)

Sr. No.	Location	Noise Level Leq dB(A)					
		Min		Max		Average	
		2011	2012	2011	2012	2011	2012
1.	Ashok Nagar, Allahabad (Residential Area)	41.6	44.2	99.6	95.3	63.02	62.03
2.	Katra Crossing, Allahabad (Commercial Area)	38.6	40.8	101.3	97.6	71.33	70.88
3.	Near Hon'ble High Court, Allahabad (Sensitive Area)	36.9	33.5	80.2	86.6	57.88	56.42

Source: UPPCB

Ambient Noise Level, Kanpur (2014)

Sr. No.	Monitoring Place	Noise Level dB A(Leq)					
		Morning : 11:30 to 16:30			Evening: 22:00 to 02:00		
		Min.	Max.	Average	Min.	Max.	Average
Residential Area		Ambient noise level standard dB A(Leq)		1. Day time: (06:00 AM to 10:00 PM) - 55 2. Night time: (10:00 to 06:00 PM) - 45			
1.	Vasant Vihar	66	98.6	80	60	71	66
2.	Begum Purva	70	89	77	60	79	67
3.	Shastri Nagar	60	85	72	62	85	70
4.	Babu Purva Colony	69	91	83	61	77	69
5.	Indra Nagar	62	80	71	66	54	73
Commercial Area		Ambient noise level standard dB A(Leq)		1. Day time: (06:00 AM to 10:00 PM) - 65 2. Night time: (10:00 to 06:00 PM) - 55			
1.	C.T.E. Chouraha	75	100	86	68	98	74
2.	Fazalganj Chouraha	74	103	87	68	83	76
3.	Brahm Nagar, Chouraha	76	102	90	60	80	68
4.	Govind Nagar, Bazar	72	98	84	74	90	80
5.	Mesten Road	78	103	93	60	86	73
Industrial Area		Ambient noise level standard dB A(Leq)		1. Day time: (06:00 AM to 10:00 PM) - 75 2. Night time: (10:00 to 06:00 PM) - 70			
1.	Panki Site No. – 1	70	96	85	63	82	70
2.	Panki Site No. – 3	75	106	85	64	83	72
3.	Panki Site No. – 4	70	96	81	65	102	75
4.	Dada Nagar	75	90	81	65	81	73

Sr. No.	Monitoring Place	Noise Level dB A(Leq)					
		Morning : 11:30 to 16:30			Evening: 22:00 to 02:00		
		Min.	Max.	Average	Min.	Max.	Average
5.	Fazalganj	66	88	78	64	80	71
Silence Zone		Ambient noise level standard dB A(Leq)		1. Day time: (06:00 AM to 10:00 PM) - 50 2. Night time: (10:00 to 06:00 PM) - 40			
1.	Subhash Inter College	63	89	71	61	78	65
2.	J.K. Temple	71	95	82	63	75	67
3.	Kanpur, Civil Court	72	92	80	61	95	66
4.	L.L.R. Hospital	62	95	74	74	85	78
5.	Mariampur Hospital	73	87	81	60	81	67

Source: UPPCB

Annexure - 5.3: Ground Water Quality Analysis

Ground Water Quality Analysis-Firozabad (2011)

Sampling Point	Source	Date	pH	EC (µmhos/cm)	Color (Hazen)	Odour	TDS (mg/l)	Total hardness (mg/l)	Ca as CaCo3 (mg/l)	Mg (mg/l)	Alkalinity (mg/l)	Cl (mg/l)
I/A Firozabad	TW	15.11.2011	7.41	1226	colourless	odourless	1525	320	270	50	300	170
Suhag Nagar	TW	15.11.2011	8	1803	colourless	odourless	1390	310	220	90	280	150
Agra Gate	TW	15.11.2011	8	1998	colourless	odourless	2440	1530	1330	200	170	1260
Near Raja Ka Tal	TW	15.11.2011	7.81	968	colourless	odourless	664	270	220	50	190	50
Labour Colony, SKBD	TW	15.11.2011	7.22	577	colourless	odourless	434	180	170	10	170	320
Manipuri Road, SKBD	TW	15.11.2011	7.91	1598	colourless	odourless	1101	400	330	70	310	200
Dist Hospital, SKBD	TW	15.11.2011	6.82	609	colourless	odourless	425	210	190	20	190	30

Source: UPPCB

Ground Water Quality Analysis-Aligarh

Sr. No.	Location	E.C. micro-siemens/cm. at 25°C	pH	.....Concentration in mg/l.....													
				CO_2	HCO_3	Cl	NO_3	SO_4	F	Ca	Mg	TH as $CaCO_3$	Na	K	SiO_2	PO_4	B
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.	Aligarh	645	8.0	Nd	213	42	196	26	1.27	20	54	160	76	16	-	Nd	2
2.	Atrauli	1011	8.03	Nd	305	159	14	Nd	0.43	20	36	275	115	5.5	-	Nd	2
3.	Iglas	856	8.14	Nd	366	78	8.0	43	0.70	16	38	190	121	.3	-	Nd	
4.	Khair	68	8.04	Nd	317	64	2.0	41	0.53	18	19	200	86	4.9	-	Nd	
5.	Chandaus	689	8.11	Nd	348	42	14	38	0.78	12	24	110	115	5.6	-	Nd	
6.	Barla	400	8.0	Nd	238	21	3.3	96	1.0	20	24	160	29	4.	-	Nd	
7.	Safedpur	422	8.0	Nd	244	21	8.7	Nd	1.0	16	25	145	41	4.8	-	Nd	
8.	Taquipur	389	8.01	Nd	207	14	5.1	Nd	1.45	24	12	110	38	4.1	-	Nd	
9.	Anala	66	8.06	Nd	256	57	25	Nd	0.22	16	24	130	104	5.6	-	Nd	
10.	Sankra	1045	8.15	Nd	390	106	66	4	0.22	48	55	350	92	11	-	Nd	
11.	Gonda	3447	8.12	Nd	604	681	95	58	2.5	52	160	795	360	125	-	Nd	
12.	Gorai	561	8.1	Nd	403	1404	452	134	0.69	32	79	410	752	602	-	Nd	
13.	Jawam	756	8.0	Nd	256	581	19	19	1.24	24	34	200	69	5.2	-	Nd	
14.	Rathkargla	189	8.06	Nd	732	243	12	60	1.33	20	58	290	290	6.6	-	Nd	
15.	Palachand	1846	8.04	Nd	878	149	28	82	1.95	16	38	200	388	2.7	-	Nd	
16.	Gopi	967	8.0	Nd	506	71	14	53	1.53	24	31	190	166	29	-	Nd	
17.	Bhikampur	389	8.01	Nd	195	21	15	Nd	0.66	24	11	105	43	4.2	-	Nd	

Source: CGWB

Arsenic Concentration in NHS of Aligarh District

1.	Khair	-	0.004 microgram / litre
2.	Akrabad	-	0.016 microgram / litre
3.	Thulai	-	0.001 microgram / litre
4.	Safedpur	-	0.022 microgram / litre
5.	Taquipur	-	0.032 microgram / litre
6.	Andila	-	0.007 microgram / litre
7.	Kansera	-	0.027 microgram / litre
8.	Shankara	-	0.027 microgram / litre

Source: CGWB

Ground Water Quality Analysis-Varanasi

Location		pH	EC	TDS	Turbidity	hardness	Chloride
I/A Chandpur	Post monsoon	7.37	318	360	8	380	29.98
I/A Chandpur	Pre monsoon	7.17	536	355	7	370	27.48

Source: CGWB

Ground Water Quality Analysis-Patiala

Constituents	Minimum Limit	Maximum Limit
pH	.10	8.24
EC Micromhos/cm at 25°C	687	4100
Alkalinity (mg/l)	195	810
CO_3 (mg/l)	Nil	Nil
HCO_3 (mg/l)	238	988
Cl (mg/l)	21	379
SO_4 (mg/l)	37	1260
NO_3 (mg/l)	0.40	200
F (mg/l)	0.44	2.8
Ca (mg/l)	12	130
Mg (mg/l)	1.2	81
Na (mg/l)	116	778
K (mg/l)	1.4	205
B (mg/l)	0.14	0.54
TH as $CaCO_3$ (mg/l)	35	657
As (mg/l)	0.0002	0.0022
Fe (mg/l)	0.10	0.75
SAR (mg/l)	3.00	14.01
RSC (mg/l)	-7.37	12.17

Source: CGWB

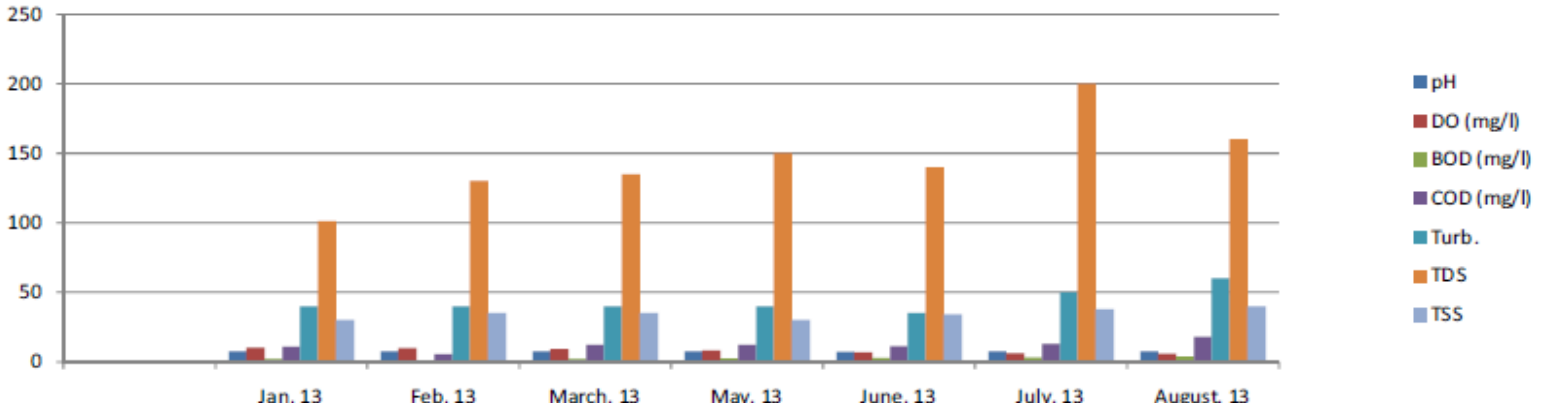
Annexure - 5.4: Surface Water Quality

Surface Water Quality-Bulandshahr

1. Anupshahar, Ganga River Upstream water quality detail and graph

Sr. No.	Month	Colour	Odour	pH	Cond.	Alkinity (mg/l)	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Cl (mg/l)	Calcium (mg/l)	Mg (mg/l)	Turb. (NTU)	Hard (mg/l)	TDS	TSS
1.	January, 13	Clear	--	7.5	171	150	10.26	2.2	10.8	8	75.6	32.4	40	108	101	30
2.	February, 13	Clear	Odourless	7.5	240	120	10	1.1	5.5	8	75	44	40	119	130	35
3.	March, 13	Clear	Odourless	7.5	245	130	9.2	2.1	12	5	76	41	40	117	135	35
4.	April, 13	Clear	Odourless		--	--	--	--	--	--	--	--	--	--	--	--
5.	May, 13	Clear	Odourless	7.5	250	120	8.1	2.4	12	6	76.6	45.4	40	122	150	30
6.	June, 13	Clear	Odourless	7.5	230	110	6.84	2.82	11.2	6	71	24	35	95	140	34
7.	July, 13	Clear	Odourless	7.5	270	110	6.14	3.2	12.8	3	71	25	50	96	200	38
8.	August, 13	Clear	Odourless	7.5	220	100	5.92	3.6	18	7	71.6	23.6	60	95.2	160	40

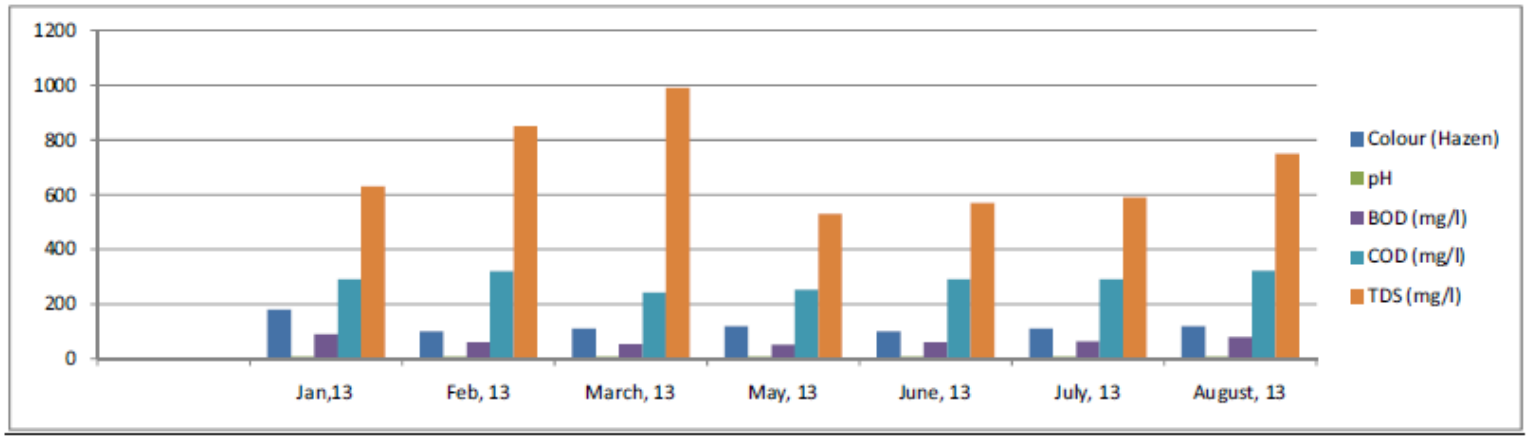
Source:UPPCB



2. Kali Nadi Upstream water quality detail and graph

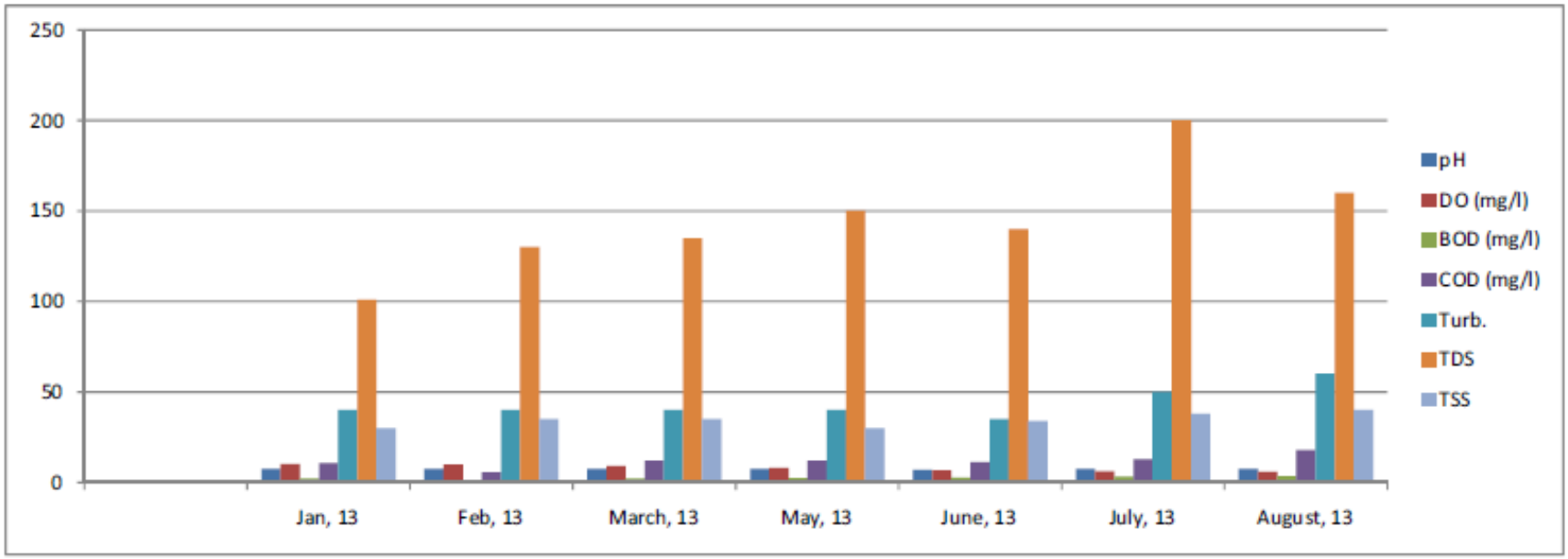
Sr. No.	Month	Colour (Hazen)	Odour	Cond.	Turb. (NTU)	pH	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Chloride (mg/l)	Hard (mg/l)	TDS	Ca (mg/l)	Mg (mg/l)	Alkinity (mg/l)
1.	January, 13	180	Unpleasant	1100	60	8	Nil	95	295	160	388	650	284	104	550
2.	February, 13	100	faint	1420	70	7.5	Nil	58	290	175	350	810	290	60	580
3.	March, 13	110	faint	1520	60	7.6	Nil	50	240	50	342	980	186	156	500
4.	April, 13	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Sr. No.	Month	Colour (Hazen)	Odour	Cond.	Turb. (NTU)	pH	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Chloride (mg/l)	Hard (mg/l)	TDS	Ca (mg/l)	Mg (mg/l)	Alkinity (mg/l)
5.	May, 13	120	Faint	910	46	7.2	Nil	42	205	50	351	530	185	166	710
6.	June, 13	100	Odorless	930	60	8	Nil	55	256	56	376	550	187	189	650
7.	July, 13	110	Faint	950	70	8	Nil	60.2	256	56	280	570	200	80	500
8.	August, 13	120	Unpleasant	1100	78	8	Nil	75	300	40	294	710	169	125	550

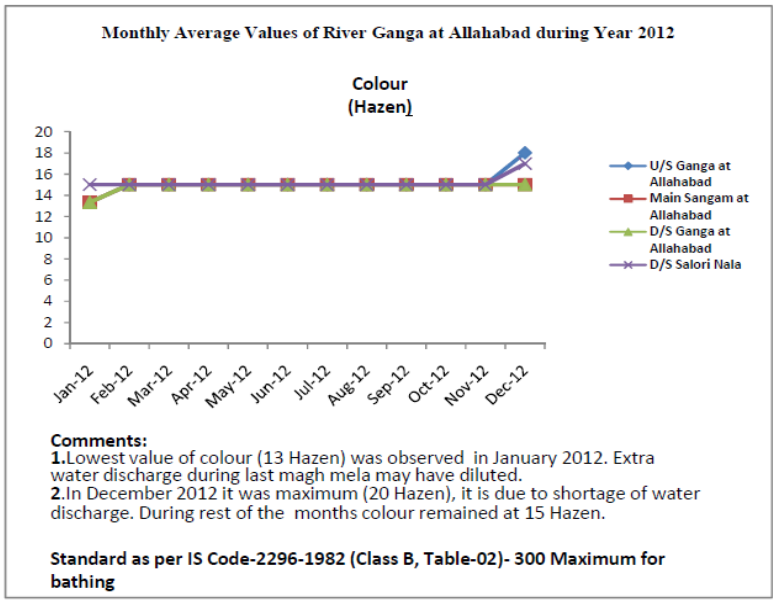


3. Kali Nadi Downstream water quality detail and graph

Sr. No.	Month	Colour (Hazen)	Odour	Cond. mhos / cm	Turb. (NTU)	pH	DO (mg/l)	BOD (mg/l)	COD (mg/l)	Chloride (mg/l)	Hard (mg/l)	TDS	Ca (mg/l)	Mg (mg/l)	Alkinity (mg/l)
1.	January, 13	180	Unpleasant	1060	55	8	Nil	90	290	155	357	630	233	124	520
2.	February, 13	100	Faint	1490	80	7.5	Nil	60	320	160	320	850	285	35	560
3.	March, 13	110	Faint	1530	62	7.8	Nil	53	242	52	345	990	190	155	520
4.	April, 13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5.	May, 13	120	Faint	890	50	7.4	Nil	52	253	51	364	530	190	174	20
6.	June, 13	100	Odourless	970	64	8	Nil	60	290	58	380	570	200	180	660
7.	July, 13	110	Faint	980	75	8	Nil	64	290	50	276	590	212	64	505
8.	August, 13	120	Unpleasant	1150	80	8	Nil	80	321	40	354	750	147	207	560

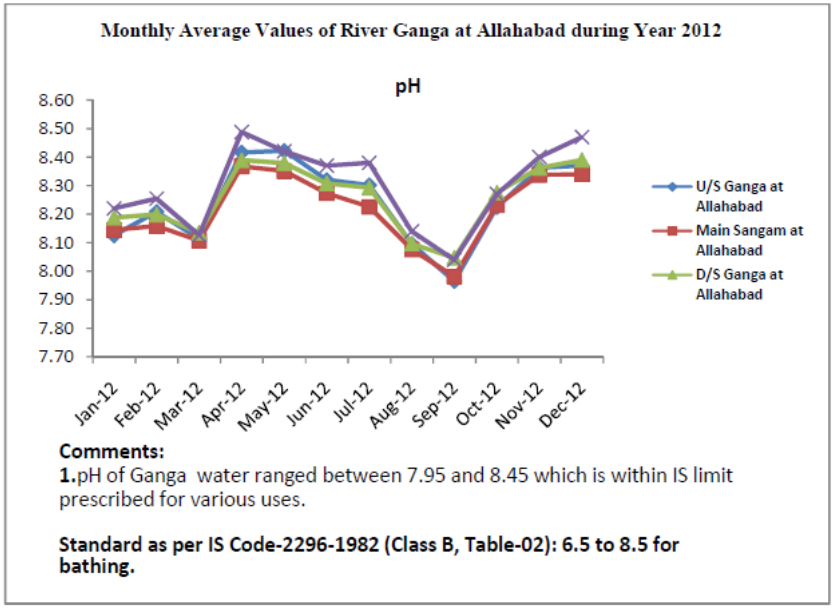


Surface Water Quality-Allahabad



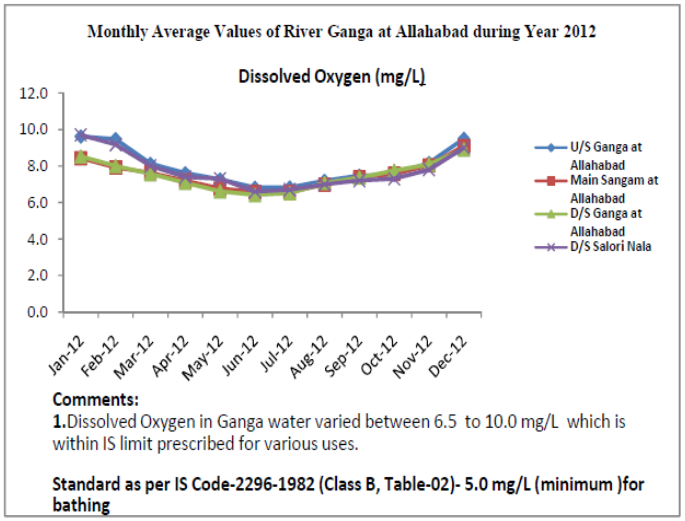
Comments:
1.Lowest value of colour (13 Hazen) was observed in January 2012. Extra water discharge during last magh mela may have diluted.
2.In December 2012 it was maximum (20 Hazen), it is due to shortage of water discharge. During rest of the months colour remained at 15 Hazen.

Standard as per IS Code-2296-1982 (Class B, Table-02)- 300 Maximum for bathing



Comments:
1.pH of Ganga water ranged between 7.95 and 8.45 which is within IS limit prescribed for various uses.

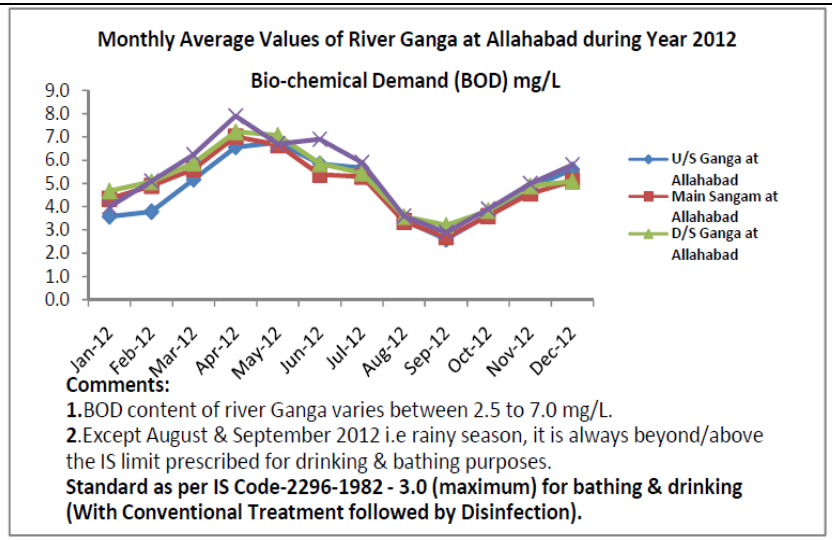
Standard as per IS Code-2296-1982 (Class B, Table-02): 6.5 to 8.5 for bathing.



Comments:

1.Dissolved Oxygen in Ganga water varied between 6.5 to 10.0 mg/L which is within IS limit prescribed for various uses.

Standard as per IS Code-2296-1982 (Class B, Table-02)- 5.0 mg/L (minimum)for bathing

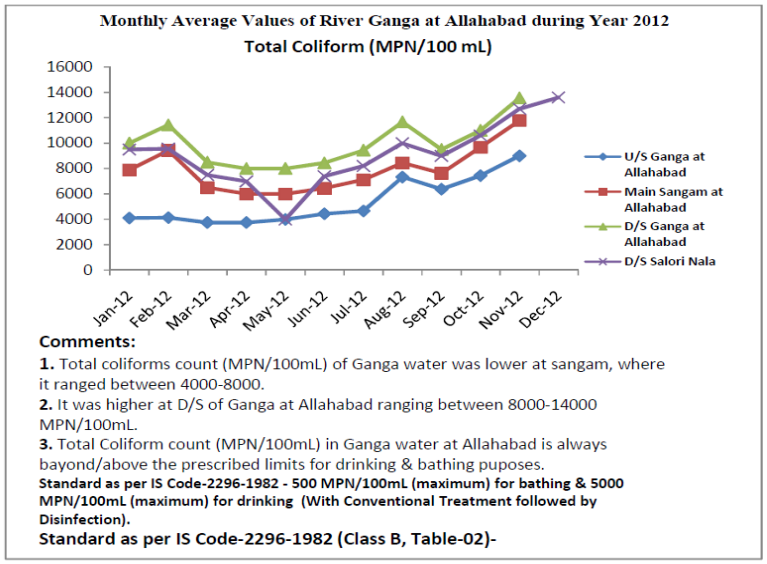


Comments:

1.BOD content of river Ganga varies between 2.5 to 7.0 mg/L.

2.Except August & September 2012 i.e rainy season, it is always beyond/above the IS limit prescribed for drinking & bathing purposes.

Standard as per IS Code-2296-1982 - 3.0 (maximum) for bathing & drinking (With Conventional Treatment followed by Disinfection).



Comments:

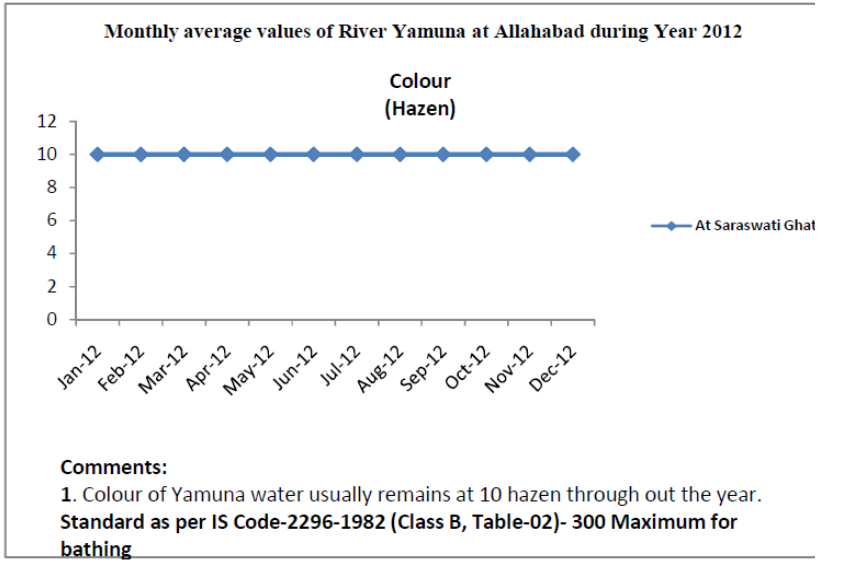
1. Total coliforms count (MPN/100mL) of Ganga water was lower at sangam, where it ranged between 4000-8000.

2. It was higher at D/S of Ganga at Allahabad ranging between 8000-14000 MPN/100mL.

3. Total Coliform count (MPN/100mL) in Ganga water at Allahabad is always bayond/above the prescribed limits for drinking & bathing puposes.

Standard as per IS Code-2296-1982 - 500 MPN/100mL (maximum) for bathing & 5000 MPN/100mL (maximum) for drinking (With Conventional Treatment followed by Disinfection).

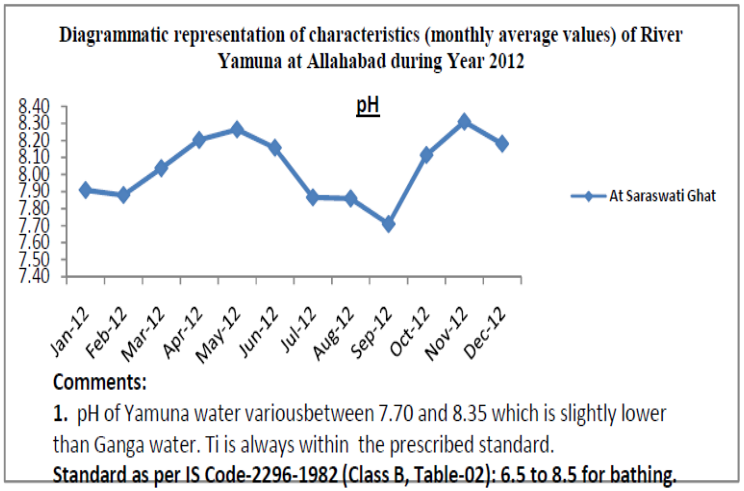
Standard as per IS Code-2296-1982 (Class B, Table-02)-



Comments:

1. Colour of Yamuna water usually remains at 10 hazen through out the year.

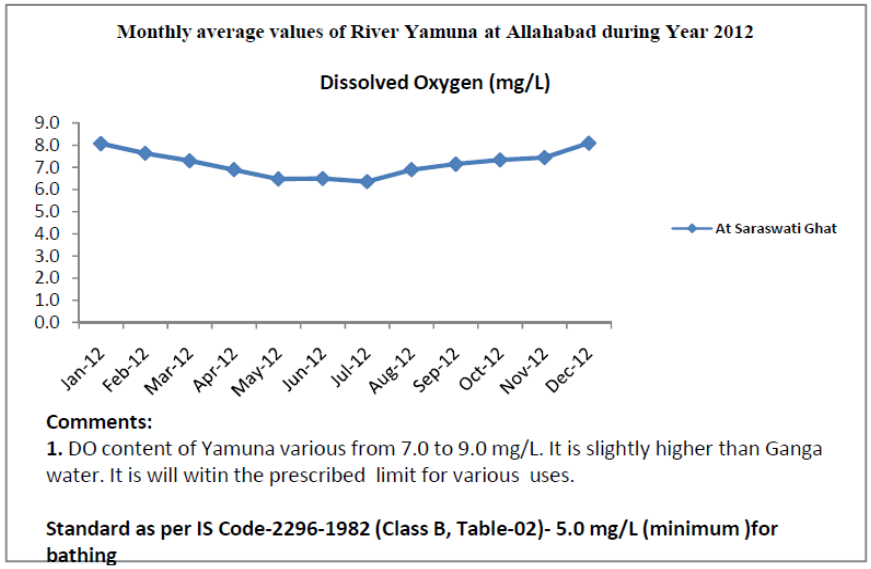
Standard as per IS Code-2296-1982 (Class B, Table-02)- 300 Maximum for bathing



Comments:

1. pH of Yamuna water variousbetween 7.70 and 8.35 which is slightly lower than Ganga water. Ti is always within the prescribed standard.

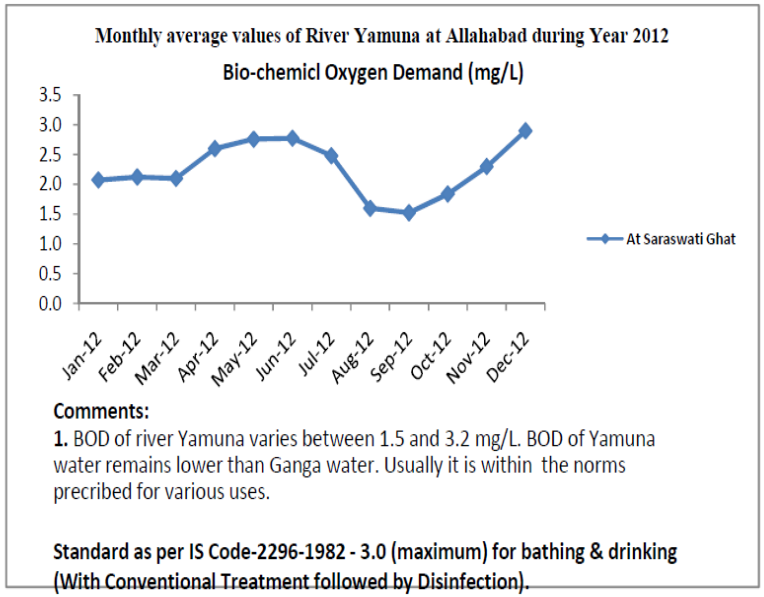
Standard as per IS Code-2296-1982 (Class B, Table-02): 6.5 to 8.5 for bathing.



Comments:

1. DO content of Yamuna various from 7.0 to 9.0 mg/L. It is slightly higher than Ganga water. It is will witin the prescribed limit for various uses.

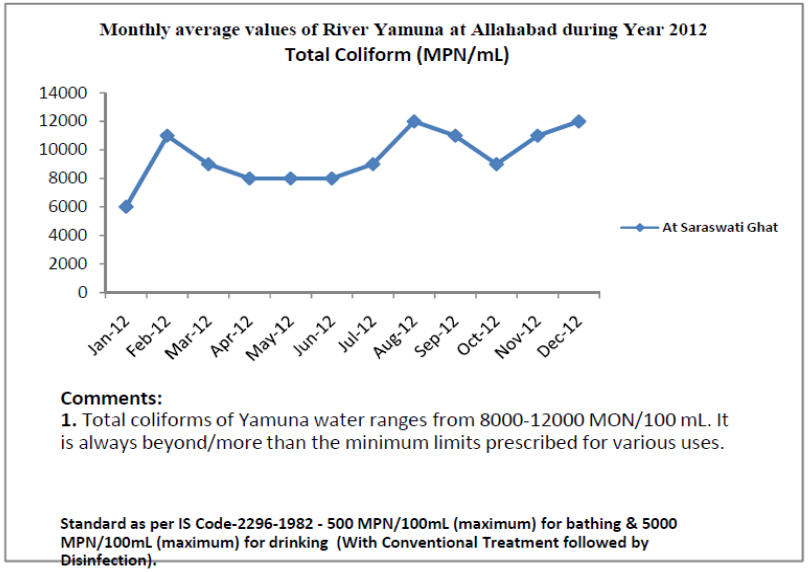
Standard as per IS Code-2296-1982 (Class B, Table-02)- 5.0 mg/L (minimum)for bathing



Comments:

1. BOD of river Yamuna varies between 1.5 and 3.2 mg/L. BOD of Yamuna water remains lower than Ganga water. Usually it is within the norms precribed for various uses.

Standard as per IS Code-2296-1982 - 3.0 (maximum) for bathing & drinking (With Conventional Treatment followed by Disinfection).



Comments:

1. Total coliforms of Yamuna water ranges from 8000-12000 MON/100 mL. It is always beyond/more than the minimum limits prescribed for various uses.

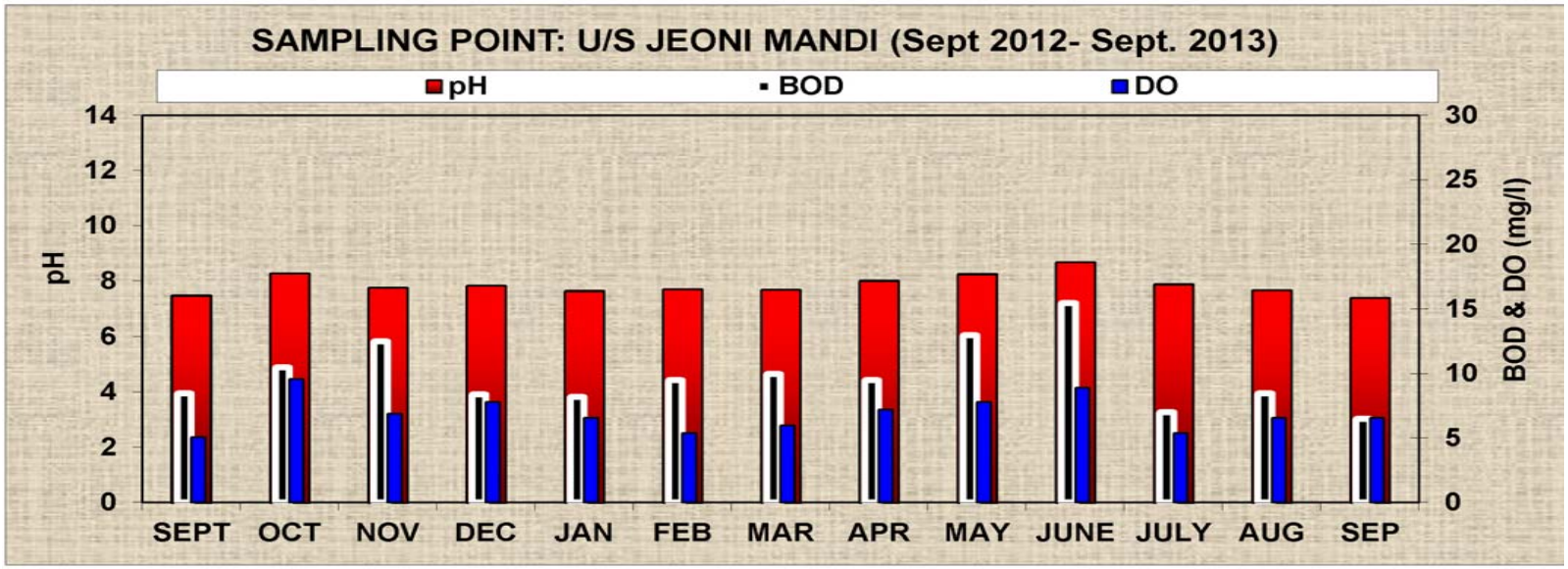
Standard as per IS Code-2296-1982 - 500 MPN/100mL (maximum) for bathing & 5000 MPN/100mL (maximum) for drinking (With Conventional Treatment followed by Disinfection).

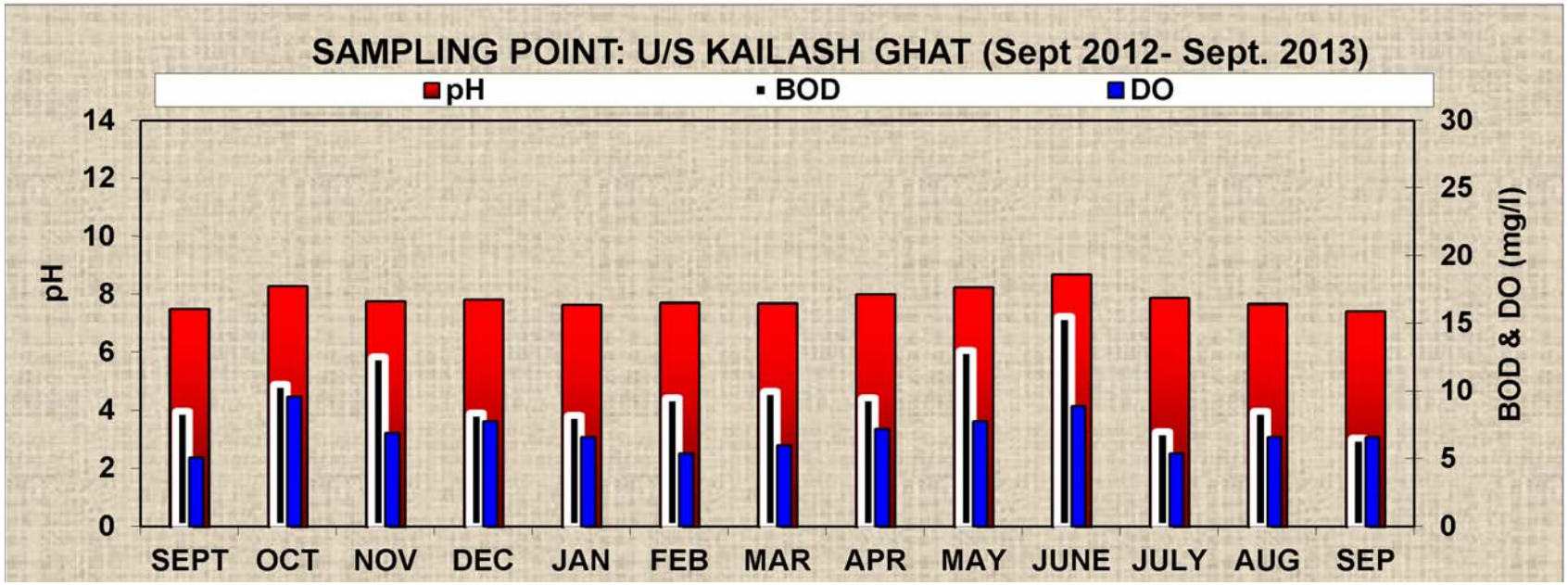
Surface Water Quality-Varanasi

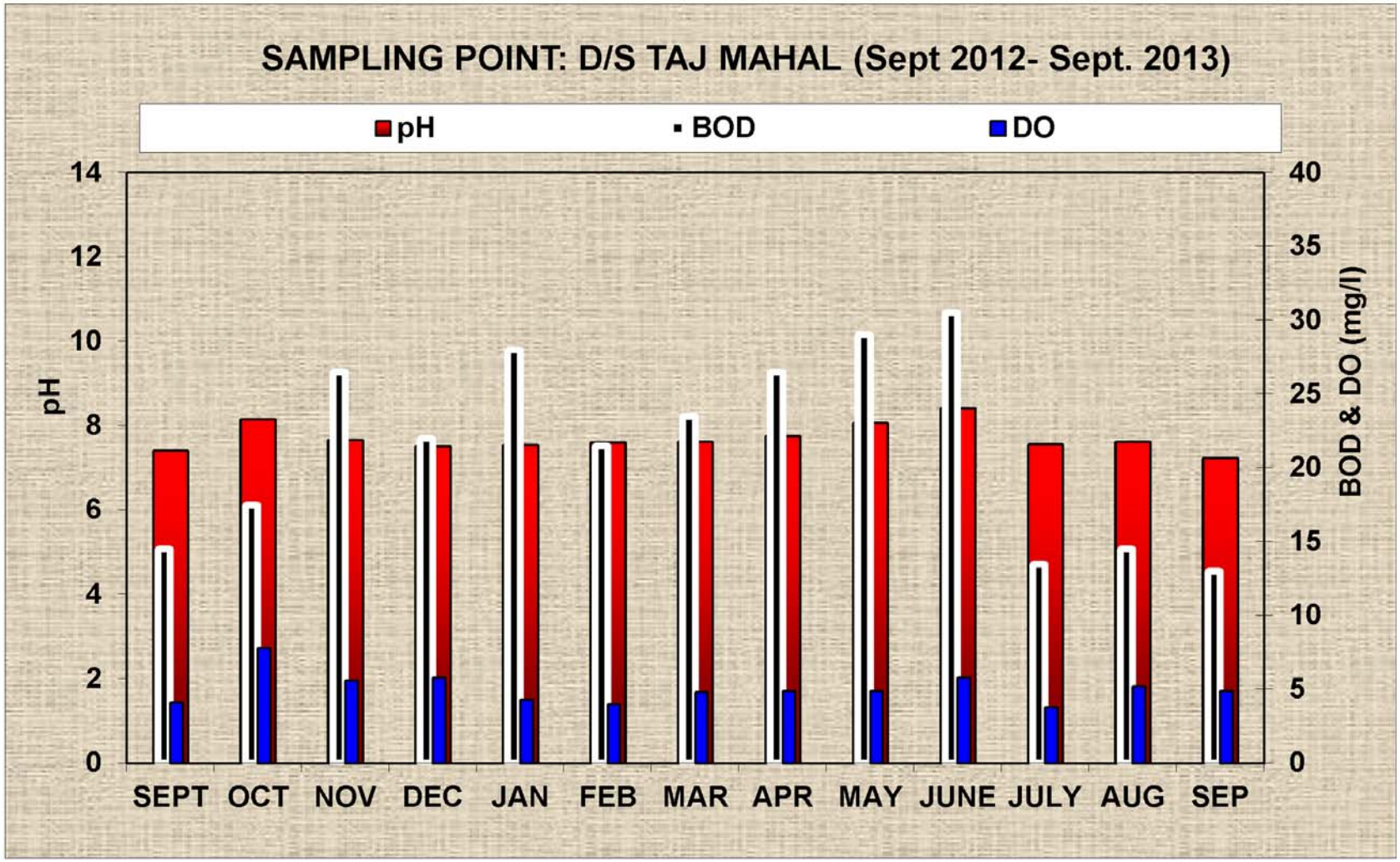
Oct-13					Nov-13				
	pH	DO (mg/l)	BOD (mg/l)	T. Coliform (MPN/100 ml)		pH	DO (mg/l)	BOD (mg/l)	T. Coliform (MPN/100 ml)
Ganga Upstream	7.72	7	2.7	9400	Ganga Upstream	7.74	7.2	2.8	8000
Ganga Downstream	8.1	6.6	3.8	46000	Ganga Downstream	8.12	6.8	4.2	49000
Varuna upstream	7.68	7.3	2.9	220000	Varuna upstream	7.62	7.6	2.9	5400
Varanasi Downstream	8.26	5.2	24.4	11000	Varanasi Downstream	8.21	5.8	26.4	240000

Dec-13					Jan-14				
	pH	DO (mg/l)	BOD (mg/l)	T. Coliform (MPN/100 ml)		pH	DO (mg/l)	BOD (mg/l)	T. Coliform (MPN/100 ml)
Ganga Upstream	7.6	8	3	7000	Ganga Upstream	8.1	8.5	2.9	4900
Ganga Downstream	8.54	7.4	4.4	46000	Ganga Downstream	8.62	8	4.3	43000
Varuna upstream	7.89	7.8	3.1	4600	Varuna upstream	7.96	8.2	2.8	3200
Varanasi Downstream	8.26	5.2	28.4	220000	Varanasi Downstream	8.1	4.8	30.4	240000

Surface Water Quality-Agra


SAMPLING POINT: U/S JEONI MANDI (Sept 2012- Sept. 2013)
pH
BOD
DO
pH
BOD & DO (mg/l)
0
2
4
6
8
10
12
14
0
5
10
15
20
25
30
SEPT
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP


SAMPLING POINT: U/S KAILASH GHAT (Sept 2012- Sept. 2013)
pH
BOD
DO
pH
BOD & DO (mg/l)
0
2
4
6
8
10
12
14
0
5
10
15
20
25
30
SEPT
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP


SAMPLING POINT: D/S TAJ MAHAL (Sept 2012- Sept. 2013)
pH
BOD
DO
14
12
10
8
6
4
2
0
pH
40
35
30
25
20
15
10
5
0
BOD & DO (mg/l)
SEPT
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUNE
JULY
AUG
SEP

Surface Water Quality-Kanpur

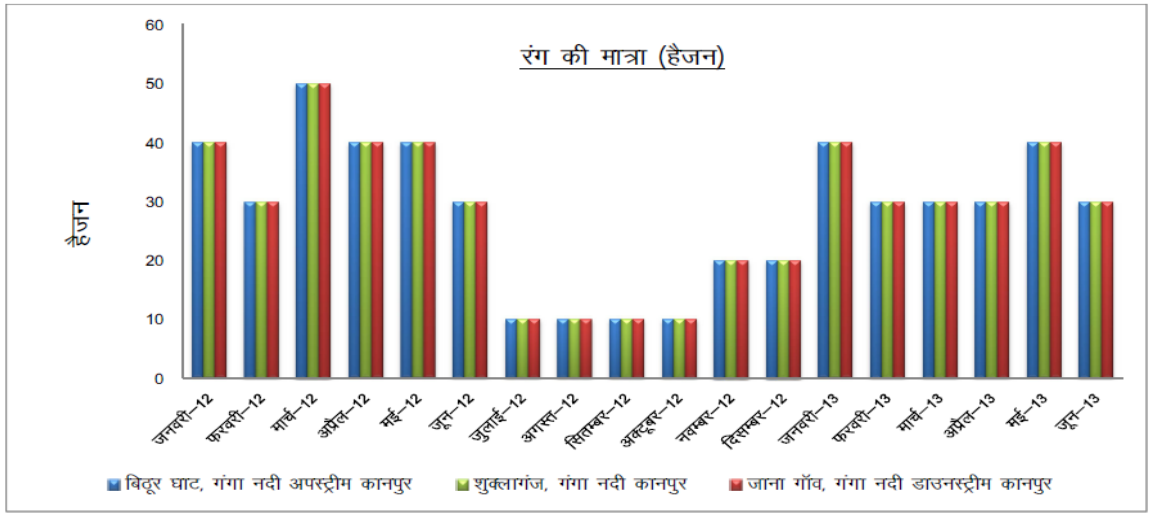
1. Ganga River Water Quality (Kanpur Upstream, Bithur Ghat Year 2012-13)

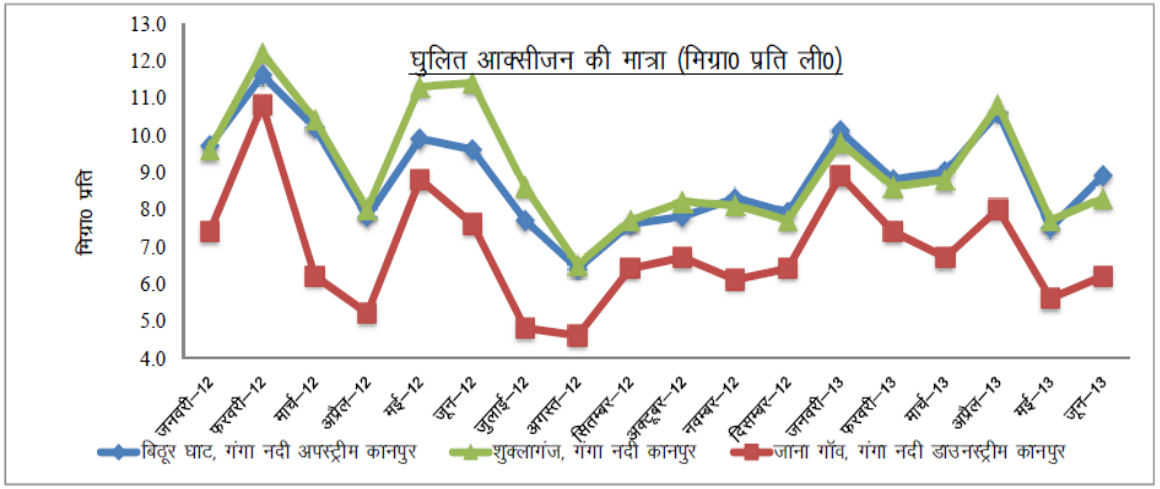
Sr. No.	Colour (Hazen)	pH	*DO ((mg/l)	**BOD (mg/l)	***COD (mg/l)	Alkalinity $CaCO_3$ (mg/l)	Hardness as $CaCO_3$ (mg/l)	Calcium as $CaCO_3$ (mg/l)	Magnesium as $MgCO_3$ (mg/l)	Conductivity □ mhos / cm	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
1	40	7.65	9.7	3.1	10.4	60	72	56	16	498.6	3900	1400
2	30	8.41	11.6	3	12.0	64	92	64	28	322.6	2000	1100
3	50	8.40	10.2	4.6	12.4	88	108	76	32	--	--	--
4	40	8.60	7.8	4.7	16.4	248	192	164	28	604.8	2800	1500
5	40	8.80	9.9	5.4	18.2	256	196	172	24	541.5	4300	1400
6	30	8.40	9.6	5.6	17.2	244	184	156	28	396.3	4300	1500
7	10	8.30	7.7	5.7	16.8	168	192	160	32	256.5	2100	900
8	10	7.39	6.4	4.8	13.6	160	124	92	32	228.0	150000	28000
9	10	7.84	7.6	2.6	9.4	76	124	92	32	229.1	9300	1500
10	10	8.11	7.8	3.6	13.6	136	104	92	12	320.0	3900	900
11	20	8.29	8.3	3.7	13.6	--	184	128	56	349.5	4300	900
12	20	8.32	7.9	2.8	10.4	180	126	108	18	392.8	2800	700
13	40	8.72	10.1	3.3	12.8	184	116	96	20	316.4	4300	900
14	30	7.70	8.8	3.5	13.6	148	144	116	28	385.6	3900	900
15	30	8.09	9.0	3.2	12.4	152	156	124	32	329.5	3900	900
16	30	7.92	10.6	3.4	12.0	148	176	148	28	324.8	2800	700
17	40	8.22	7.5	3.8	11.6	152	168	152	16	325.0	2300	700
18	30	8.51	8.9	3.6	12.0	152	172	144	28	230.0	4300	900

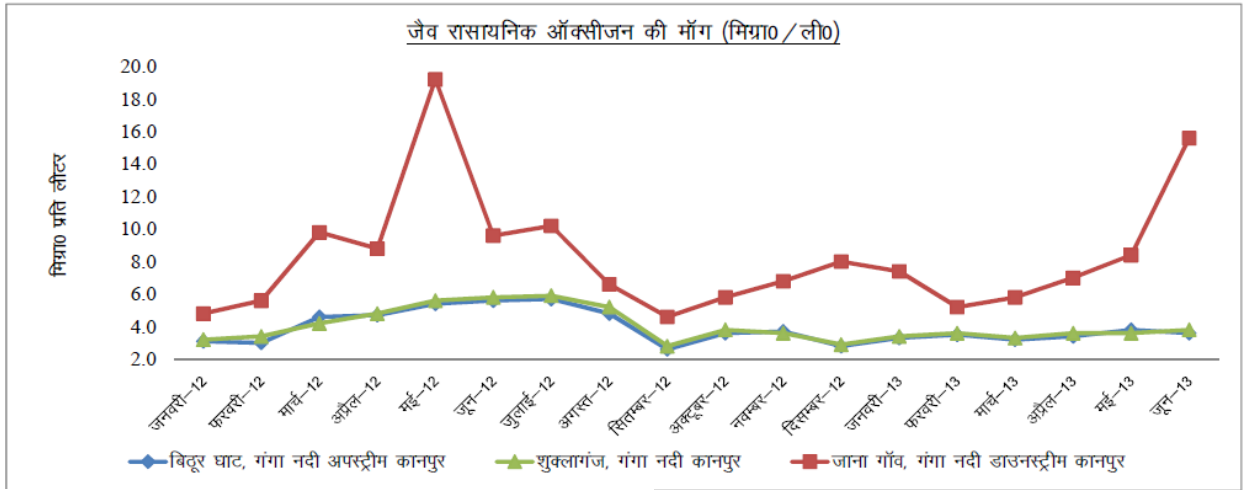
Sr. No.	Colour (Hazen)	pH	*DO ((mg/l)	**BOD (mg/l)	***COD (mg/l)	Alkalinity $CaCO_3$ (mg/l)	Hardness as $CaCO_3$ (mg/l)	Calcium as $CaCO_3$ (mg/l)	Magnesium as $MgCO_3$ (mg/l)	Conductivity □ mhos / cm	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
1	40	7.91	9.6	3.2	12.0	64	80	60	20	528.3	43000	2800
2	30	8.35	12.2	3.4	12.8	68	84	68	16	305.2	64000	3900
3	50	8.55	10.4	4.2	15.2	104	124	96	28			
4	40	8.50	8.0	4.8	16.8	256	196	188	8	585.2	2800	1500
5	40	8.95	11.3	5.6	17.6	260	208	188	20	548.4	4300	1400
6	30	9.10	11.4	5.8	20.8	268	196	172	24	401.8	6400	1500
7	10	9.10	8.6	5.9	21.6	198	204	176	28	255.3	2800	1100
8	10	7.50	6.5	5.2	15.2	188	136	108	28	230.0	150000	39000

Sr. No.	Colour (Hazen)	pH	*DO ((mg/l)	**BOD (mg/l)	***COD (mg/l)	Alkalinity $CaCO_3$ (mg/l)	Hardness as $CaCO_3$ (mg/l)	Calcium as $CaCO_3$ (mg/l)	Magnesium as $MgCO_3$ (mg/l)	Conductivity □ mhos / cm	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
9	10	8.14	7.7	2.8	10.0	100	128	88	40	245.2	9300	1500
10	10	8.14	8.2	3.8	14.8	140	112	100	12	328.0	3900	900
11	20	8.27	8.1	3.6	12.4		192	132	60	347.4	4300	900
12	20	8.21	7.7	2.9	10.8	168	132	100	32	371.7	2800	700
13	40	8.69	9.8	3.4	13.6	192	124	100	24	334.6	4300	900
14	30	7.74	8.6	3.6	14.0	152	136	104	32	334.3	3900	900
15	30	8.16	8.8	3.3	13.2	156	168	132	36	330.7	4300	700
16	30	8.00	10.8	3.6	12.4	152	192	168	24	341.2	2800	700
17	40	8.24	7.7	3.6	12.0	156	176	156	20	344.0	2300	700
18	30	8.34	8.3	3.6	12.4	160	180	148	32	288.1	2800	900

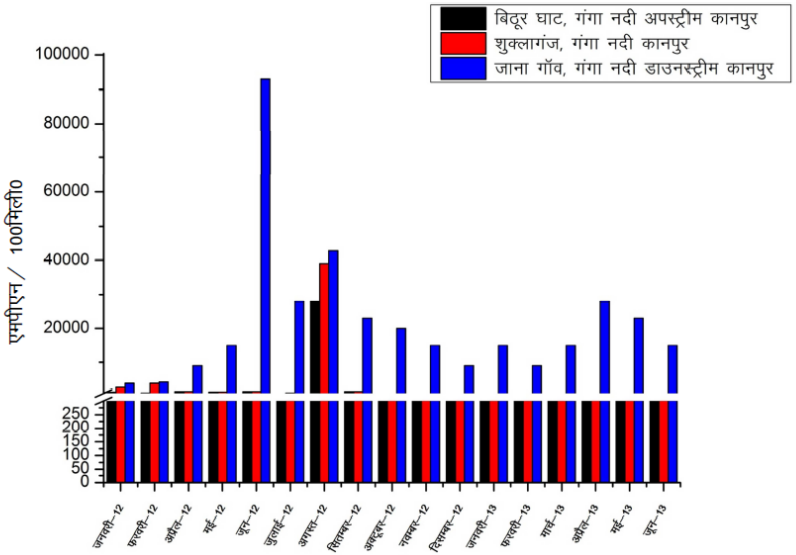
Sr. No.	Colour (Hazen)	pH	*DO ((mg/l)	**BOD (mg/l)	***COD (mg/l)	Alkalinity $CaCO_3$ (mg/l)	Hardness as $CaCO_3$ (mg/l)	Calcium as $CaCO_3$ (mg/l)	Magnesium as $MgCO_3$ (mg/l)	Conductivity □ mhos / cm	Total Coliform (MPN/100 ml)	Fecal Coliform (MPN/100 ml)
1	40	7.82	7.4	4.8	24.8	100	116	84	32	574.4	64000	3900
2	30	8.33	10.8	5.6	18.4	96	124	92	32	685.4	12000	4300
3	50	8.56	6.2	9.8	36.8	112	128	92	36			
4	40	8.34	5.2	8.8	28.8	260	200	192	8	655.4	64000	9000
5	40	8.70	8.8	19.2	31.2	276	226	200	26	688.8	150000	15000
6	30	8.90	7.6	9.6	34.4	298	212	180	32	663.6	120000	93000
7	10	8.50	4.8	10.2	32.8	248	224	188	36	377.0	64000	28000
8	10	7.20	4.6	6.6	28.8	264	148	112	36	288.1	210000	43000
9	10	8.10	6.4	4.6	25.2	84	132	92	40	287.6	120000	23000
10	10	8.44	6.7	5.8	27.4	152	116	92	24	384.0	150000	20000
11	20	8.18	6.1	6.8	22.4		224	172	52	484.8	93000	15000
12	20	8.46	6.4	8.0	34.4	216	184	148	36	543.2	75000	9000
13	40	8.74	8.9	7.4	32.4	220	192	140	52	496.6	64000	15000
14	30	8.09	7.4	5.2	16.8	156	156	112	44	396.2	43000	9000
15	30	7.86	6.7	5.8	17.8	160	192	140	52	363.4	75000	15000
16	30	8.20	8.0	7.0	32.8	160	228	180	48	586.0	150000	28000
17	40	8.12	5.6	8.4	38.0	192	236	208	28	586.0	210000	23000
18	30	8.44	6.2	15.6	38.4	172	204	160	44	498.9	75000	15000

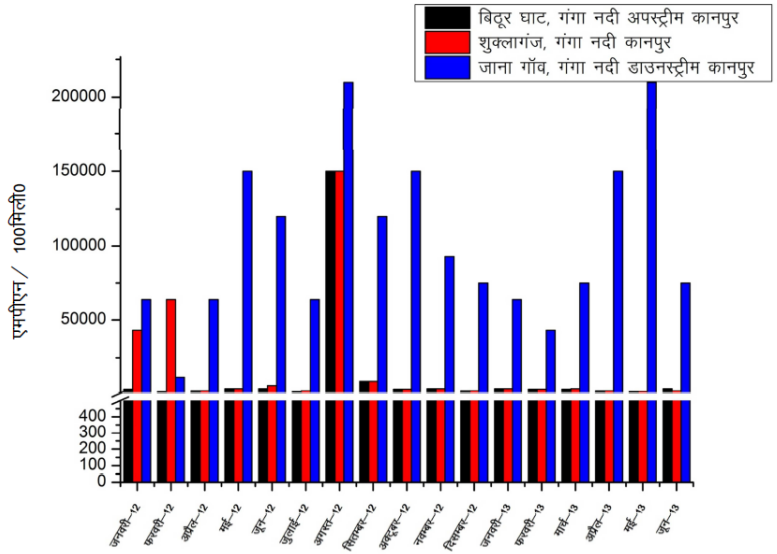

रंग की मात्रा (हैजन)
हैजन
60
50
40
30
20
10
0
जनवरी–12
फरवरी–12
मार्च–12
अप्रैल–12
मई–12
जून–12
जुलाई–12
अगस्त–12
सितम्बर–12
अक्टूबर–12
नवम्बर–12
दिसम्बर–12
जनवरी–13
फरवरी–13
मार्च–13
अप्रैल–13
मई–13
जून–13
बिठूर घाट, गंगा नदी अपस्ट्रीम कानपुर
शुक्लागंज, गंगा नदी कानपुर
जाना गॉव, गंगा नदी डाउनस्ट्रीम कानपुर


घुलित आक्सीजन की मात्रा (मिग्रा0 प्रति ली0)
मिग्रा0 प्रति
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
जनवरी–12
फरवरी–12
मार्च–12
अप्रैल–12
मई–12
जून–12
जुलाई–12
अगस्त–12
सितम्बर–12
अक्टूबर–12
नवम्बर–12
दिसम्बर–12
जनवरी–13
फरवरी–13
मार्च–13
अप्रैल–13
मई–13
जून–13
बिठूर घाट, गंगा नदी अपस्ट्रीम कानपुर
शुक्लागंज, गंगा नदी कानपुर
जाना गॉव, गंगा नदी डाउनस्ट्रीम कानपुर


जैव रासायनिक ऑक्सीजन की मॉग (मिग्रा0/ली0)
मिग्रा0 प्रति लीटर
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
जनवरी–12
फरवरी–12
मार्च–12
अप्रैल–12
मई–12
जून–12
जुलाई–12
अगस्त–12
सितम्बर–12
अक्टूबर–12
नवम्बर–12
दिसम्बर–12
जनवरी–13
फरवरी–13
मार्च–13
अप्रैल–13
मई–13
जून–13
बिठूर घाट, गंगा नदी अपस्ट्रीम कानपुर
शुक्लागंज, गंगा नदी कानपुर
जाना गॉव, गंगा नदी डाउनस्ट्रीम कानपुर

5.फीकल कोलीफार्म:–


बिठूर घाट, गंगा नदी अपस्ट्रीम कानपुर
शुक्लागंज, गंगा नदी कानपुर
जाना गॉव, गंगा नदी डाउनस्ट्रीम कानपुर
एमपीएन / 100मिली0
100000
80000
60000
40000
20000
250
200
150
100
50
0


बिठूर घाट, गंगा नदी अपस्ट्रीम कानपुर
शुक्लागंज, गंगा नदी कानपुर
जाना गॉव, गंगा नदी डाउनस्ट्रीम कानपुर
एमपीएन / 100मिली0
200000
150000
100000
50000
400
300
200
100
0

Surface Water Quality-Firozabad

1. Upstream – Firozabad District Near Nayabos Village, Firozabad Water Quality

Sr. No.	Date of Sample	Colour (hazen)	pH	D.O. (mg/l)	Turbidity (NTU)	B.O.D. (mg/l)	C.O.D (mg/l)	Total Coliform (mpn/100 ml)
1	21.09.12	30	7.16	5.7	55.0	12.0	27.6	88000
2	15.10.12	30	8.47	6.4	58.0	17.5	64.8	35000
3	21.11.12	30	7.78	6.4	44.0	18.0	64.0	54000
4	13.12.12	45	6.83	6.8	56.0	16.0	53.2	54000
5	07.01.13	40	7.63	6.0	58.0	11.5	48.4	540000
6	15.02.13	36	7.60	6.0	44.0	12.5	44.4	92000
7	13.03.13	35	7.71	6.0	40.0	12.0	48.0	35000
8	04.04.13	30	8.00	6.0	45.0	13.0	52.0	28000
9	09.05.13	30	6.92	6.4	48.0	14.0	53.2	
10	13.06.13	35	7.00	6.5	52.0	12.5	48.8	_
11	11.07.13	50	7.66	7.0	76.0	8.2	42.0	_
12	12.08.13	45	7.69	6.3	70.0	9.5	35.6	_
13	09.09.13	50	7.44	7.3	114.0	12.5	33.6	_

2. Downstream – District Firozabad Near Last Madaiya Gaon, Water Quality Table

Sr. No.	Date of Sample	Colour (hazen)	pH	D.O. (mg/l)	Turbidity (NTU)	B.O.D. (mg/l)	C.O.D (mg/l)	Total Coliform (mpn/100 ml)
1	21.09.12	35	7.49	5.6	59.0	14.0	30.4	54000
2	15.10.12	35	8.09	6.0	65.0	19.0	77.6	92000
3	21.11.12	35	7.19	6.0	62.0	25.0	68.8	92000
4	13.12.12	55	6.62	6.2	60.0	22.5	89.2	160000
5	07.01.13	50	7.51	5.8	66.0	16.5	51.2	52000
6	15.02.13	40	7.48	5.6	48.0	17.0	48.0	160000
7	13.03.13	40	7.38	5.8	45.0	15.5	50.4	54000
8	04.04.13	35	7.80	6.0	56.0	14.0	58.4	35000
9	09.05.13	35	6.43	6.0	58.0	24.0	73.6	--
10	13.06.13	40	7.00	6.3	64.0	24.0	75.2	--
11	11.07.13	55	7.69	7.0	88.0	12.0	44.4	--
12	12.08.13	50	7.77	6.0	75.0	13.5	39.2	-
13	09.09.13	60	7.39	7.0	126.0	14.0	35.6	--

Surface Water Quality-Ghaziabad - Hapur

Summary of Water Quality of Ganga River at Brij Ghat, Garh Muketshwar, Hapur for the Month of April 2013 to July 2013.				
Para-meter	**April 2013 (30.04.13)**	**May 2013 (06.05.13)**	**June 2013 (03.06.13)**	**July 2013 (11.07.13)**
Temp.(°C)	25	25	27	25.5
pH	7.5	7.8	7.7	7.5
Cond (µmhos)	260	290	250	273
Turb (N.T.U.)	34	40	40	60
Nitrate, (mg/l)	0.38	0.41	0.35	0.38
D.O. (mg/l)	8.7	9	8	7
T.D.S. (mg/l)	150	170	160	205
BOD (mg/l)	2.8	2.7	3.2	3.4
COD (mg/l)	18	11.6	12	12.8
Fecal Coliform (mg/l)	840	780	610	680
Total Coliform (mg/l)	1500	1300	1200	1400

Summary of Water Quality of Kali River at Babu Garh, Hapur for the Month of January 2013 to July 2013.						
Monitoring Point	**Date**	**Colour**	**pH**	**BOD mg/1**	**COD mg/1**	**DO mg/1**
Kali River at Babu Garh.	02.01.13	Greyish	7.3	72	280	NIL
	05.02.13	Greyish	7.2	40	160	NIL
	02.03.13	Greyish	7.5	50	240	NIL
	29.04.13	Greyish	7.5	42	165	NIL
	08.05.13	Greyish	7.3	87	296	NIL
	03.06.13	Greyish	7	90	312	NIL
	19.07.13	Greyish	7	91	322	NIL

S.N.	Monitoring Point	Date	pH	BOD mg/l	COD mg/l	Fecal Coliform/ 100 ml	Total Coliform/ 100 ml	DO mg/l
1	Hindon River at Karheda Village	16.01.13	7	135	660	120000	> 160000	NIL
		16.02.13	7	150	670	130000	> 160000	NIL
		15.03.13	7	155	660	120000	> 160000	NIL
		26.04.13	6.8	52	180	130000	160000	NIL
		16.05.13	7.2	30	72	79000	100000	NIL
		18.06.13	6.9	13	44	79000	110000	1
		04.07.13	7.9	36	267	84000	120000	NIL
2	Hindon River at Mohan Nagar Road Bridge	16.01.13	7	130	540	130000	> 160000	NIL
		16.02.13	7.1	160	660	140000	> 160000	NIL
		15.03.13	7.1	165	760	130000	> 160000	NIL
		26.04.13	7	55	200	140000	160000	NIL
		16.05.13	7.4	32	84	94000	120000	NIL
		18.06.13	7	11	38	70000	94000	1.2
		04.07.13	7.6	38	299	79000	110000	NIL
3	Hindon River at Chijrashi Village	16.01.13	5.9	125	460	140000	> 160000	NIL
		16.02.13	7.2	180	680	140000	> 160000	NIL
		15.03.13	7.3	185	760	140000	> 160000	NIL
		26.04.13	7.5	70	240	160000	160000	NIL
		16.05.13	7.6	35	84	150000	170000	NIL
		18.06.13	7.5	17	56	110000	150000	0.8
		04.07.13	7.6	41	254	120000	140000	NIL
4	Hindon River at Kulesara	27.01.13	7.1	10	32	48000	68000	4.3
		15.02.13	7.2	18	36	130000	240000	2.4
		18.03.13	7.2	32	103	130000	240000	NIL
		27.04.13	7.2	38	114	140000	240000	NIL
		26.05.13	7.4	42	120	160000	240000	NIL
		23.06.13	7	38	98	150000	220000	NIL
		22.07.13	7.5	40	108	160000	240000	NIL

Annexure – 6.1: Impacts Due to Proposed, Planned and Anticipated Developments in Study Area

S. No.	Item	Anticipated Impacts	Affected VECs
1.	Industrial area development/ Integrated Industrial Development Parks/areas	▪ Degradation of air quality ▪ Increased withdrawal of ground & surface water & reduction in available flow in watershed ▪ Increased surface run-off and sedimentation load of run-off & Silting up of water bodies ▪ Increased surface water pollution due to discharge of pollutants in water bodies ▪ Impact on terrestrial & aquatic flora & fauna due to diversion of forest and vegetated lands ▪ Loss of habitats due to change in land use ▪ Loss of top fertile soil & fertility of the fields close to industrial area due to depletion of ground water resources and soil & air pollution in that area ▪ Excavation of soil from (borrow areas) from fertile agriculture lands to obtain soil for construction of embankment for railway, road and other structures will impact the productivity of agricultural fields ▪ Change in land use & land cover. Diversion of productive agricultural land for industrial/ residential & commercial purposes ▪ Increased water ponding/urban flooding due to disruption of natural drainage pattern & increased sealed areas and decreased infiltration ▪ Immigration of population in areas experiencing development causing stratification and thus increased pressure on existing infrastructure of that area ▪ Increased pressure on sewerage system of the areas experiencing development due to migration ▪ Increased municipal waste, hazardous waste, e-waste, plastic waste generation in the areas experiencing development due to migration ▪ Increased vulnerability of human health due to increased pollution levels ▪ Increased demand & usage of fertilizers and pesticides to obtain maximum yield from limited agricultural land ▪ Increased soil salinity issue ▪ Excavation of earth & excess withdrawal of ground water may enhance chances of land subsidence ▪ Encroachments and slum developments by	▪ Air Quality ▪ Water Quality ▪ Water Resources ▪ Land Use ▪ Soil Quality ▪ Existing Infrastructure ▪ New Infrastructure development ▪ Quality of life ▪ Micro-climate ▪ Ecology

S. No.	Item	Anticipated Impacts	Affected VECs
		construction labor ▪ Traffic congestion due to movement of heavy vehicles near upcoming industrial areas ▪ Traditional access roads are likely to be covered under DFCCIL thus causing infringement of access rights of the villagers. ▪ Movements of the vehicles carrying construction materials would dismantle the village roads. ▪ Loss of cultivable lands will affect livelihoods of the farmers thus out-migration may be visible. ▪ Displacement of population and loss of livelihood of people in case of land acquisition ▪ Crimes and emerging of red light areas near the industrial areas and growth centers ▪ Social threats like cases of crimes e.g. robbery & arson, assault will increase around the growth centers thus creating pressures on the neighboring villages. ▪ Culture and ethnic practices will get affected due to influx of multi-cultural assimilation. ▪ Improved infrastructure such as water supply, drainage system, power supply, roads, transportation, connectivity, accessibility, communication system etc ▪ With developments of new I/As, residential areas and commercial areas there are possibility of improvisation of health facilities in the area (both private & govt.) which will improve health status of the area ▪ Increased hospitability services in the area ▪ Increased nos. of educational & training institutes ▪ Increased direct & indirect employment opportunities in the areas. ▪ Increased availability of skilled, semi-skilled and unskilled labour due to immigration ▪ With the numerous economic activities in and around the proposed projects, there is likely increase in the purchasing power of the local community/ petty business/ service providers. ▪ Increase in inflow of agriculture produce in the neighboring market due to upcoming of agro based industries. ▪ Increased export of goods to all parts of countries and outside country ▪ Establishments of ITI, skill development centers etc by industries as part of CSR	

S. No.	Item	Anticipated Impacts	Affected VECs
		activities ▪ Development of green areas around each developmental units (mandate requirement of MoEFCC) will improve ecology and aesthetics of the area	
2.	Development of Roads/Highways/Expressways	▪ Improved roads, decreased traffic congestion and decreased travelling time ▪ Improved air quality, reduction in emissions of particulate matter and emissions due to traffic jams ▪ Land acquisition, displacement of population and loss of agricultural land ▪ Felling of trees ▪ Change in land use & land cover ▪ Improved road will attract more traffic ▪ Increased paved surfaces thus increased surface run-off ▪ Contamination of surface run-off with oil / grease / particulate matter / garbage / sulphur ▪ Excavation of soil from agricultural lands and nearby areas for construction of embankments ▪ Encroachments of areas by squatters, vendors, slums etc ▪ Disruption of natural drainage pattern ▪ Increased traffic load on feeder routes ▪ May attract developments like Motels, educational institutes, townships, industries etc along or near the proposed highway/expressway ▪ Development of avenue plantation ▪ Improved connectivity with other modes and accessibility ▪ Development of nearby villages and towns ▪ Usage of fly ash mix cement/concrete thus reduction of waste load ▪ Will provide connectivity to the coal fields and the TPPs ▪ Will link the source of raw material to manufacturer/producer to consumer ▪ Will reduce the traffic density on existing traffic and will enable for more good transportation thereby enhancing economy ▪ A study has been carried to assess the reduction in traffic on the highways due to development of EDFC (due to shift of freight from road to railway) and is attached as **Annexure 6.1**	▪ Air Quality ▪ Land Use ▪ Soil Quality ▪ New Infrastructure development ▪ Quality of life ▪ Ecology ▪ Noise level
3.	Waterways (Near Mugalsarai at Varanasi)	▪ Bulk transportation with low cost & less fuel consumption ▪ Most-eco friendly mode of transportation as	▪ Water Quality ▪ Drainage pattern

S. No.	Item	Anticipated Impacts	Affected VECs
		emissions are fairly less as compared to road transportation ▪ Reduction of burden on existing roads & railways ▪ Availability of goods at cheaper rate due to very less transportation cost ▪ Exploration of solar power for lighting Increased turbidity & sediment load in river water due to construction of Inland waterways ▪ Depletion of water quality of the river near the developed structure due to reduced water circulation ▪ Depletion of water quality due to oil spillage, accidental collision, discharge of commodities carried by vessels ▪ Loss of submerged flora in the areas where structures are proposed ▪ Impact on aquatic flora and fauna ▪ Emissions from the commodities to be transported (like coal/coal ash)	▪ Aquatic ecology ▪ Soil erosion ▪ Air quality ▪ Quality of life ▪ Existing infrastructure
4.	Expansion or Green filed projects of IR & DFCCIL	▪ To assess the impacts of railway projects on environment a review of the EIA & SIA studies of EDFC 1, 2 & 3 has been carried out. Review of EIA study of the EDFC-1,2 & 3 is attached as **Annexure 6.2.** From the study following major impacts are identified to be affecting environment ▪ Bulk transportation with low cost ▪ No air emissions ▪ Reduction of burden on existing roads ▪ Availability of goods at cheaper rate due to very less transportation cost ▪ Change in topography due to construction of embankment and cutting & filling operations for construction of ROB/RUB, construction of stations and other related facilities ▪ Large nos. of tree felling ▪ Change in natural drainage pattern ▪ Excavation of soil for construction of embankment from agriculture land thus loss of fertile soil from agriculture lands and reduction of fertility. Predominantly agricultural land is being used by DFCCIL to obtain soil and barren land is used barely (e.g. only at Banadn, Achlda, Etawaha & Ferozabad area for while APL-1) ▪ Large effluent from washing of trains and station areas may pollute nearby surface water bodies ▪ High noise level & vibrations in the nearby areas	▪ Noise level ▪ Vibration ▪ Existing infrastructure ▪ New infrastructure development ▪ Ecology ▪ Land use ▪ Quality of life

S. No.	Item	Anticipated Impacts	Affected VECs
		▪ Change in land use and diversion of agricultural land ▪ Will attract development of industrial areas, urban areas, townships, commercial/residential areas etc. ▪ Usage of fly ash mix cement/concrete thus reduction of waste load ▪ Exploration of solar power for lighting ▪ Detailed study has been undertaken how the traffic will increase in the roads near junction status and areas where unloading & loading yards are proposed by DFCCIL. The study is attached as **Annexure 6.1.**	
5.	Thermal Power Plants and Power Grids	▪ High pressure on water resources and depletion/pollution of ground water resources of the area ▪ High air emissions and depletion of air quality, if coal based (fly ash & exhaust gases) ▪ Threat of ground water pollution ▪ Huge emissions involved in transportation of coal & other raw materials ▪ Land acquisition and diversion of agriculture land ▪ Loss of fertility of soils of nearby agricultural fields ▪ Will ensure more and continuous supply of electricity to the industries ▪ Reduced power failures and running of DG sets by individual industrial and residential units thus reducing emissions	▪ Air Quality ▪ Soil Quality ▪ Water Quality ▪ Water Resources ▪ Existing Resources ▪ Quality of Life ▪ Micro-climate ▪ Noise level ▪ Vibration ▪ Ecology
6.	Aviation/Airports	▪ Requirement of large area of land for airport thus involve change in land use ▪ Creation of large sealed surfaces thus no infiltration and increased run-off ▪ Loss of livelihood of people due to loss of agricultural land and displacement of population ▪ Disturbance with the movement of birds and may lead to accidents due to collision with birds ▪ No high rise building can come in cone of flight ▪ Fastest mode of transportation thus will ease the travelling ▪ Will make the nearby location preferable for business and industrial developments	▪ Land use ▪ Ecology ▪ Quality of life ▪ Noise level ▪ Water resources
7.	Agricultural Projects & Irrigation Scheme	▪ Changes in flow regimes of the river and reduced available water in downstream ▪ Pollution of the ground & surface water with fertilizers and pesticides ▪ Loss of the habitat along side of river ▪ Reduction in water table in confined and	▪ Soil quality ▪ Water quality ▪ Water resources ▪ Ecology

S. No.	Item	Anticipated Impacts	Affected VECs
		semi-confined aquifers ▪ Water logging due to high scale irrigation ▪ Impact on aquatic life to availability of low flow in water body and construction of dams ▪ Increased soil salinity ▪ Decreased agricultural production due to soil salinity ▪ Due to low flow, reduction in natural restoration capacity of the streams ▪ Increased agriculture production by ensuring water supply ▪ Reduced dependency on rains for irrigation ▪ Increased income of farmers by increased crop production ▪ Improved economy of country ▪ Power generation ▪ Employment generation ▪ Coming up of various policies/schemes for providing HYV seeds, subsidies for better agricultural equipment and machinery, availability of loans etc, learning & training programs for farmers, soil quality testing centres to enhance agricultural production	
8.	Residential Developments and Related Facilities like Health centers, educational institutes, amusement parks etc.	▪ Increased air emissions due to increased nos. of vehicle movement ▪ Increased pressure on water resources, sewerage system, power supply etc ▪ Development of sealed areas thus reduction of infiltration ▪ Increased municipal waste, e-waste bio-medical waste and plastic waste ▪ Facility of living for people working in industrial areas/commercial areas etc	▪ Water resources ▪ Water quality ▪ Air Quality ▪ Land use ▪ Soil Quality

Cumulative Impact Assessment of EDFC Project

CUMULATIVE IMPACT ASSESSMENT OF EDFC PROJECT- LUDHIANA-MUGHALSARAI

Transport Component

1. BACKGROUND

Indian Railways (IR) operates a national rail network of about 64,600 route-kilometers; which is one of the most densely-used rail networks in the world. In 2011-2012, it carried over 8 billion passengers and about 1 billion tons of freight. Its total traffic task (measured by total traffic units carried) has increased by nearly 110 percent in the last ten years. Despite strong growth in its freight business, IR has been losing market share to road haulage. This situation is the result of insufficient physical capacity and service quality, exacerbated by the need to fit freight trains into a busy passenger service schedule. Yet if an annual economic growth rate of 7 percent were again to be attained, the underlying freight traffic demand would grow at around 8.75 percent. Without additional rail network capacity, much of the traffic for which rail should have competitive advantage would be forced to use road haulage or be suppressed. In both cases this would be at a cost to the economy and in the former case, at a cost to the environment as well.

Over the last decade, IR has successfully adopted many management measures to:

(i) squeeze more capacity from existing assets;
(ii) increase average trainload;
(iii) utilize equipment more efficiently; and
(iv) improve railway labor productivity.

Today, physical capacity on key corridors is the most pressing constraint. The main corridors in India are part of a Golden Quadrilateral connecting New Delhi, Mumbai, Chennai and Kolkata. They account for 16 percent of the railway network's route length but carry more than 60 percent of its freight task. The rail sector urgently needs to add capacity to these routes. The Government of India (GOI) has therefore approved a long-term plan to build dedicated freight-only lines, paralleling the existing Golden Quadrilateral mixed traffic routes. The new freight network will allow trains to carry more freight, faster, more reliably and at lower cost. The relief on the existing lines will allow improvements in passenger services. At completion, total corridor railway capacity will double, thereby unleashing a new platform for supporting economic growth.

The first dedicated freight corridors (DFC) to be built are the Western and Eastern Corridors. The Western Corridor (Delhi-Mumbai) is 1,534km. Construction of the Western dedicated Freight Corridor is funded by the *Japanese International Cooperation Agency (JICA)*. The Eastern Corridor is 1,839km and extends from Ludhiana to Kolkata. The World Bank is supporting construction of the Eastern Dedicated Freight Corridor (EDFC) through a series of loans for a total length 1,133km.

"CIA is the process of

- analyzing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and
- proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible. The key analytical task is to discern how the potential impacts of a proposed development might combine, cumulatively, with the potential impacts of the other human activities and other natural stressors such as droughts or extreme climatic events. VECs are immersed in a natural ever-changing environment that affects their condition and resilience. VECs are integrators of the stressors.

"CIA has six objectives:

- Assess the potential impacts and risks of a proposed development over time, in the context of potential effects from other developments and natural environmental and social external drivers on a chosen VEC;
- Verify that the proposed development's cumulative social and environmental impacts and risks will not exceed a threshold that could compromise the sustainability or viability of selected VECs;
- Confirm that the proposed development's value and feasibility are not limited by cumulative social and environmental effects;
- Support the development of governance structures for making decisions and managing cumulative impacts at the appropriate geographic scale (e.g., airshed, river catchment, town, regional landscape);
- Ensure that the concerns of affected communities about the cumulative impacts of a proposed development are identified, documented, and addressed; and
- Manage potential reputation risks.

By basing this analysis on appropriate methodology for assessing CIA (qualitative and quantitative methods) impacts for multiple linear projects, the results should identify the cumulative impacts of the Eastern Dedicated Freight Corridor (EDFC) program (in three phases) and identify possible mitigation measures / strategies to address and thus mitigate any major negative cumulative impacts.

2. OBJECTIVES OF TRANSPORT COMPONENT

The objective of CIA study from transportation perspective are:

- To inform the effects that the new EDFC will have on the modal share between the new freight corridors and the adjoining rail systems or feeder rail links.
- Broader impact of the new DFC on the road transport network (including impact on supply roads, origins and destinations, traffic flow, ways in which this track might impact bottlenecks elsewhere in the system).
- The cumulative assessment may also reveal positive effects from both the location of the line adjacent to an existing one, effects on the broader systemic transport

investments (such as reducing need for investments in roadways), and climate benefits.

- Specific aspects that may be considered in the study include cumulative effects on traffic, accidents, pollution and noise, induced and incremental growth along different points of the railway, land occupation and gentrification effects, cumulative effects on natural/critical habitats and fragmentation effects, among other potential impacts.

3. DFCC PROJECT

The Eastern Dedicated Freight Corridor (EDFC) is divided into three sub projects namely, EDFC-1 of 393.85 kilometer length from Bhaupur-Khurja-Dadri section, EDFC-2 of 448.51 kilometer length from Bhaupur to Mughalsarai section and EDFC-3 of 395.1 kilometer length from Sahnewal (Ludhiana) to Khurja-Dadri Section.

The eastern corridor encompasses a double line electrified traction corridor from Sone Nagar on the East Central Railway to Khurja on the North Central Railway, Khurja to Dadri on NCR double line electrified corridor and single electrified line from Khurja to Ludhiana on Northern Railway.

For CIA study, section of EDFC from Mugalsarai to Khurja, Khurja to Dadri and Khurja to Ludhiana have been considered. The total length of EDFC from Mugalsarai to Khurja, Khurja to Dadri and Khurja to Ludhiana works out to 1237.46 km. the project map of Eastern Dedicated Freight Corridor (EDFC) is shown in the figure below.

Table 1: World Bank Funded EDFC

Projects	Section	Length(km)	Number of Tracks
EDFC1	Khurja-Kanpur	393.85	Double
EDFC2	Kanpur-Mughalsarai	448.51	Double
EDFC3	Ludhiana-Khurja-Dadri	395.1	Single
Total Length		**1237.46**	

Source: RFP

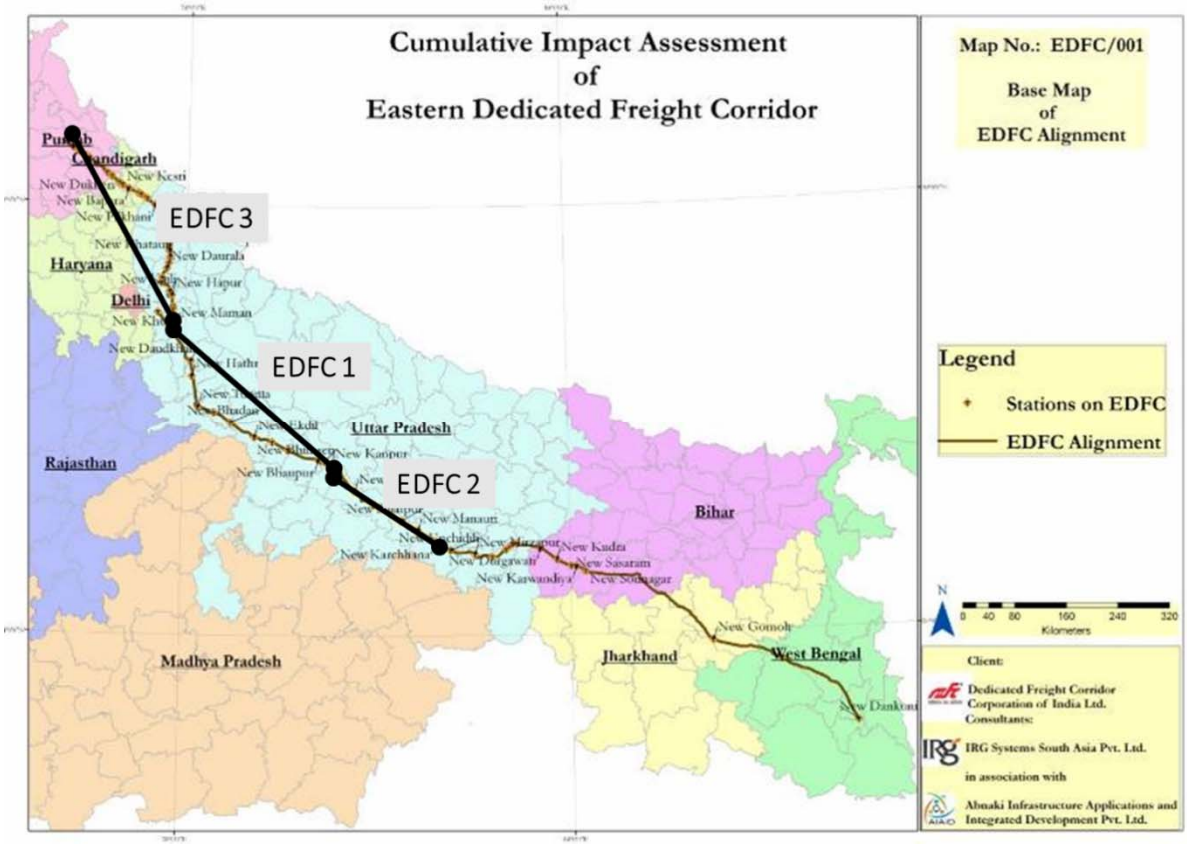


Figure 1: EDFC Alignment

4. METHODOLOGY

Following steps have been carried out for the transport component in the CIA study.

Step 1: Scoping Phase I – VECs, Spatial and Temporal Boundaries

From Transportation perspective, the following parameters have been identified.

- Traffic
  - shift in modal share from the adjoining rail and feeder links to EDFC
  - shift in modal share from road system to EDFC
  - impact on the supply roads to the Junction stations
- Air pollution
  - impact on emissions of ambient air quality standards
- Accidents
  - Impact on accidents in the identified region due to EDFC
- Noise
  - impact on Noise and Vibration in the identified region due to EDFC (This was not identified as a significant VEC, though)

Cumulative Impact Assessment (CIA) requires fixation of spatial and temporal boundaries in order to assess the impacts of direct, indirect and induced activities due to proposed project. To conduct the detailed study of the project, three buffer boundaries have been considered; i.e. 100 m, 300 m and 10 km. The basis for delineating these three buffer boundaries are based on the EIA reports of EDFC (EDFC – 1, EDFC – 2 and EDFC – 3), IFC codes and the expert's consultation/ judgment.

- **100 m buffer** – This boundary has been taken according to the EIA study conducted for the entire stretch of EDFC.
- **300 m buffer** – According to IFC codes and applicable Indian regulations, for archeological and cultural sites a maximum distance of 300 mtrs is considered to study the impact of any upcoming developmental project.
- **10 km buffer** – It is being considered that the extent of area of influence of the project may not go beyond 10 km as per the expert's consultations. Therefore the farthest distance covered in the CIA boundary is 10 km.

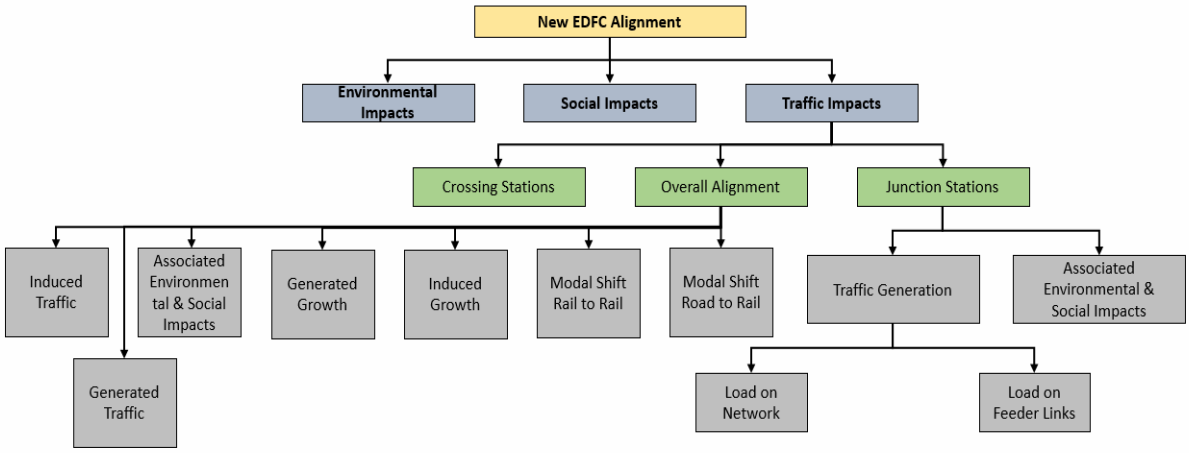
Impact of DFCC due to transportation is carried out for year 2021.

Step 2: Shift in Modal share from Existing Rail and Road to EDFC

It is assumed that DFC corridor will be fully operational in the year 2021. As a result of EDFC a modal shift is expected to happen.

- from the adjoining saturated rail system and feeder links to EDFC
- shift in modal share from road system to EDFC

The flow chart below detail out the Traffic Impacts of the EDFC and associated social and environmental impacts.



Available data of freight train operation is extrapolated till year 2021 and number of freight trains which can run on the existing rail system have been estimated considering the following assumptions:

- A growth rate in freight and accordingly in number of trains has been taken at 4 percent per year,
- These routes carry a mix of passenger and freight traffic and, being utilized up to 150 percent of their charted capacity, are fully saturated. As a result, movement of freight trains, which are assigned a lower priority as compared to passenger and other services, the number of freight trains which existing system can carry has been limited to potential available capacity
- Assignment of traffic to DFC is based on the two junction principle, which means that only such traffic that spans over two or more DFC junction stations will be transferred to the DFC; the rest will continue to utilize the IR network. Although such traffic (mostly of a short lead of 100 km or less) it is estimated that it would amount to not more than 15% of total traffic on the eastern corridor. Accordingly the number of freight trains has been adjusted.
- The resultant number of trains will shift to EDFC, accordingly freeing capacity of the existing rail system. It is estimated that nearly 80-85 % of the existing traffic will shift from existing Rail system to EDFC will free the existing rail system of 20-45 percent of the capacity. This is summarized in the following table

Table 2: Shift in Modal from the existing Rail system to EDFC

Sr. No.	Section	Rail shift in number of trains per day			
		UP	DN	UP %	DN %
1	Sonnagar - Mughalsarai	25.30	25.52	43.61	44.00
2	Mughalsarai - Allahabad	23.20	23.20	40.00	40.00
3	Allahabad – Kanpur	23.20	23.20	40.00	40.00
4	Kanpur – Tundla	23.20	23.20	40.00	40.00
5	Tundla – Aligarh	20.88	20.88	36.00	36.00
6	Aligarh – Khurja	20.88	20.88	36.00	36.00
7	Khurja – Dadri	20.88	20.88	36.00	36.00
8	Khurja - Meerut - Saharanpur	0.00	0.00	0.00	0.00
9	Saharanpur - Rajpura	3.56	9.30	6.14	16.04
10	Rajpura – Sirhind	3.33	9.10	5.75	15.68
11	Sirhind - Dhandari Kalan	1.34	5.08	2.31	8.76

Source: Consultant Estimates

The DFCCIL has carried out detailed, section-wise, traffic assignment exercise to estimate potential traffic expected to move on the DFC routes up to 2036-37. The commodity-wise growth projections have been arrived at by using a mix of techniques like regression analysis, demand elasticity-based econometric modelling, development of scenarios for future port capacity expansion and establishment of new thermal power plants and expansion of capacity of existing plants located in the project influence area, along with a review of the anticipated coal requirement and supply linkages as worked out by the concerned government and private agencies, etc. The impact of the recent global economic meltdown on industrial output and foreign trade and the likely redistribution of commodity flows in the post- DFC era have been taken into consideration. The forecasted number of trains on Eastern DFC corridors in the different reference years is presented below. Traffic in both up and down direction for all reference years in respect of Eastern DFC is given in terms of 25

tonnes axle load wagons. Accordingly, the forecasted section-wise, number of trains on Eastern DFC in the different reference years is given below:

Table 3: Forecasted Traffic (Trains) - Eastern DFC

Sr. No.	Section	No. of Trains (2021)	
		UP	DN
1	Sonnagar - Mughalsarai	79.42	80.67
2	Mughalsarai - Allahabad	68.26	70.92
3	Allahabad – Kanpur	65.76	67.01
4	Kanpur – Tundla	74.21	70.39
5	Tundla – Aligarh	63.71	63.89
6	Aligarh – Khurja	60.57	60.08
7	Khurja – Dadri	34.42	32.67
8	Khurja - Meerut - Saharanpur	26.15	27.41
9	Saharanpur - Rajpura	20.13	20.91
10	Rajpura – Sirhind	16.1	16.77
11	Sirhind - Dhandari Kalan	12.04	12.39

Source: DFCC_Final_Business_Plan

The traffic which would have continued on the existing Road network, if EDFC was not in place is estimated considering the following assumptions:

- Estimates of increase in freight growth on existing rail corridor and on EDFC and accordingly the number of trains have been estimated for the year 2021.
- The shift in modal share from the existing rail system to EDFC is subtracted to derive the number of trains which would have continued on the existing road system if EDFC was not built.
- Estimation of load which would have been carried by Trucks is estimated by multiplying number of trains to load carried by the trains
- The load carried is divided into:
- Light commercial vehicles (LCV having gross weight of 3.5 Tonnes),
- Medium commercial vehicles (MCV having gross weight of 9-12 Tonnes)
- Multi axle Vehicles having Gross vehicle weight 35 tonnes)
- Basis on the distribution pattern of such trucks in the country has been taken as LCV:MCV: MAV as 30%:60%:10%.

The resultant number of truck which will not ply in due to EDFC resulting in savings in congestion, air pollution and accidents is summarized in the following table.

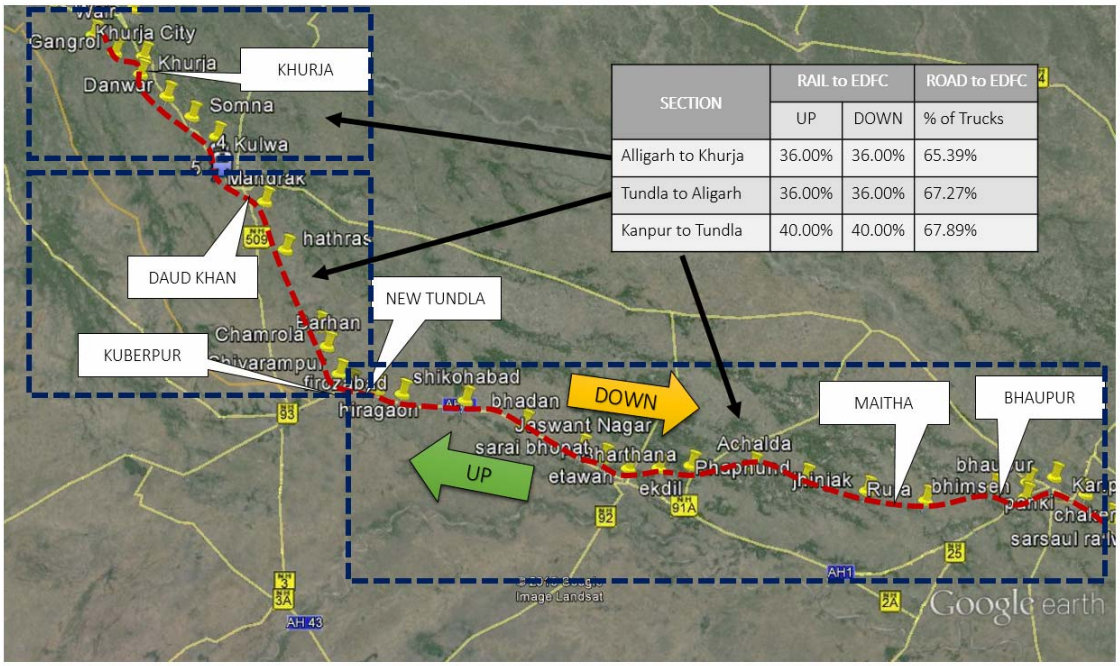
Table 4: EDFC Impact Assessment

Sr. No.	Section	No of Trucks Shifted to Rail		EDFC Benefit %		
		UP	DN	UP	DN	Average
1	Sonnagar – Mughalsarai	14873	4293	68.15	68.36	68.26
2	Mughalsarai - Allahabad	11384	4497	66.01	67.29	66.65

3	Allahabad – Kanpur	11162	3422	64.72	65.38	65.05
4	Kanpur – Tundla	13717	3592	68.74	67.04	67.89
5	Tundla – Aligarh	13416	2044	67.23	67.32	67.27
6	Aligarh – Khurja	12411	1810	65.53	65.25	65.39
7	Khurja – Dadri	4205	312	39.34	36.09	37.71
8	Khurja - Meerut - Saharanpur	8250	1911	100.0	100.0	100.00
9	Saharanpur – Rajpura	5232	1061	82.32	55.50	68.91
10	Rajpura – Sirhind	4031	854	79.29	45.77	62.53
11	Sirhind - Dhandari Kalan	3351	1028	88.86	59.00	73.93

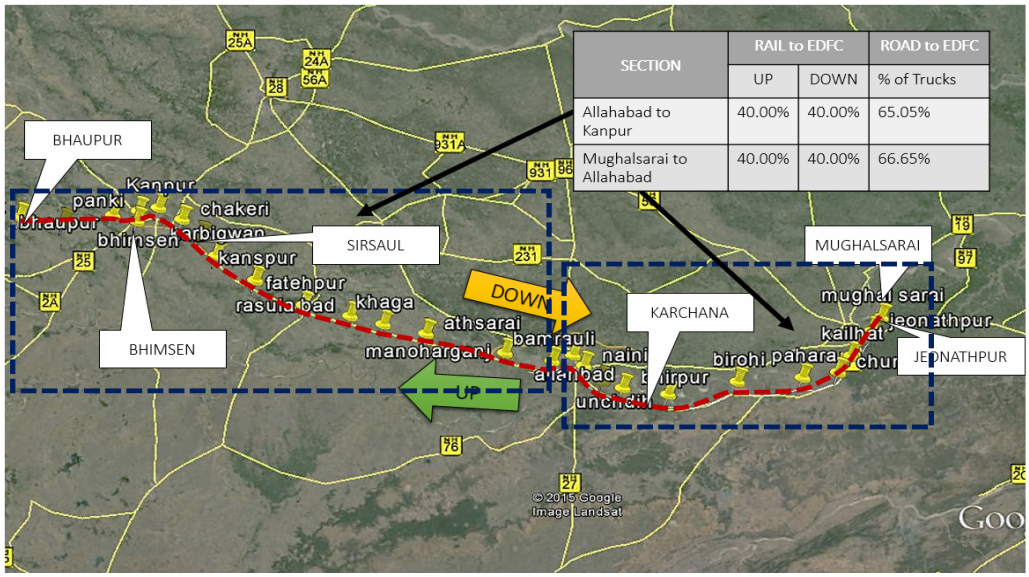
Source: Consultant Estimates

Shift in modal share from existing rail and road to EDFC and has been depicted in the following figures.



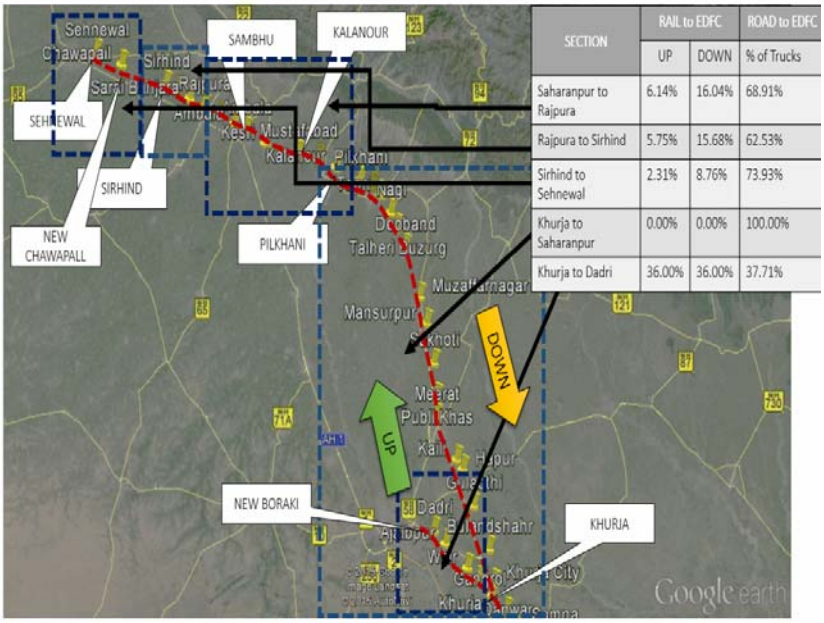
SECTION	RAIL to EDFC		ROAD to EDFC
	UP	DOWN	% of Trucks
Alligarh to Khurja	36.00%	36.00%	65.39%
Tundla to Aligarh	36.00%	36.00%	67.27%
Kanpur to Tundla	40.00%	40.00%	67.89%

Figure 2: Shift in modal share towards EDFC 1



SECTION	RAIL to EDFC		ROAD to EDFC
	UP	DOWN	% of Trucks
Allahabad to Kanpur	40.00%	40.00%	65.05%
Mughalsarai to Allahabad	40.00%	40.00%	66.65%

Figure 3: Shift in modal share towards EDFC 2



SECTION	RAIL to EDFC		ROAD to EDFC
	UP	DOWN	% of Trucks
Saharanpur to Rajpura	6.14%	16.04%	68.91%
Rajpura to Sirhind	5.75%	15.68%	62.53%
Sirhind to Sehnewal	2.31%	8.76%	73.93%
Khurja to Saharanpur	0.00%	0.00%	100.00%
Khurja to Dadri	36.00%	36.00%	37.71%

Figure 4: Shift in modal share towards EDFC 3

The pattern of freight traffic on the road is expected to change significantly because of EDFC. There will be significant savings in terms of reduction in congestion on the roads, air pollution and accidents, however as the loading and unloading will happen at the junction stations, adequate care in planning the road system is required for mitigating the negative impacts of this change. In order to accurately assign attracted/generated traffic to the surrounding road network (Regional and Local roads) requires an understanding of the likely inbound and outbound routes that traffic would take when arriving and departing the junction station. The access roads leading the Junction Stations are depicted in the following figures.

EDFC 1

1. Khurja Junction Station

Figure-5: Access Plan for Khurja Junction Station

2. New Tundla Junction Station

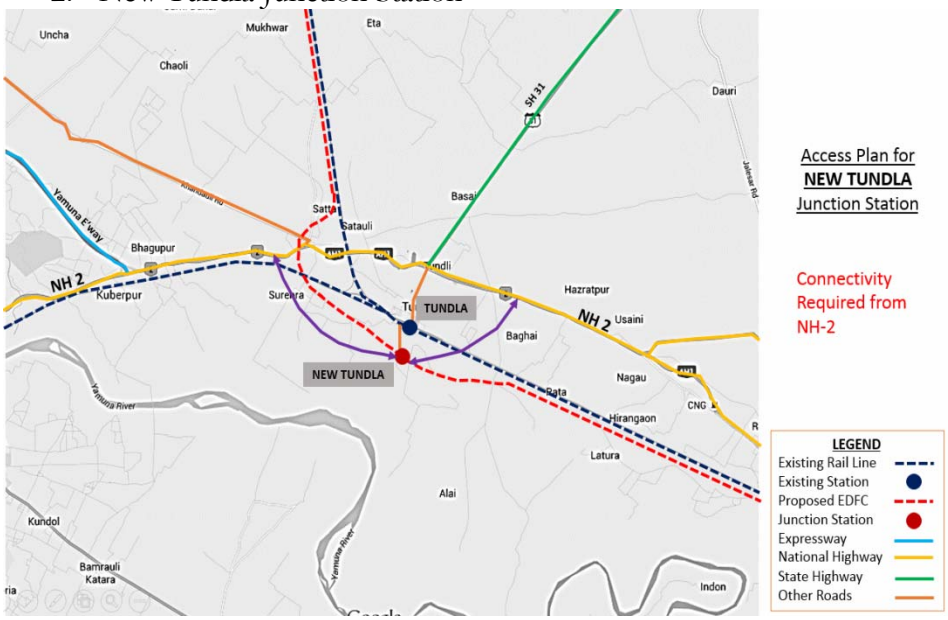


Figure 6: Access Plan for New Tundla Junction Station

3. Daudkhan Junction Station

Figure 7: Access Plan for Daudkhan Junction Station

4. Kuberpur Junction Station

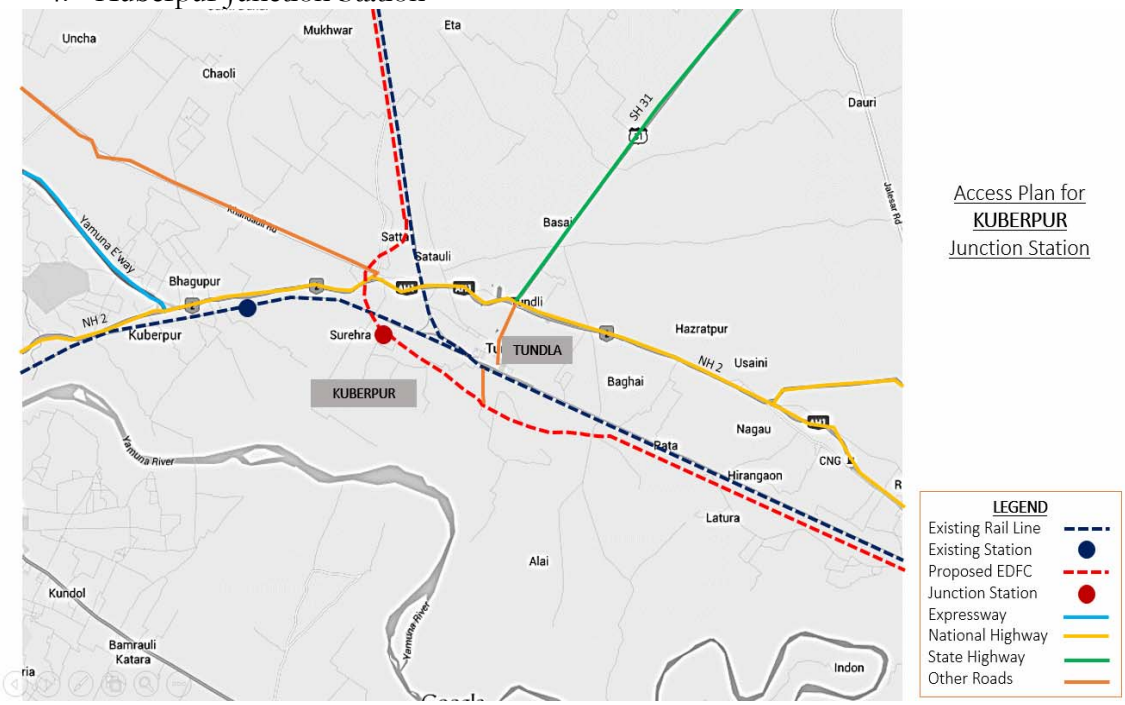


Figure 8: Access Plan for Kuberpur Junction Station

5. Maitha Junction Station

Figure 9: Access Plan for Maitha Junction Station

EDFC 2

1. Bhaupur Junction Station

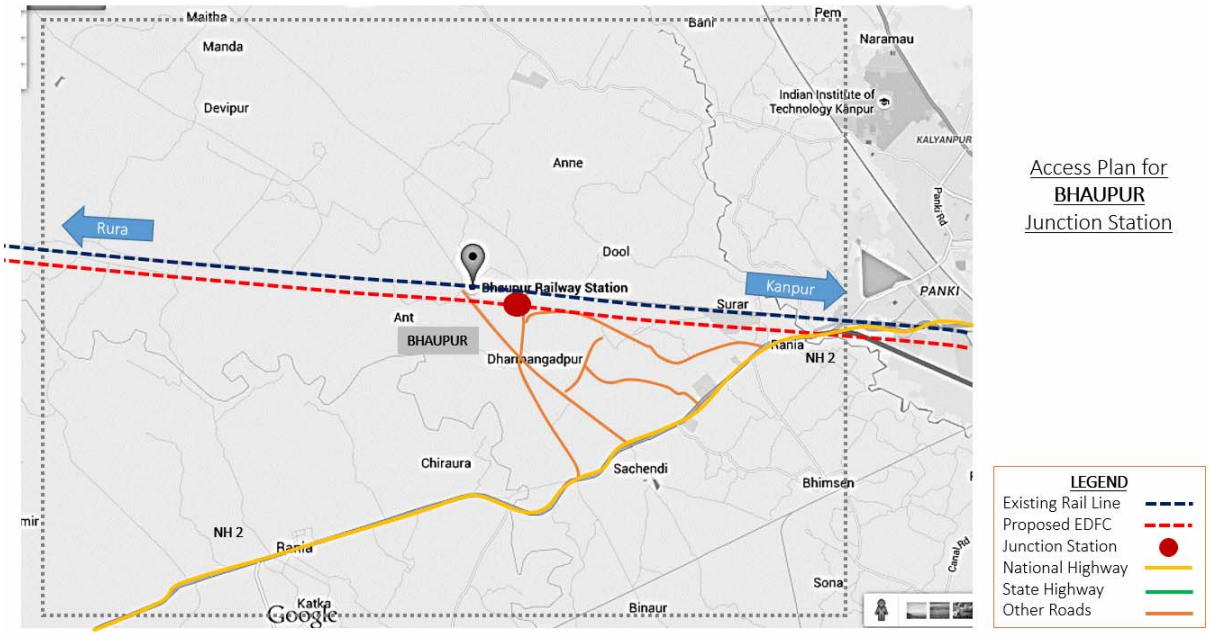


Figure 10: Access Plan for Bhaupur Junction Station

2. Bhimsen Junction Station

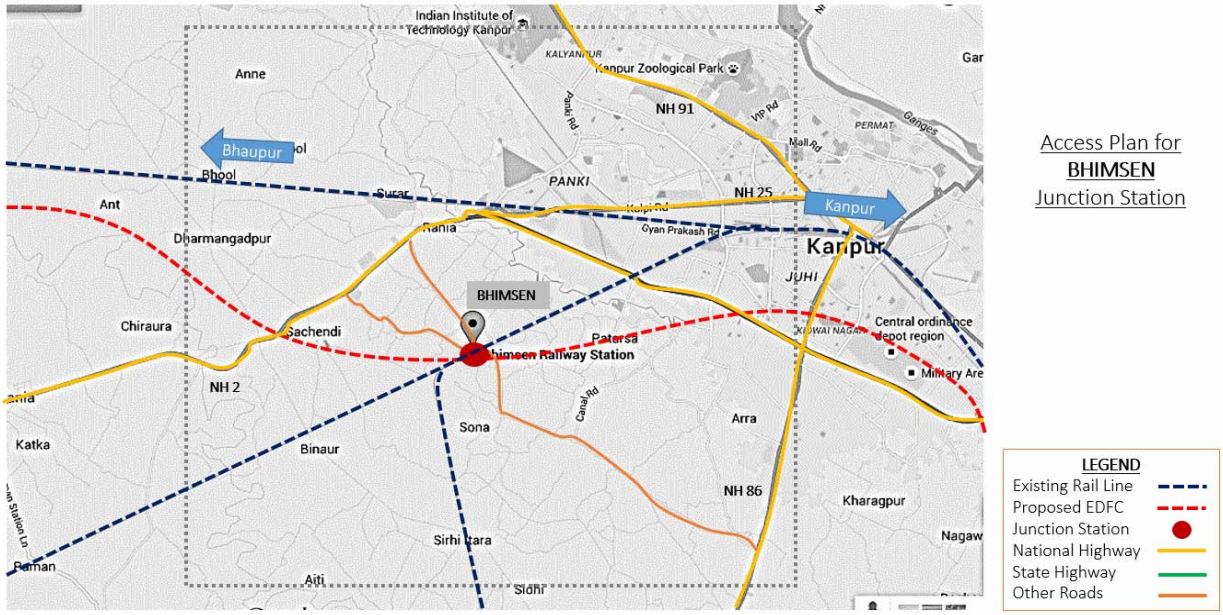


Figure 11: Access Plan for Bhimsen Junction Station

3. Sirsaul Junction Station

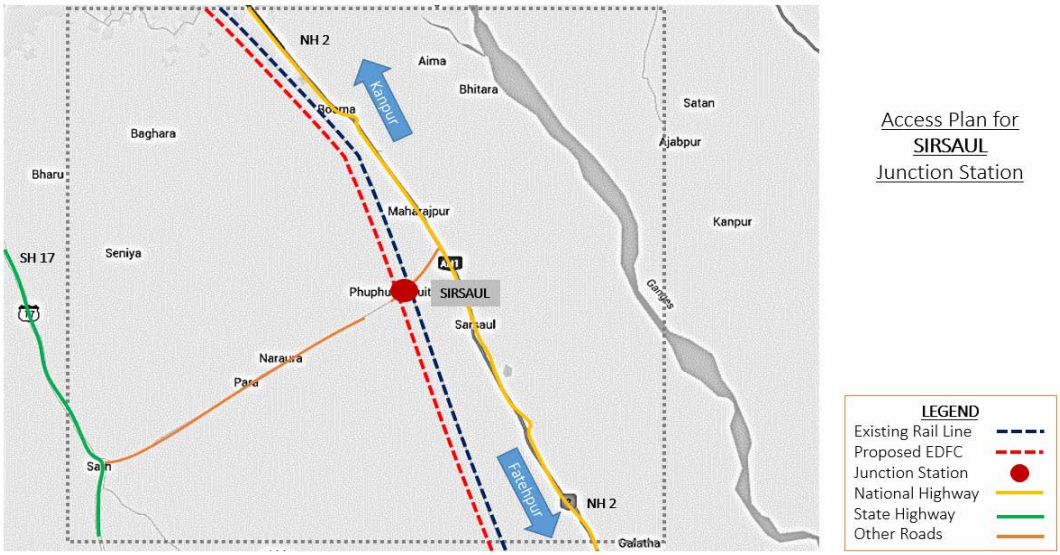


Figure 12: Access Plan for Sirsaul Junction Station

4. Karchana Junction Station

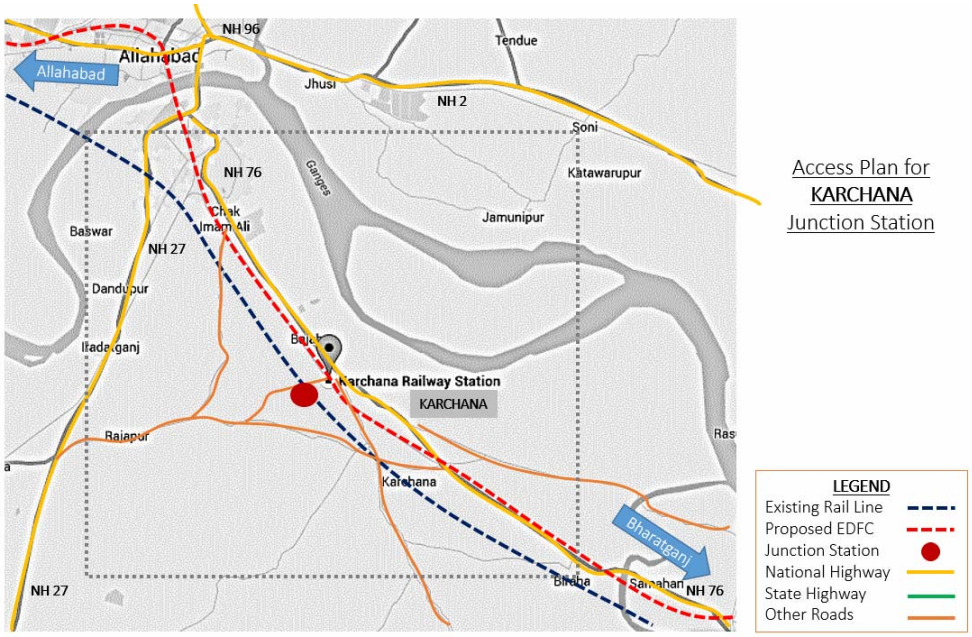


Figure 13: Access Plan for Karchana Junction Station

5. Jeonathpur Junction Station

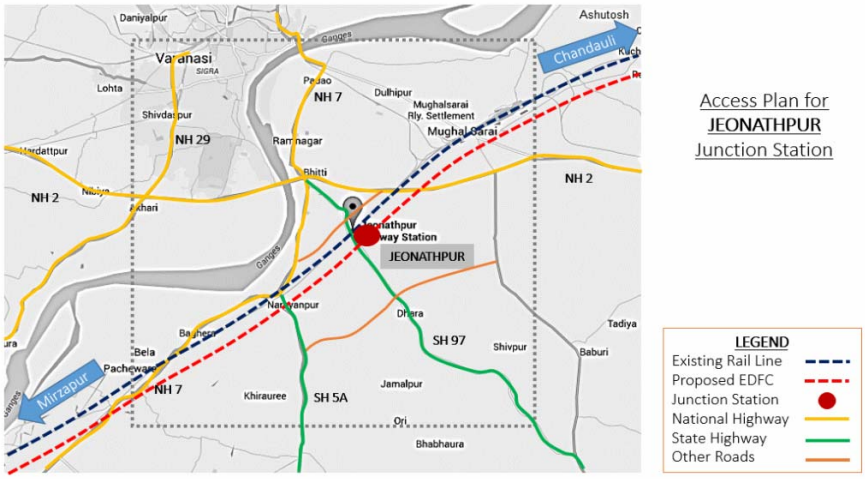


Figure 14: Access Plan for Jeonathpur Junction Station

6. Mughalsarai Junction Station

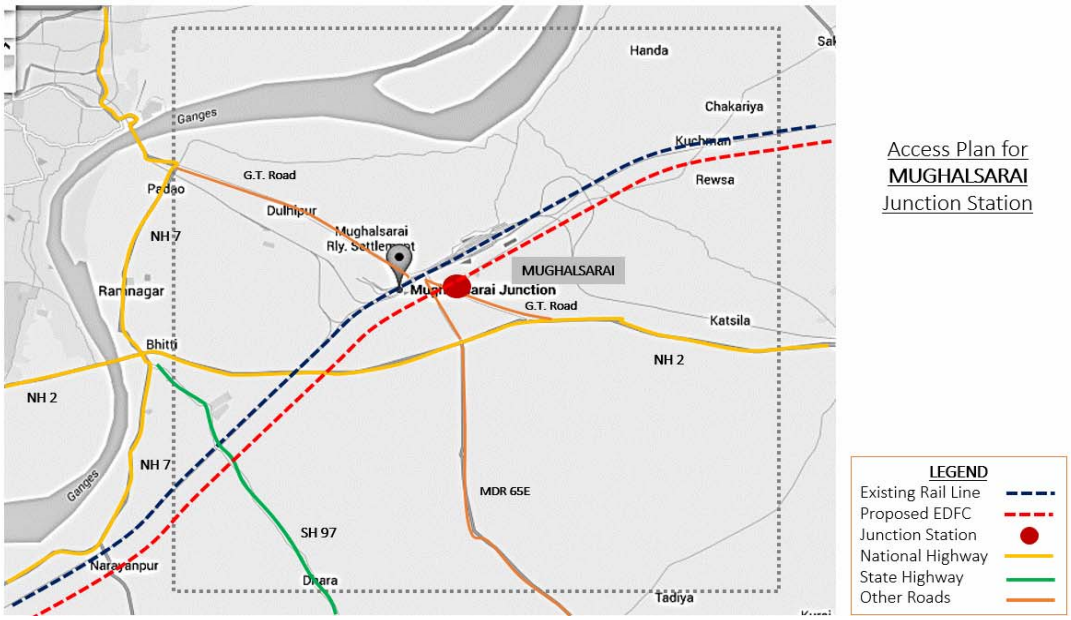


Figure 15: Access Plan for Mughalsarai Junction Station

EDFC 3

1. Sahnewal

Figure 16: Access Plan for Sahnewal Junction Station

Figure 17: Access Plan for Chawpall Junction Station

2. Sirhind Junction Station

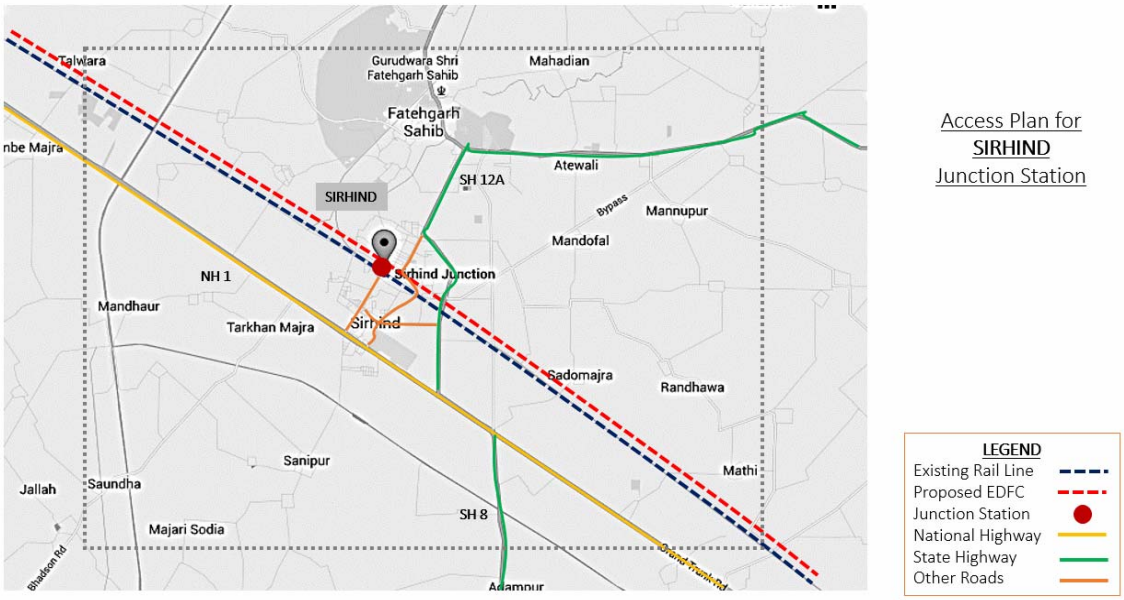


Figure 18: Access Plan for Sirhind Junction Station

3. Sambhu Station Junction

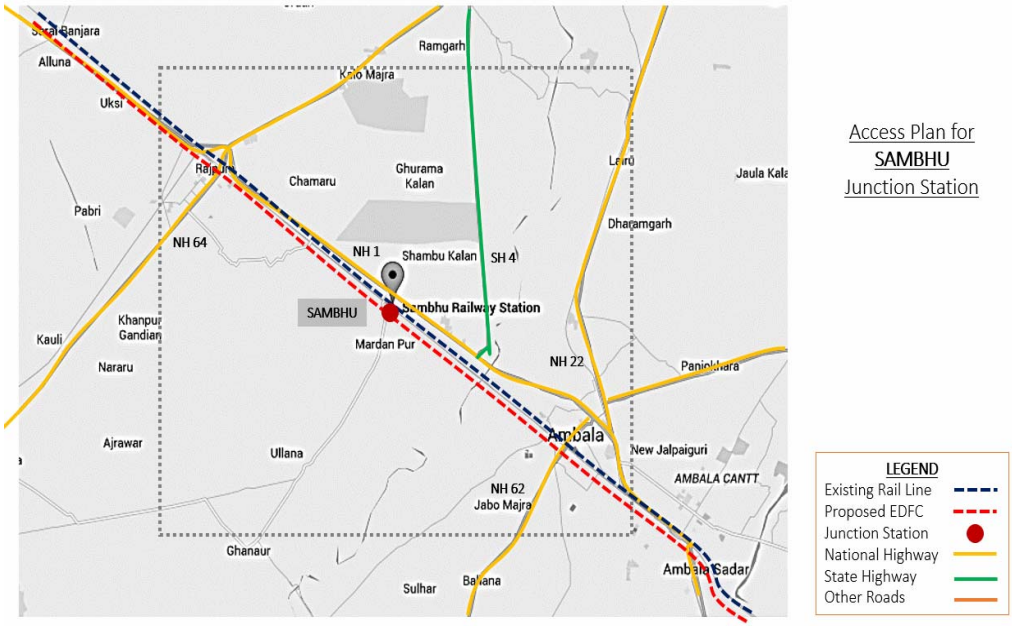


Figure 19: Access Plan for Sambhu Junction Station

4. Kalanour Junction Station

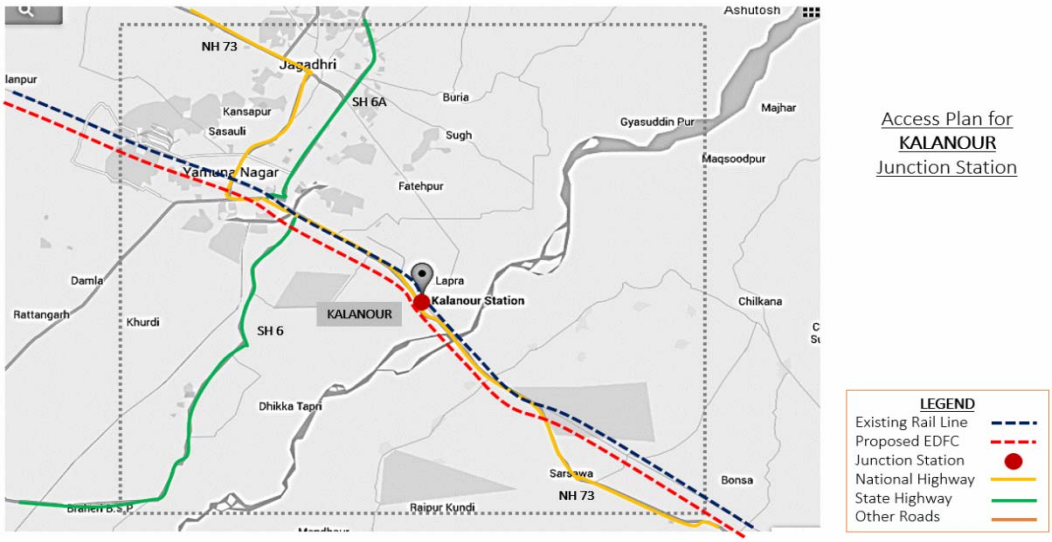


Figure 20: Access Plan for Kalanour Junction Station

5. Pilkhani Junction Station

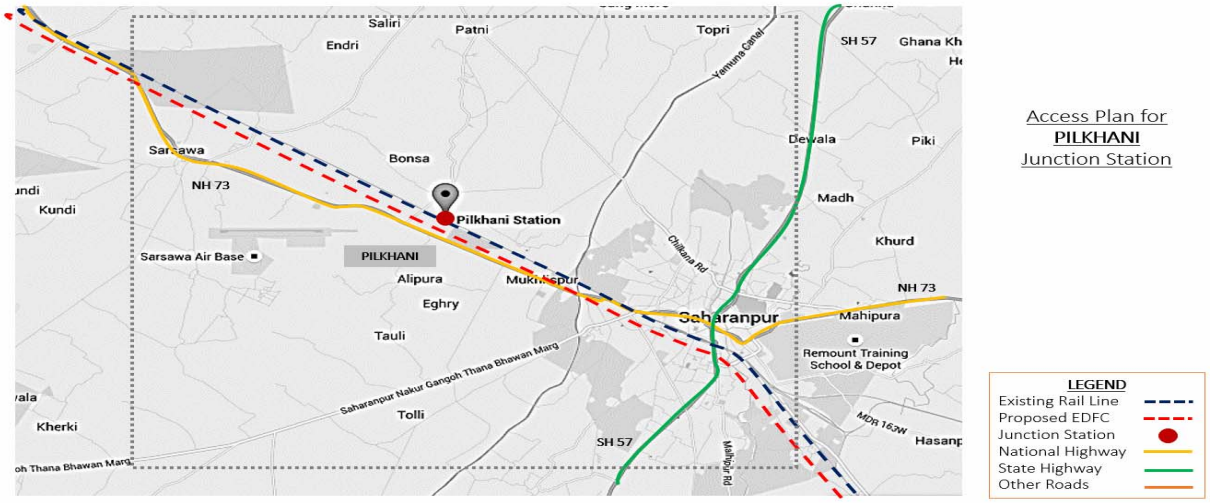


Figure 21: Access Plan for Pilkhani Junction Station

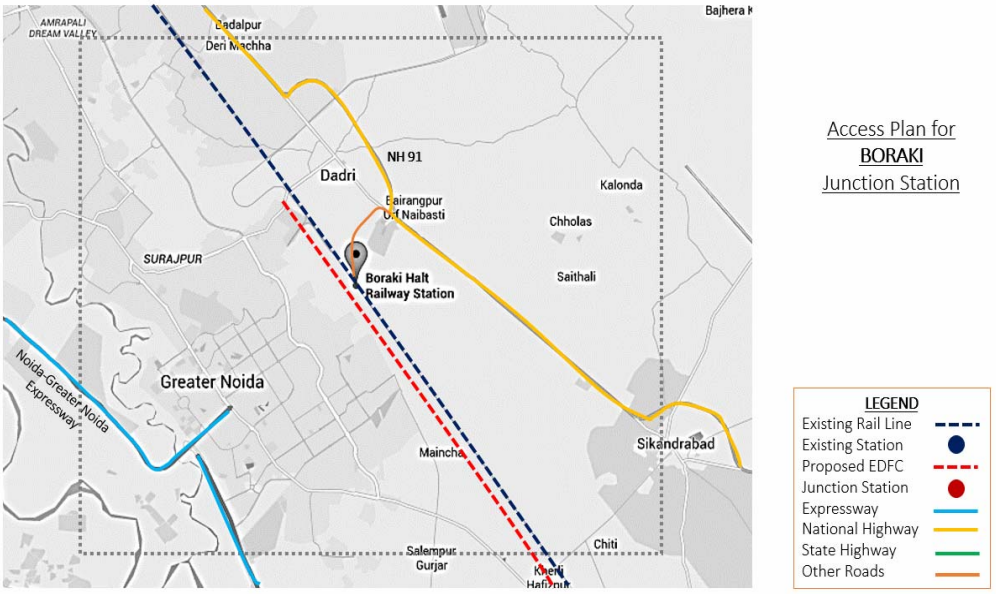


Figure 22: Access Plan for Boraki Junction Station

The maps shows access roads of the proposed Junction stations. These access roads would require micro-level traffic estimates, existing level of service and future required road widths. At the broader level main arterial roads would also cater to the through traffic which would grow at the normal pace. At the next level of detailing, these roads would require improvements at the intersections as per the IRC code and guidelines.

Step 4: Establishing Base Line Parameters

Ambient air quality monitoring has been carried out along each section/sub-section during environment impact assessment study. Study has been carried out in different season for

different sections/sub-section. Cumulative data on ambient air quality for each section of respective study period is given in table below.

Table 5: Ambient Air Quality Data along the Project Alignment

Parameters/ Project Sections	EDFC-2 (Bhaupur to Mugal Sarai)	EDFC-1 (Bhaupur to Khurja)			EDFC-3 (Sanhewal to Khurja-Dadri)		NAAQS, 2009
	(Bhaupur to Mugal Sarai) Mar-Apr, 2011	(Bhaupur to Khurja) May, 2009	Kaurara to Chamrola May, 2011	Khurja to Dadri Jan, 2012	Khurja to Pilkhani Feb-Mar, 2015	Pilkhani to Sanhewal Dec-Feb, 2010	
Max. PM_{10}	108	83	78	81	140	162	100
Min. PM_{10}	51	56	65	44	84	118	
Max. $PM_{2.5}$	55	--	23	28	56	45	60
Min. $PM_{2.5}$	23	--	18	19	33	18	
Max. SO_2	22	14	19.2	16.1	14.5	23	80
Min. SO_2	12	8	16.2	11.5	7.1	10	
Max. NO_x	31	25	22.5	23.4	26.6	18	80
Min. NO_x	10	14	19.3	17.6	13.0	8	
Max. CO	--	529	--	--	--	--	2000
Min.CO	--	98	--	--	--	--	

Source: EIA reports of EDFC1,2,3 ***(All Units are µg/cum)***

As per the ambient air quality data given in table above, it is found that all the parameters along the project alignment are within the permissible limits of NAAQS, 2009, CPCB except PM_{10}/RPM value. Levels are found higher along Bhaupur to Mugalsarai and Pilkhani to Sanhewal section.

Step 4: Assessing Impact of EDFC

Various direct and indirect impacts on VECs are identified in three EIA reports due to the project activities. Qualitative and quantitative methods are used for impact assessment in all the three reports. The identified impacts significance is assessed following five scale criteria as presented at the following table.

Table 6: Parameter and Scale of Impact Matrix

Parameter	Scale		Remarks	
Significance	No impact	E		
	Negligible impact	D	Positive:+	Negative:-
	Insignificant impact	C	Positive:+	Negative:-
	Relatively significant impact	B	Positive:+	Negative:-
	Significant impact	A	Positive:+	Negative:-
	Significance Scale Criteria			

	Scale A: If Impacts are significant Scale B: If impacts are relatively significant Scale C: If impacts are insignificant Scale D: If impacts are negligible Scale E: No impacts or not applicable for assessment

The impact assessment has been done considering the following parameters:

Sr. No.	Parameter	Impacts due to EDFC
	Access roads to the junction station within 100m radius	Due to loading and unloading activities, goods vehicle movement would increase at the local level near the junction station
	Associated Environmental impacts due to increase in Traffic intensity within 100m radius	Pollution and noise level due to the junction station and goods movement
	Access roads and intersection within 300m radius	Due to loading and unloading activities, goods vehicle movement would increase at the local level near the junction station which may create congestion at the nearby intersection
	Associated Environmental impacts due to increase in Traffic intensity within 300m radius	Pollution and noise level due to the junction station and goods movement
	Traffic impacts on the state and national highways, including the intersections which may result in bottlenecks within 10km buffer zone	The amount of traffic generated/attracted due to the junction station and the amount of traffic shifted from road to EDFC would have negative OR positive impact at the network level
	Associated Environmental impacts due to increase in Traffic intensity within 10km radius	Congestion and road widening due to EDFC may have direct/indirect impact on environment

Table 7: Impact evaluation due to EDFC

Parameters	Impacts due to EDFC			Remarks	Mitigation Strategies
	EDFC 1	EDFC 2	EDFC 3		
Traffic					
Traffic at Network Level					
Shift in Modal Share from Rail	A+	A+	B+	Release in significant line capacity of existing rail system for more passenger services on the existing IR	
Shift in Modal Share from Road	A+	A+	A+	Significant reduction of freight traffic from the existing road system	
Air quality	A+	A+	A+	Significant reduction in pollution levels	
Accidents	B+	B+	B+	• Reduction in accident levels due to reduction in fleet of trucks from roads • Reduction in number of manual rail crossings due to EDFC	
Noise	B+	B+	B+		
Traffic at Junction Level					
Traffic on Access Roads	B-	A-	C-	Impact on the access roads to the junction stations due to loading/unloading and induced traffic due to EDFC. Unorganized parking may increase.	Adequate road capacity to handle the peak load near the junction access road should be provided. This has to be as per IRC standards. Geometric and pavement design has to be carried out to prepare the roads for the impending loads. Truck Lay bays to be provided. (UPPWD has proposed six state highways under UP state sub-road project to GoUP to link the **EDFC-I** stations to National highways)
Air quality	B-	B-	C-	Increase in levels of pollution due to movement of freight traffic on access roads	Mitigation strategies have to be planned to minimize or reduce the Bottlenecks.
Accidents	B-	B-	C-	As the fleet of freight traffic rise with time might increase the risk of accidents on the access roads	Proper traffic calming and road safety measures to be undertaken at the planning and implementation stage.
Noise	B-	B-	C-	Presence of EDFC junction stations induce greater freight traffic which might possibly increase the levels of noise	Urban street-scaping and Noise barriers to be provided wherever required.

Source: Consultant Estimates

The above impacts have been assessed qualitatively. It appears that DFCC will have overall positive impacts at Mesoscopic level.

Step 5: Assessing Cumulative Impact of the developments

A list of Transport related ongoing and planned projects in the 10 km meso-scopic region have been listed in Table below and cumulative impact of all the projects have been qualitatively assessed in line with the parameters identified.

Table 8: Upcoming Transport Projects

EDFC 1
Major transport companies of Kanpur are proposed to establish their units near Rania.
Lucknow-Agra Express way (LA already started)
UPPWD of six state highways has proposed under UP state sub-road project to GoUP to link the EDFC-I stations to National highways
CONCOR has acquired land near Maitha station to establish Container Depot (proposal already sent from UPSIDC)
EDFC 2
Six laning of NH-2
Widening of Sayyed Raza Jamnia road, Varanasi
Yamuna bridge new section starts from 4.878 to 458.000 in Allahabad
2-lane with paved shoulder (both side widening each 1.5m), Allahabad
Strengthening of Chandauli-Sakaldiha-Saidpur road SH-69
Widening works of ROB Bichhyya crossing
6-lane of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687
2-lane with paved shoulder of Kanpur-Kabrai of NH-86.
6-lane of Chakeri to Allahabad of NH-2 from km 483.687 to 628.753
ESIA/EMP/RAP for "Capacity augmentation of navigational infrastructure of NW-1 (Jal Vikas Marg)
GoUP has planned to develop an airport of international level Taj International Airport
EDFC 3
Nhai-1 Road widening from Jalandhar to Ambala
Patiala, road connecting to villages Fategarh Sahib
3 ROB on Existing road is proposed 6 RUB are proposed along the DFCC corridor. 1 ROB is proposed at Madapur, Fathegarh Saheb

Source: Secondary

Table 9: Impact of cumulative projects on EDFC

Cumulative Projects	Parameters				Remarks
	Traffic	Air Pollution	Accidents	Noise	
EDFC 1					
Major transport companies of Kanpur are proposed to establish their units near Rania.	C-	C-	C-	C-	Due to upcoming transport oriented units the traffic is expected to increase in the effective buffer zone; due to increment in the traffic that might probably lead to rise in air pollution; similarly have a negative impact on accident levels; and might increase noise levels
Lucknow-Agra Express way (LA already started)	B-	C-	B-	C-	As the expressway will start to operate, traffic will start flowing and eventually impact level of traffic, air pollution, number of accidents and noise produced by vehicles
UPPWD of six state highways has proposed under UP state sub-road project to GoUP to link the EDFC-I stations to National highways	B+	B+	B+	B+	New State highways will increase accessibility of the junction station and also might divert the trucks from moving through internal roads.
CONCOR has acquired land near Maitha station to establish Container Depot (proposal already sent from UPSIDC)	C+	C+	C+	C-	As the junction station of Maitha is located at remote location of Kanpur Dehat so, impacts will be insignificant.
Overall Impact	B+	B+	E	C-	
EDFC 2					
Six laning of NH-2	B+	B+	B+	B+	Widening would increase the road capacity and reduce congestion.
Widening of Sayyed Raza Jamnia road, Varanasi	E	E	E	E	Beyond 10 km zone.
Yamuna bridge new section starts from 4.878 to 458.000 in Allahabad	B+	B+	B+	B+	Capacity of access points would increase.
2-lane with paved shoulder (both side widening each 1.5m), Allahabad	E	E	C+	E	Will improve safety.
Strengthening of Chandauli-Sakaldiha-Saidpur road SH-69	E	C+	C+	E	Will improve safety.
Widening works of ROB Bichhyya crossing	D+	D+	D+	D+	Will improve capacity of access points.
6-lane of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687	B+	B+	B+	B+	Widening would increase the road capacity and reduce congestion.
2-lane with paved shoulder of Kanpur-Kabrai of NH-86.	E	E	E	D+	Will improve safety.

Cumulative Projects	Parameters				Remarks
	Traffic	Air Pollution	Accidents	Noise	
6-lane of Chakeri to Allahabad of NH-2 from km 483.687 to 628.753	B+	B+	B+	B+	Widening would increase the road capacity and reduce congestion.
ESIA/EMP/RAP for "Capacity augmentation of navigational infrastructure of NW-1 (Jal Vikas Marg)	B+	B+	B+	B+	Will have positive impact at regional level.
GoUP has planned to develop an airport of international level Taj International Airport	E	E	E	E	Insignificant
Overall Impact	B+	B+	B+	B+	
EDFC 3					
NHAI Road widening from Jalandhar to Ambala	B+	B+	B+	B+	Widening would increase the road capacity and reduce congestion.
Patiala, road connecting to villages Fategarh Sahib	E	E	E	E	Connectivity will improve
3 ROB on Existing road is proposed 6 RUB are proposed along the DFCC corridor. 1 ROB is proposed at Madapur, Fathegarh Saheb	B+	B+	B+	B+	Delay and pollution will reduce.
Overall Impact	B+	B+	B+	B+	

Source: Consultant Estimates

Impact assessment of DFCC as a stand-alone project and cumulative impact assessment of the ongoing and proposed transport infrastructure developments in the identified buffer region have been largely assessed qualitatively as per the available secondary data.

Cumulative impact assessment includes the impact from not only the transportation related infrastructure but from other developments in the buffer region as well and has been presented elsewhere in the report.

Annexure 6.2: Review of Environmental Impact Assessment of EDFC-1, 2 & 3

Introduction

Environmental impact assessment involves prediction of potential impacts by the development of the project on the surrounding area. Based on the baseline environmental status described in earlier section and the proposed project activities, potential impacts have been assessed and predicted. The impacts due to the development of the Eastern Dedicated Freight Corridor (EDFC 1, EDFC 2 &EDFC 3) have been assessed for the planning phase, construction phase and implementation phase.

Analysis of Environmental Attributes as per Baseline Scenario and Identification of Focus Impact Assessment of VECs Areas

Baseline study for each section and sub-section has been carried out during environment impact assessment study to collect the information of environmental conditions in pre-project development stage. It is found that ambient air quality is within the permissible limit as per the prescribed CPCB standards except levels of RPM. Level of RPM exceeds the prescribed limit of 100 µg/cum. Thus it is required to maintain RPM levels at site especially during construction phase. **Ambient air quality is thus a valued environmental component especially from incremental impact from particulate matter prospective.**

Noise levels have been studied along the entire alignment. Noise levels have been compared with noise standards for industrial zone as per Ambient Air Quality Standards w.r.t noise, 2000. It is found that noise levels are high during day time but within the limits during night time. Noise levels are further high when trains are passing through the tracks. Noise level varies with speed and type of train. Nature of high level noise is though intermittent but significant. Also noise will further increase during construction phase due to construction activities and operation phase due to increased movement of trains. **Thus noise is another valued environment component** on which impacts are to be studied in detail. Vibrations are recorded along the proposed segments parallel to IR track. Vibrations results during passage of the trains due to contact between train wheel and track. Nature of vibration is again intermittent like noise but significant.

Ground water quality in the area has been studied and is found to be good and potable as per IS:10500, except fluoride concentration in Mugalsarai to Bhaupur section. Care is required to be taken that contamination of ground water should not occur either during construction and operation phase as the inhabitant of villages are highly dependent on ground water for domestic and agricultural use.

Project area is a part of Ganga basin, which is largest river system on subcontinent. Proposed alignment crosses several perennial and seasonal water bodies. Water quality of these water bodies

has been assessed and compared with surface water body classification criteria of CPCB. All the water bodies are falling under category D & E[4] as the BOD levels are high.

Soil samples along the project alignment have either been taken from agricultural fields or orchard. It is found that soil are fertile and fit for agriculture. Thus the impact on soil quality will affect the soil productivity, agricultural yield, income of the farmer, production potential of the area etc. Borrow earth is proposed to be sourced from nearby agriculture fields. This will therefore be an important VECs to be studied.
A significant nos. of trees will be felled along the entire stretch. Though compensatory tree plantation is planned, however with other developments this environmental resource can be largely impacted and requires to be studied in detail as part of CIA. Thus this component is also a valued component.
Quality of life of the people will undoubtedly be impacted due to the project as the project development involves acquisition of large area of land. Land to be acquired is of agricultural, residential and commercial use. Many of the people are losing their entire land and will become landless. Many of them are completely dependent on agriculture only and are practicing agriculture since generation. These people will lose their livelihood and become unemployed. Socio-economic aspects thus will be other VECs to be assessed in detail from cumulative impact perspective.

CPRs like wells, tube wells, hand pumps, temple, mosque etc are required to be relocated. These Quality of life, income of the family, employment and displacement of families are identified valued social components that are to be studied in detail so as adequate mitigation measures to be taken to reduce the negative impact and enhancement plan can be prepared for bringing improvement.
Impacts on these identified valued environment & social components are assessed for each of the activity to be undertaken during construction and operation phase and due to other developments in the area. Impact identified due to EDFC project in the EIAs and level of impacts on these VECs are given in matrix form in following section.

4.2 Impact Assessment Methodology

Various direct and indirect impacts on VECs are identified in three EIA reports due to the project activities. Qualitative and quantitative methods are used for impacts assessment in all the three reports. The identified impacts significance is assessed following five scale criteria as presented in Table 1

Table 1: Parameter and Scale of Impact Matrix

Parameter	Scale		Remarks	
Significance	No impact	E		
	Negligible impact	D	Positive:+	Negative:-
	Insignificant impact	C	Positive:+	Negative:-
	Relatively significant impact	B	Positive:+	Negative:-
	Significant impact	A	Positive:+	Negative:-

[4]*CPCB has classified rivers on water quality basis and suitability of use as per classification. D category is considered fit for propagation of wild life, fisheries, irrigation, industrial cooling and controlled waste disposal. Whereas Category E is suitable for irrigation, industrial cooling and controlled waste disposal.*

	Significance Scale Criteria Scale A: If National Parks, Wildlife Sanctuaries or any designated natural reserve, protected species of any kind are directly affected. Scale B: If large areas of forest, grassland, cultivable land or any natural environment for tourism are indirectly affected. Scale C: If impacts are insignificant Scale D: If impacts are negligible Scale E: No impacts or not applicable for assessment

Following the above scale and impacts identified under EDFC 1,2,3 EIAs, impact significance matrix is compiled for construction and operation phase. Same are presented in table2 and 3 respectively.

Table 2 Impact Assessment-Construction Phase

No.	Items	Overall Evaluation on the Project	Pre-construction Stage			Construction Stage											
										Construction Works for railway line and related structures							
			Surveying of Planned Areas and Sites	Selection of the Project Location and Sites	Land Acquisition and Resettlement	Extraction of Building Materials (stones, aggregates, sand, soil, etc.) at Quarries and Borrow Areas	Earth Moving: Cutting and Filling of the Construction Works	Preparation of Construction Plants, and Warehouses, Work Camps, etc.	Operation of Construction Plants, Machines and Vehicles for Construction Works	(A) Construction Works for Railway Lines and Installation of Related Facilities (signals, rails, etc.)	(B) Construction Works for ICDs and Freight Logistic Parks	(C) Construction Works for Stations (Terminal, Junction and Crossing)	(D) Construction Works for ROBs and RUBs	(E) Construction Works for Bridges	(F) Construction Works for Tunnels	Localized Employment Opportunities of the Construction Works	Localized Business Opportunities Related to the Construction Works
1	Topography and Geology	C/D	D	D	D	C	C	C	C	C	C	D	D	C	E	E	C
2	Soil	C/D/E	D	D	E	B	B	C	C	C	C	B	D	D	E	E	E
3	Groundwater	D/E	D	D	C	D	D	D	D	D	D	D	D	D	E	E	E
4	Hydrological Condition	D/E	E	E	E	D	E	D	D	D	D	D	D	C	E	C	C
5	Fauna, Flora and Biodiversity	D	D	C	C	C	C	D	C	C	D	D	D	D	E	D	D
6	Protected Areas / sanctuaries	D	D	D	D	D	D	D	D	D	D	D	D	D	E	D	D
7	Landscape	D	D	D	D	D	D	D	D	D	D	D	D	D	E	D	D
8	Local Meteorological Conditions	D	D	D	D	D	D	D	D	D	D	D	D	D	E	D	D
9	Global Warming	D	D	D	D	D	D	D	D	D	D	D	D	D	E	D	D

Table 3 Impact Assessment-Operation Phase

No.	Project Activities / Items of the Environment Subject to Positive / Negative Changes	Logistic conditions of goods, raw materials, agro & industrial products	Traffic condition of roads	Operation & maintenance of railway lines & related structures	Employment opportunities (whole country / local level)	Freight oriented business opportunities	Passenger oriented business opportunities	Promoting development of surrounding areas	Increase in settlers & visitor to the project area
1	Topography and Geology	D	D	D	C	C	C	C	C
2	Soil	D	D	E	E	E	C	C	C
3	Groundwater	D	D	C	D	D	D	D	D
4	Hydrological Condition	C	C	C	D	C	D	D	C
5	Coastal and Marine Environment	E	E	E	E	E	E	E	E
6	Fauna, Flora and Biodiversity	D	C	C	C	C	D	C	C
7	Protected Areas / sanctuaries	D	D	D	D	D	D	D	D
8	Landscape	D	D	D	D	D	D	D	D
9	Local Meteorological Conditions	D	D	D	D	D	D	D	D
10	Noise and Vibration	D	D	C	E	D	D	D	E
11	Global Warming	D	D	D	D	D	D	D	D

As per the impact matrix for construction phase it is analyzed that the topography, soil, ground water, hydrology and ecology will be impacted due to project development during construction phase. Relatively significant impact is anticipated on the soil quality of the area during construction phase as soil will be excavated for construction purpose and top soil layer will be disturbed. Topography and ecology of the area will also be impacted due to construction of the raised embankment but the impact assessed is insignificant.

As per the impact matrix for operation phase it is analyzed that no significant impact on environment is anticipated during operation phase. Noise and vibration will be the most impacting resultant of the project. Project will ultimately result in reduction of emission of GHGs from the vehicles plying on the road for transportation of material due to shortage of the freight transportation facility. Impacts due to the project on each of environment and social attribute are summarized in the **Table 4** below.

Table 4 Anticipated Impacts of EDFC during Construction and Operation Phase

S. No.	Impacted Parameter	Impact During Pre-Construction & Construction Phase	Type of Impact	Impact During Operation Phase	Type of Impact
1.	Topography & Geology	• Change in topography due to construction of embankment and cutting & filling operations for construction of ROB / RUB, construction of stations and other related facilities	Permanent & negative	Insignificant	--
2.	Soil	• Increase in soil erosion due to tree felling and vegetation removal • Loss of fertile agricultural soil • Loss of soil (from borrow areas) for construction of embankment • Soil erosion from borrow area due to air and water movement • Soil pollution due to disposal of construction waste, dismantling of structures, spillage of oil, hazardous waste like used/spent oil and waste from construction labour camps	Permanent & negative Permanent & negative Permanent & negative Short term, localized and negative Short term, localized and negative	Insignificant	--
3.	Air Quality	• Generation of dust due to construction, dismantling, loading/unloading of material, transportation of material • Emissions due to plying of vehicles, running DG sets and construction machinery • Dust generation from raw material and debris storage area	Short term, localized and negative Short term, localized and negative	• Emissions from material like coal if transported in open wagons • Emissions from diesel based trains • Reduction in emissions due to transportation of material by road	Long term, negative & moderate Long term, negative & moderate Long Term, Positive and Significant

S. No.	Impacted Parameter	Impact During Pre-Construction & Construction Phase	Type of Impact	Impact During Operation Phase	Type of Impact
		• Excavation of soil from borrow areas • Emission from batching plant and pugmill (WMM plants) • Silica dust generation from laying of ballast	Short term, localized and negative Short term, localized and negative Short term, localized and negative Short term, localized and negative	• Reduction in emissions from diesel engines as track is electrified	Long Term, Positive and Significant
4.	Noise & Vibrations	• Generation of noise & vibrations due to construction, dismantling and demolition of structures, movement of vehicles, running machinery and DG sets • Generation of noise & vibrations due to excavation for under bridges & earth from borrow area • Noise generation while laying ballast on tracks • Generation of noise from batching plant	Short term, localized and negative Short term, localized and negative Short term, localized and negative Short term, localized and negative	• Noise & vibrations generation due to movement of trains on trains and whistling of trains • Noise generation while loading & unloading of materials	Intermittent, Moderate Intermittent, insignificant
5.	Water Resources	• Contamination of water quality from run-off from construction site- spillage of oil/fuel, debris, bitumen etc. • Contamination of water quality from material and waste storage yards • Contamination of water quality	Short term & negative Short term & negative Short term & negative	• Washing of the cars/wagons • Washing of station area and tracks • Disposal of sewage generated at freight stations	Long term and insignificant Long term and insignificant Long term and insignificant

S. No.	Impacted Parameter	Impact During Pre-Construction & Construction Phase	Type of Impact	Impact During Operation Phase	Type of Impact
		from labour camps • Loss of ponds • Increase in run-off due to loss of agriculture land and forest land • Water to be taken from ground & surface water sources for construction purpose may divert the water source of the inhabiting population • Discharge of water from batching plant and pugmills and other construction activities • Discharge of curing run-off from the concrete structures like culver, bridges etc.	Permanent & negative Permanent & negative Permanent &negative Permanent & negative Permanent & negative		
6.	Drainage & Hydrology	• Alteration in drainage pattern due to construction of embankment • Alteration in drainage due to construction of temporary structures like storage yards and stock piling of materials • Construction of bridges on the water body thus change in flow	Permanent & negative Temporary & negative Permanent & negative	Insignificant	--
7.	Ecology	• Loss of protected and reserved forest land • Felling of trees • Loss of habitat of birds, insects, butterflies, reptiles and other animals living in the impacted	Permanent & negative Permanent & negative Permanent & negative	• Compensatory Plantation	Permanent &positive

S. No.	Impacted Parameter	Impact During Pre-Construction & Construction Phase	Type of Impact	Impact During Operation Phase	Type of Impact
		forest area and trees • Accidents of animals	Permanent & negative		
8.	Socio-economy & Aesthetics	• Loss of livelihood of people due to loss of agriculture land • Displacement of family • Loss & relocation of common property resources like religious structure, wells, tube wells, hand pumps, kabristan, play grounds etc. • Acquisition of the private and government land, i.e. schools, kabristan, play grounds, college etc. • Disturbance to aesthetics value and scenic beauty due to set up of construction camps, labour camps, batching plants, storage yards etc. • Impact on archeological structure (BudiyakaTaal) • Excavation of soil from agriculture fields • Establishment of plant site, labour camps, batching plant, pugmilletc may impact the life of people if set up in close vicinity to residential areas, schools, colleges, community place	Permanent & negative Permanent & negative Permanent & negative Permanent & negative Permanent & negative Permanent & negative Temporary ad negative Temporary ad negative	• Enhancing the CPRs like strengthening the embankment of nearby pond, plantation near schools, development of bathing ghats nearby ponds etc as par of CSR activity • Increase in freight movement & thus revenue generation • Development of DFC which will reduce the burden from IR track and thus no. of passenger trains will increase significantly and thus improved connectivity • Reduction in traffic congestion as the material can be more quickly and efficiently will be transported through DFC • Reduction in air pollution • Generation of direct & indirect employment • Development of industries like TPP, warehouses, logistics etc. near to the DFC • Enhanced connect with Inland Waterways • Assistance in adopting alternate livelihood • Industrial development (larger focus is on manufacturing industry development); • Housing for a larger population (including affordable housing);	Permanent & positive Permanent & positive Permanent & positive Permanent & positive Permanent & positive Permanent & positive Permanent & positive

S. No.	Impacted Parameter	Impact During Pre-Construction & Construction Phase	Type of Impact	Impact During Operation Phase	Type of Impact
				• Better and improved connectivity to other modes of transport like National Highways, State Highways, Major District Roads, Other Roads, Inland Waterways with the DFCCIL; • Larger economic opportunities leading directly to increased access to livelihood opportunities (increasing employability); • Introducing Transit Oriented Development to address issues related to mass transit systems which would be the necessity and fallout of all the above identified developments; • Emphasis on revising existing policies or introducing new policies to address and facilitate this development scenario; • Larger responsibility of the Urban Local Bodies and Planning departments to facilitate and accelerate this development agenda; • Increased involvement of local population in the development planning and implementation along with operation and maintenance. and • Institutional development, capacity building and training to the Urban Local bodies and	Positive

S. No.	Impacted Parameter	Impact During Pre-Construction & Construction Phase	Type of Impact	Impact During Operation Phase	Type of Impact
				other line departments that would be part of this development situation (this includes the revenue departments, the PHED, the power departments, etc.) • Overall Economic development on a micro and macro level.	
9.	Energy Conservation	• Usage of low energy intensive construction material like fly ash mixed cement & bricks • Re-usage of construction debris • Preventing idling of vehicles • No wastage of water and electricity at site • Obtaining temporary power connections during construction and running DG sets only during power failure • Usage of CFL/LED for lightning	Positive Positive Positive Positive Positive Positive	• Provision of solar lightning in station area in ratio of 1:3 • Installation of solar panels on roof-top area of station building to harness solar energy	Positive Positive

Conclusion

Impact analysis based on EIA& SA studies indicate that VECs impacted during construction and operation stage include air, water (surface & ground), soil, land, ecology & socioeconomics consisting of loss of land and community resources. Loss of land and community resources requires relocation, rehabilitation and resettlement. All the above mentioned impacted VECs need to be assessed considering the other direct, indirect and induced activities and their zone of influence in the context of proposed development.

Annexure - 6.3: Cumulative Impact Assessment-Socio-Economic Environment

INTRODUCTION:

Cumulative Impacts on the socio-economic environment has been assessed for the study area. Study area has been well defined in the chapter 3 of the CIA report. For Cumulative Socio-Economic Impact Assessment, in addition to data available for study area, district level data has also been used. List of the districts through which EDFC will traverse is given in Table 1. Also list of the stations proposed on the EDFC alignment is given in Table 2 below. The developments proposed to be taken along the corridor will be on an increased percentage when compared to the other parts of the developments within the 10 km radius of the corridor. Detailed impact assessment study has been undertaken to assess the cumulative impacts of these developments in the study area.

Table 1: State and Districts through which the EDFC corridor is traversing

No.	Name of the Districts	State
I	**EDFC 1 districts – Bhaupur to Khurja**	
1	Kanpur Dehat	Uttar Pradesh
2	Auraiya	
3	Etawah	
4	Firozabad	
5	Hathras	
6	Agra	
7	Aligarh	
8	Bulandshehar	
II	**EDFC 2 districts – Kanpur – Mughalsarai**	
1	Kanpur Nagar	Uttar Pradesh
2	Kanpur Dehat	
3	Fathepur	
4	Kaushambi	
5	Allahabad	
6	Mirzapur	
7	Chanduli	
III	**EDFC 3 - Ludhiana – Khurja – Dadri**	
1	Ghaziabad	Uttar Pradesh
2	Meerut	
3	Hapur	
4	Muzzaffarnagar	
5	Bulandshahr	
6	Saharanpur	
7	Yamunanagar	Haryana
8	Ambala	
9	Fatehgarh Sahib	Punjab
10	Patiala	
11	Ludhiana	

Table 2: List of Station Proposed Along EDFC Alignment

S. No.	Name	S. No.	Name
1	Chawapail	**34**	Maman
2	Khanna	**35**	Khurja

S. No.	Name	S. No.	Name
3	Mandi Govindgarh	**36**	Daudkhan
4	Sarai Bangara	**37**	Tundla
5	Sirhind	**38**	Hathras
6	Shambhu	**39**	Makhanpur
7	Ambala City	**40**	Bhadan
8	Dukheri	**41**	Ekdil
9	Kesri	**42**	Achalda
10	Bapara	**43**	Kanchausi
11	Darazpur	**44**	Bhaupur
12	Jagadhari	**45**	Bhimsen
13	Kalanaur	**46**	Kanpur
14	Pilkhani	**47**	Malwan
15	Saharanpur	**48**	Rasulabad
16	Tapri	**49**	Sujatpur
17	Talheri Buzurg	**50**	Manauri
18	Deobanda	**51**	Karchhana
19	Muzafar Nagar	**52**	Unchidih
20	Bamanheri	**53**	Mirzapur
21	Rohankalan	**54**	Dagmagpur
22	Mansurpur	**55**	Ahraura Road
23	Sakoti Tanda	**56**	Mughalsarai
24	Khatauli	**57**	Ganjkhwaja
25	Daurala	**58**	Durgawati
26	Meerut City	**59**	Kudra
27	Partappur	**60**	Sasaram
28	Nurnagar	**61**	Karwandiya
29	Kaili	**62**	Sonnagar
30	Hapur	**63**	Gomoh
31	Gulaothi	**64**	Dankuni
32	Chaprawat	**65**	Andal
33	Bulandshahr	**66**	Chamrawali Bodaki

METHODOLOGY OF IMPACT ASSESSMENT

The methodology adopted to gather information for assessing the cumulative impacts is detailed in this section of the report. The impacts on VECs were identified from two sources, these are primary stakeholder meetings and secondary published information as gathered during the stakeholder discussions and from the other sources like the websites (internet) of the government of India and respective state departments.

The stakeholders were contacted in the three corridors by dedicated teams comprising of social scientists. These team enlisted the districts through which each corridor is traversing and accordingly listed the various stakeholders as per the VECs identified, which included:

- Industries
- Transportation sector
- Real estate sector (housing)
- Land use of the region (irrigation, power, health infrastructure or other department projects)

In order to conduct these meetings the teams designed checklists for each category of stakeholder which was utilized as a tool for data collection. In this context the assessment of the cumulative positive and adverse impacts has been identified. This section of the report elaborates the assessment carried out which not only provides the background of the assessment, but also provides an insight into the various positive and adversaries that could accrue to the region as an entity due to only the DFCCIL corridor, but also the other infrastructure developments that are being implemented or proposed to be implemented in the vicinity of the DFCCIL project.

IMPACT ASSESSMENT

The various developments that exist, planned or proposed necessarily accrue positive or adverse impacts to the communities living in the region and also cause influx by way of in-migration to these development centres. These development centers could be those that have been planned or presently exist which will either expand the urban landscape of existing two-tier towns or three-tier towns across the corridor apart from the metropolitan areas. These developments will also pave the way for creating new townships or semi-urban or urban centers across the DFCCIL corridor due to the extent of allied activities that is envisaged to be mushrooming especially at the stations, linkage points to the other modes of transport, vicinity of industrial settlements, etc.

The existing centre would be further pressured with an influx of all categories of labor (skilled, semi-skilled and unskilled) which is generally the rural population. Though agriculture has been the main stay of the population of this North Indian belt, the development of the corridor triggering various other large economic developments will definitely encourage the rural productive population to migrate and settle around such developments due to the ease of attaining employment at all levels (skilled, semi-skilled and unskilled).

Thus the *economic development* will lead to increased *livelihood opportunities*. This means these centre will have high employability and encourage individuals to become *entrepreneurs* with increase in demand for allied activities at these locations. These centres will provide opportunities for the productive population to enhance their skills through available skill training facilities in these locations (an allied activity that will be established due to the local demand for skilled labor). These could be *skill development centre* established by the government or private industry, overall leading to increase in *demand for the services sector* in general.

Larger influx of population will lead to high demand in housing which would require the local government and private developers from the real estate/housing sector to bring in more *low cost affordable housing facilities* to these centres.

Better employment opportunities will have a direct relationship with raise in liquid money in the hands of the local population due to *stable or increased incomes*. This will lead to *higher purchasing power* in turn having a direct impact on demand for goods and commodities which will give an impetus to the *manufacturing sector*.

The increase in urbanization or semi-urban and its stresses on the population will demand for access to health facilities locally. Thus the improvement to the *health infrastructure* both by government and the private industry will open up another sector of opportunities in the region.

The other major sector that will feel the pressure is the energy requirement to these urban centres. The demand will be to cater to industrial, commercial, domestic and civic amenities across the corridor. The DFCCIL will also need a dedicated energy arrangement for efficient functioning. All this will put pressure on the power companies, both generation and transmission and distribution sectors. Thus a need to look at *non-conventional sources of energy*, especially solar followed up by hydel and wind energy would be important.

The impacts have been classified under three categories as discussed above. In this order the impacts include:

DFCCIL Corridor and related direct impacts

The DFCCIL corridor development will have a large land acquisition impact and impact to the local communities losing their properties in the form of land or structures and to some extent their livelihood sources due to loss of productive agriculture land. In this context the project proponent (DFCCIL) has carried out the Social Impact Assessment of the entire corridor that would require land for the purpose of the railway track and the stations along the corridor.

The cumulative impacts have been assessed from the point of various projects that are being proposed or in the implementation stage across this DFCCIL corridor. However, the impacts along this entire section of the DFCCIL collectively indicate that there would be about 5529 ha of land being acquired with 39,912 families being affected. Along with this there are about 712 structures belonging to the BPL category being affected and 52,969 vulnerable project affected persons due to the project development.

Table 6 Key impacts

Key Impacts							
Description of impacts	Mughalsarai – Bhaupur – Khurja Section	Khurja Dadri Section	Bhaupur-Khurja Section	Kaurara Chamro la Section	Khurja to Pilkhani	Pilkhani to Sanehwal	Total
Land Acquisition in Ha.	1400	211.67	1182	1648	732.91	355.34	5529.92
No.of PAFs	13034	1974	8126	1745	11,982	3051	39912
Landless	329	4	38	1345	80	25	1821
Small	821	298	1706	461	220	228	3734
Marginal	674	392	4212	955	416	1231	7880
TH(Residential)	264	52	173	64	282	134	969
TH(Commercial)	14	25	53	10	46	51	199
NTH(Residential)	166	0	123	15	52	83	439
NTH(Commercial)	84	0	26	0	72	56	238
Tenants	15	0	31	0	26	0	72
Kiosk	25	4	63	8	0	0	100

BPL(Land)	1765	111	5126	248	0	95	7345
BPL(Structure)	215	11	162	0	0	324	712
Vulnerable PAPs	20714	932	15493	1856	13920	54	52969
CPRS	55	14	22	56	0	8	155

The impacts from other development projects corridor wise – EDFC 1, 2 and 3 is discussed in the sections below.

Impacts with the districts through which the DFCCIL corridor is traversing

However this project development will also bring in a lot of other developments which would be positive to the region and the corridor in particular. In accordance with this the other developments that have been identified along the corridor in accordance with the identified VECs is discussed in the ensuing section of this report.

Thus this section of the CIA would provide us with an understanding of the social impacts from both positive and adverse, due to the DFCCIL project and the impacts due to the other VECs.
The overall impact from the positive perspective of the DFC development and our identified developments or VECs is:

- Industrial development (larger focus is on manufacturing industry development);
- Housing for a larger population (including affordable housing);
- Better and improved connectivity to other modes of transport like National Highways, State Highways, Major District Roads, Other Roads, Inland Waterways with the DFCCIL;
- Larger economic opportunities leading directly to increased access to livelihood opportunities (increasing employability);
- Introducing Transit Oriented Development to address issues related to mass transit systems which would be the necessity and fallout of all the above identified developments;
- Emphasis on revising existing policies or introducing new policies to address and facilitate this development scenario;
- Larger responsibility of the Urban Local Bodies and Planning departments to facilitate and accelerate this development agenda;
- Increased involvement of local population in the development planning and implementation along with operation and maintenance. and
- Institutional development, capacity building and training to the Urban Local bodies and other line departments that would be part of this development situation (this includes the revenue departments, the PHED, the power departments, etc.)
- Overall Economic development on a micro and macro level.

The VEC wise identification of the developments, both existing and proposed) along the EDFC have been elucidated here from both primary field visits (through contacts of various stakeholder and available secondary sources) include:

- **Industries**

The dedicated freight corridor has been generally designed to accommodate various industrial growth centres and provide dedicated cargo movement along its stretch. This corridor would reduce or eliminate the pressure of the present cargo movement on the existing railway sector. In view of this when we examine the EDFC 1 & 2 corridors it is found to be traversing through the traditional industrial centre of Uttar Pradesh (UP), these have also been identified by different studies as future industrial growth centre. The initial section of the EDFC 3 also covers parts of UP leading to the States of Haryana and Punjab wherein the corridor again traverses the industrial locations or districts with industrial concentrations.

Amongst the other studies, M/s Deloitte Touche Tohmatsu India Private Limited[5] has conducted a study for the UP section of the DFCCIL which emphasis the economic growth centre as mentioned above.

The various industrial developments that have been identified which provide an understanding of the category of developments and will bring in both positive and adverse impacts. A brief note on the proposed developments includes:

EDFC 1

The various projects and developments existing or proposed to be implemented along this stretch of the EDFC corridor include:

- Existing Plastic city, Auraiya
- *Logistic parks* on important EDFC stations like Bhaupur, Ekdil
- *Multi – Modal Economic Zones* proposed between Auriaya and Etwah
- *Industrial belts* proposed near every major junction of DFCCIL (proposal for notify 5 km strip near EDFC-1 sent to GoUP from UPSIDC to ensure organized industrial development and to prevent haphazard LA for development by private parties) 11 hi –tech townships and 31 integrated townships are being developed by private developers in major cities of the state.
- *National Manufacturing Investment Zone* being planned each in Jhansi and Auraiya
- Shortlisted Projects Dadri – Noida – Ghaziabad *Investment Region*
- Meerut – Muzaffarnagar *Manufacturing Zone*
- *Multimodal Logistic Hub* at Dadri
- *High tech Industrial Township*
- *High speed connectivity* between Investment Region and New Delhi
- *Modern Rail Terminal* at Boraki, Greater Noida -_Government of Uttar Pradesh has proposed development of Boraki Railway Station as the major passenger and goods based rail terminal with state-of-the-art infrastructure through public private partnership. It is expected to serve as convenient location for evacuation of goods from Delhi/Ghaziabad region and help in decongesting the rail terminals. Boraki Railway Station is close to the proposed 2500 Acre SEZ, 1000 Acre Handicraft SEZ, Container Depot at Dadri. Moreover, Boraki Rail Terminal is proposed to be connected to the Container Depot at Tughlakabad with a new

[5] *Preparation of a detailed regional economic analysis study of three sub-regional growth centers in Uttar Pradesh, September 2014.*

alignment that connects with Noida as well. The state government has already received in-principle approval from the Ministry of Railways

- *Free Trade Warehousing Zones* - Foreign Trade Policy 2004, has announced development of Free Trade Warehousing Zones (FTWZs) to increase the percentage share of global merchandise trade in India. Free Trade Warehousing Zones are proposed to be located in six locations across India including, Greater NOIDA.
- *Integrated Logistics Hub* - Expansion of the existing Inland Container Depot at Dadri and establishment of a Logistic Park have been proposed
- *Meerut-Muzaffarnagar Industrial Area* - The proposed Meerut-Muzaffarnagar Industrial Area would be located at a distance of 100 to 150km from Delhi, the National Capital. This region has good connectivity by road (NH-58 and other State Highways) and rail (Delhi-Meerut-Lucknow/Saharanpur) to rest of the State and India.
- CONCOR has acquired land near Maitha station to establish Container Depot (proposal already sent from UPSIDC).

EDFC – 2

The various projects and developments existing or proposed to be implemented along this stretch of the EDFC corridor include:

Existing ***Industries***

At Chandauli

- Flour Mills, Chandauli
- Coal Mills, Chandauli
- Rice Mills, Chandauli
- Plastic bag manufacturing industries

At Kaushambi

- Vivek brick Sheld (Bhatta), Dhuayan
- Flour Mill, Bharwari

Ongoing Industries in Chandauli

- Matrix Roller Mill-Jivnathpur, Rampur
- Coke Industries,
- S.A. Iron-Junadpur,
- M.K. Biscuits-B-18,
- Alaknanda Cement Pvt. Ltd.-Industrial Corridor,
- Swastic Cement Products-Industrial Area-Patnva Ramnagar.

Ongoing Industrial Projects in Mirzapur:

- - Mini Industrial Estate in Pathrayya
- - Mini Industrial Estate in Chunar
- - Mini Industrial Estate in Khimaipur
- - Mini Industrial Estate in Ghatampur
- - Mini Industrial Estate in Rajgarh

- - Mini Industrial Estate in Marhyan
- - Mini Industrial Estate in Ram Nagar
- - Mini Industrial Estate in Sikri
- - Mini Industrial Estate in Sadar

Ongoing Industrial Projects in Kaushambi:

- Shiv Rice Mill, Sirathu - Ongoing
- New Shiv Rice Mill, Sirathu - Ongoing

Ruma Industrial Area, Kanpur

- Textile **& Hosiery Park at Ruma**: UPSIDC has set up Textile & Hosiery Park at Ruma in district Kanpur with industry specific infrastructure, textile training centre, fashion design centre, and quality control laboratory.

Proposed projects - Special Economic Zones

- Name of Company: UPSIDC
  Sector: Textile
  Area: 103.72 Hectare
  Formal Approval: 19.06.2007
  Address: A-1/4, Lakhanpur, Kanpur-208 024
- Name of Company: UPSIDC
  Sector: Leather
  Area: 103.85 Hectare
  Formal Approval: 19.06.2007
  Address: A-1/4, Lakhanpur, Kanpur-208 024
- Name of Company: UPSIDC
  Sector: Engineering goods
  Area: 102.75 Hectare
  Formal Approval: 19.06.2007
  Address: A-1/4, Lakhanpur, Kanpur-208 024
- Name of Company: M/s Jhunjhunwala Vanaspati Ltd.
  Area: 103.63 Hectare
  Sector: Multiservice SEZ with FTWZ
  Formal Approval: 02.01.2008
  Address: Sahupuri, Chandauli
- Name of Company: M/s. Proto Developers & Technology Ltd.
  District: Chandauli/Varanasi
  Sector: IT/ITES
  Formal Approval:
  Recommendation sent by GoUP for In-Principle approval to GoI on 14.03.08

Logistic Park

- Dedicated Freight Corridor Corporation of India has proposed to provide rail connectivity to a Logistic Park proposed at Kanpur, which is to be built in PPP mode.

Industrial Corridor

Amritsar - Delhi - Kolkata Industrial Corridor (ADKIC)

- Mughalsari-Varansai-Mirjapur Investment Zone (3000 hectares)
- Allahabad-Naini-Bara Investment Zone (3000 hectares)
- Kanpur Logistics hub (6000 hectares)

Miscellaneous Proposed Industries in Chandauli

- D.K. Engineering Works, Phase-II Industrial Area
- Ganesh Plastic Udyog, Patanwa
- Shanda Punj Fuel Coke Pvt. Ltd., Patanwa.

Proposed Industrial Projects in Mirzapur:

- South Vidhyanchal Industrial Area to be developed but it is yet not finalized.

Proposed Industrial Projects in Kaushambi:

- Raj Coal storage, Sayara, Mithapur (Permission has not been given by the railway)
- Kaushambi Rice Mill, Rosulpur, Girsa- Propose

EDFC 3

The various projects and developments existing or proposed to be implemented along this stretch of the EDFC corridor include:

Existing projects

- Registered Micro & Small Units No. 39091
- 2. Registered Medium & Large Units No. 116
- 6 – Industrial zones
- Pristine Inland Container Depot, Ludhiana (in the final stage)

Proposed Projects

- Duraha: Industrial Textile Park near existing industrial point
- Tanansu: Industrial Focal Point where 350 ha land is acquired
- **Proposed Initiatives of Haryana State Government -** As part of development of the proposed Western Peripheral Expressway (Kundli- Manesar-Palwal Expressway), the Government of Haryana has proposed development of Dry Port in the vicinity of Palwal over an area of 2 Sq km (200 Ha). In addition, the state government is also contemplating setting up Logistics Park at Rewari/ Bawal to cater to the region's requirements.
- **Transportation sector**

The road network that is connecting across these three states is quite extensive, however it is important to understand the network that already exists along the proposed DFCCIL EDFC 1, 2 &3 and examine the necessary linkages to the three corridors by way of State Highways and National Highways.

There are various National Highways (NH) that either connected to the DFCCIL corridor by design or are proposed to be connected for ease in cargo movement and shifting the cargo from one mode to the other with larger access. In this context the NH-1 and 2 are the most important NH road

corridors which are the major carriers of cargo presently along with the existing railway network and partially the Inland water (National Water No.1 – which is the Ganga River).

Further to this there are various State Highways (SH) of the respective states that have been developed or in the stage of being developed. These SH will also be connected to the DFCCIL corridor.

These NH and SH connectivity will provide the last mile connectivity to the cargo movement from the DFCCIL corridor to the logistic parks and from the sources of cargo generation to the various industrial centres or the consumer markets across this corridor. The various projects in this sector include:

- List of **National Highways** in the connecting the EDFC corridors within the corridors it is traversing are provided below corridor wise.

EDFC- 1

No.	Existing Districts	National Highway
1	Kanpur Dehat	NH-3
2	Auraiya	NH-3
3	Etawah	NH-3 and NH-92 (Ethwa to Gawaliar)
4	Firojabad	NH-2
5	Hathras	NH-2
6	Agra	NH-2, NH-3 and NH-93 (Agra to Muradabad)
7	Aligarh	NH-2
8	Bulandshahar	NH-2
9	Gautam budh nagar	NH-2

EDFC -2

No.	Existing Districts	National Highway
1	Rambainagar	NH-2
2	Kanpur Nagar	NH-2
3	Fathepur	NH-2
4	Kaushambhi	NH-2
5	Allahabad	NH-2 and NH-96 Allahabad to Partapgarh
6	Mirjapur	NH-2
7	Chaundoli	NH-2

EDFCL-3

No.	Existing District	National Highway
1	Ghaziabad	NH-58 and NH-24
2	Meerut	NH-58 and NH-119 Meerut to Najibabad
3	Mujafarnagar	NH-58
4	Saharanpur	NH-73
5	Yamunagar	NH-73
6	Ambala	NH-1 and 21A to Chandigarh andNH-1 To Delhi
7	Fathegarhsahib	NH-1
8	Patiala	NH-1
9	Ludhiana	NH-1 and NH-95 Connecting Ludhiana to Chandigarh

In addition to these projects the other developments in the transportation sector include:

EDFC 1

The various proposed transportation related projects along this corridor include:

- Major transport companies of Kanpur are proposing to establish their units near Rania.
- Lucknow-Agra Express way (LA already started)
- 43 National Highways connect it with 9 neighboring states and other parts of India
- Largest railway network in the country spanning over 8,763 KM
- 6 Domestic Airports at Agra, Allahabad, Gorakhpur, Kanpur, Lucknow and Varanasi and 1 international airport at Lucknow
- Investment worth INR 23000 crore planned for 2500 km of state highway projects
- 6730 km identified as core network by World Bank , of which 2466 km has been developed by UPPWD

- Concession agreement signed for 4 roads of 463 km , costing INR 3867 crore
- Feasibility study has been completed and proposals for VGF are being sent to GoI for 11 roads of 977 km , costing about INR 7129 crore.
- Buddh International Circuit in Greater Noida with 5.14 Km length spread across an area of 875 acres is India's only circuit for F1 motor racing
- Airports on PPP model – near Agra in the vicinity of DMIC to provide facility of dry-cargo transport along with aircraft maintenance hub and at Kushinagar in eastern Uttar Pradesh to promote industrial development and tourism
- Boraki Integrated Transport Hub
- Rail side Warehousing Complexes - In order to augment the utilization of railway transportation system and facilitate cost-effective and efficient operation for freight distribution, the Central Warehousing Corporation of India (CWC) in association with Ministry of Railways have evolved the concept of Rail side warehousing facilities so as to ensure value added services viz. provision of total logistics solutions, avoiding of multiple handling of goods, curtailing of handling cost and offering hassle free efficient operation, to the users of rail transport system. Accordingly, the CWC and Railway Ministry have identified 22 strategic locations for development rail side warehousing complexes. One of them is to be located at Shakur Basti and Ghaziabad in Northern Railway Region, the NCR of Delhi.
- *Feeder Road Links*: It is important to note that widening and strengthening of National Highways is being undertaken by the National Highways Authority of India (NHAI). Based on the detailed feasibility study for the node, relevant augmentation measures for National Highways could be put forward to the NHAI for approvals. However, development of Regional linkages connecting the identified investment region with NHDP corridors, DFC and Hinterland is the prerogative of the state government. However, based on the preliminary assessment, development of the following linkages is envisaged: - Providing linkage to NH-24 and NH-58.
  - Augmentation of State Highway connecting Ghaziabad-Aligarh-Agra.
  - Connectivity to Greater Noida/Delhi and Faridabad/NH2 and to Faridabad-Noida-Ghaziabad and Kundli-Ghaziabad Expressways.

Development of requisite grade separators/flyovers/interchanges and underpasses along the National Highways/ State Highways and access roads for uninterrupted freight and passenger movement to the region would also be included in the development of feeder links.
UPPWD has sent a proposal to CM's office, GoUP of six state highways under UP state sub-road project to GoUP to link the EDFC-I stations to National highways with the support of the World Bank under road project.(A study by the World Bank on feasibility of these state highways have already been undertaken).

EDFC 2

Ongoing Projects in Chandauli District:
5. Six laning of NH-2, Client: NHAI
6. Widening of Sayyed Raza Jamnia road, Client: NH Division, Banaras

Ongoing Projects in Allahabad District:

1. Yamuna bridge new section starts from 4.878 to 458.000 in Allahabad.
2. 2-lane with paved shoulder (both side widening each 1.5m) of other roads in this district.

Others projects in the districts through which the EDFC 2 is traversing includes:

Chandauli District:

3. Strengthening of Chandauli-Sakaldiha-Saidpur road SH-69.
4. Widening works of ROB Bichhyya crossing, CDO office to Sakaldiha road.

Kanpur District:

- 6-lane of Etawa-Chakeri section of NH-2 from km 323.475 to km 483.687
- 2-lane with paved shoulder of Kanpur-Kabrai of NH-86. (PCOD issued on 5 May)
- 6-lane of Chakeri to Allahabad of NH-2 from km 483.687 to 628.753.

Waterways

Development of the *National Waterway 1* (which is also called the Jal Marg Vikas) is being carried out which will enable sharing the cargo movement from the DFCCIL and Road transportation to the water way. Water ways have been indicated to be a cheaper mode of transport when compared to both railway and road ways. Thus this brings an integrated approach between the road, railway and water modes of transportation.

Airports

Taj International Airport[6] **-** GoUP has planned to develop an airport of international level to meet out the urgent need to cater domestic and foreign tourists. Department of Tourism is acting as nodal agency. The said airport is proposed to be developed Public Private Partnership mode on DBFOT basis. The consultant for the project has been selected. The demand for tourism will subsequently bring in allied activity development in the region. This would facilitate further economic development and livelihood opportunities to the local communities in the region.

EDFC 3

- 3 ROB on Existing roads is proposed in the Haryana section.
- 6 RUB are proposed along the DFCC corridor in the Haryana and Punjab section.
- 1 ROB is proposed at Madapur, Fathegarh Saheb (Asian Highway - AH1 traverses through this location)
- NH-1 Road widening from Jalandhar to Ambala.

These developments will ensure better traffic movement along the DFCCIL corridor with an integrated transport development approach.

- **Real estate sector (housing)**

The growth centers will itself bring in a large influx of population from different parts of the country in the form of skilled, semi-skilled or unskilled labor. This influx will not only bring in demand for various categories of residential requirements, but also put pressure on the existing residential colonies/centers or bring in a spurt of unauthorized settlements within the periphery of these growth centers.

[6] *The Taj International Airport is a proposed international airport to be built at Kurikupa near Hirangaon, Tundla in Firozabad district, Uttar Pradesh.*

The industrial growth centers will have a direct impact on the housing sector needs catering to all the sections of the labor class. This brings in the need to look at affordable housing within the vicinity of these growth centers so that the transportation demands of this population is limited. Approaches related to *Transit Oriented Development* (TOD) should be promoted from inception of these centers from existing levels to the next level as being proposed by each of the State Government's. This would reduce the pressure on existing local transportation infrastructure also.

The housing demand will have a direct impact on the availability of land for such large population that is expected to be concentrating at the identified and spill over[7] locations. This would have a large impact on the local resources like drinking water, energy and waste management.

There are various projects with regard to real estate developments these include those that presently exist and those that are proposed within the EDFC corridors. These projects include:

EDFC 1

- Private Housing colonies near Plastic cities which is already existing
- Affordable housing policy has been developed by the State of Uttar Pradesh which would enable to promote affordable housing projects in the region.

EDFC 3

- Fatehgarh master plan is for 10 years and 200 mtrs on either side of NH1 has been planned for mix land use.
- DFCC corridor has already been considered while developing the current master plan of the State governments.

The integration of the housing and TOD approach will provide for appropriate mix of transit for the local population and reduce the pressure on the local road infrastructure by way of limiting the use of private transport vehicles and increase dependence on available *mass transit* services from place of stay to the place of work. This will increase the productivity levels due to the fact that the people do not have to plan their movement to and from work places as a major activity and improves quality of life.

The pressure for providing affordable housing at all these centres is high and should be promoted as positive growth factor. In case such affordable projects are not implemented then we could see the mushrooming of *unauthorized colonies* around the industrial growth centres which would become difficult to provide basic amenities due to uncontrolled and unorganized pattern of development and constructions.

- **Land use of the region (water resources, power, health infrastructure, knowledge infrastructure or other department projects)**

In addition to the above VECs the projects related to water resources development, power systems establishment and health infrastructure development will necessarily have a large impact on the land use of the region. In this process we have the various projects which are related to the following:

[7] The *spill over effect* could be either a result of over concentration in one location and could lead to both authorised and unauthorised settlements.

a) Water sector Projects

Water resources projects that are being developed as part of the *water sector restructuring projects* in each of the states, *integrated water shed development* projects, *rural water supply* projects, etc. that are being implemented extensively to optimize the utility of every drop of water and to provide the basic amenity of drinking to the rural areas.

- Water restructuring projects (WRC)
- Integrated watershed management projects (IWMP)
- Rural water supply projects (RWS)

These water restructuring projects have facilitated in improving the existing irrigation infrastructure which was getting deteriorated or depleted. Further the performance of the existing irrigation systems was below optimum, thus in order to enhance their performance and increase the utility of every drop of water these projects have been taken across the country. These projects have been planned and initiated in the early 2000s and is being implemented in all the states through which the DFCCIL corridor is being implemented. Thus, the demand of productive land for construction of new canal systems included the distributaries. These projects have enabled to provide equity in water supply for irrigation which was earlier being exploited by a few large farmers at the head reach or the mid reach of the canal system. Thus the tail end farmers have been benefitted due to these projects.
In this context the locations where in the canal systems are being implemented in UP (UPWSRP II) need to be considered for appropriate measures to be adopted in terms of structures with *appropriate hydrological studies* so that the canal systems are not distributed and further protection from the *contamination and waste disposal perspective*.

In case of *Water resource improvement projects* the national level program of *Integrated Water Resources Management* includes domestic water and sanitation sub-sector[8]. This includes the watershed development and also water supply projects providing for potable drinking water supply to various rural areas and the urban centres across the three states wherein the DFCCIL is traversing. These projects are important as further enhancement of water resources is necessary due to the increased demand that would be confronted due to the industrialization and housing projects proposed in this region. The pressure would be equal to agriculture water demands. Thus projects with water recycling facilities must be promoted with minimum water utilization. The waste disposal should also be managed to avoid contaminating the water courses and nalas across the growth centres which would lead to further health issues to the local communities by way of spreading communicable or epidemic diseases.

The other major issue to be understood is the problem of open defecation which has been the largest killer in India (highest percentage of deaths in the World is attributed to India in this context). The necessity of providing toilets and water supply to these facilities is important. Thus the water supply could be of two types – one is potable water for drinking purposes and second the recycled water for other purposes like cleaning and washing, etc., in households or even in industries.

[8] *Integrated Water Resources Management and the domestic water and sanitation sub-sector, Thematic Overview Paper By: Patrick Moriarty (IRC) and John Butterworth (NRI) and Charles Batchelor, 2004, IRC International Water and Sanitation Centre*

IWRM has emerged during the last decade as a response to the 'water crisis': the widespread and well-articulated concern that the planet's freshwater resources are coming under increasingly unsustainable pressure from rising populations, growing demands for water and increasing pollution.

EDFC 2

Existing projects

Dams in Chandauli

6. Naugarh Dam
7. Mushakhard Dam
8. Chandraprabha Dam
9. Latifshah Dam
10. Bhaisoda Dam

Dams in Mirzapur

- Adwa Dam, 1978
- Ahraura Dam, 1955

Dams in Allahabad

- Bachara Dam, Meja, 1980

Canal

4. Chandraprabha Canal, Chandauli
5. Mushakhad Canal, Chandauli
6. Narayanpur Lift Canal, Chandauli

Ongoing Dam projects

- Banjari Kalan Dam, Allahabad
- Dam project in Khesampur village

EDFC 3

Lining of two canals is in progress.

- Sarhind canal
- Sitma canal

b) Power projects

In the behest to cater to the ***energy demand*** in each of the states where the DFCCIL corridor is traversing the Power Departments of each of these three states and the Power Grid of India is in the process of developing large scale sub-stations and long distance transmission and distribution lines across the country including the states of UP, Haryana and Punjab. This sector improvement becomes important as energy demand would further increase due to the industrial development that the corridor development is going to infest. The demand will also be high from the housing development across the corridor to the new semi-urban or urbanization that is envisaged across the corridor. The DFCCIL movement will itself depend on large scale electrification due its demand for operations.

EDFC 1

There are projects being implemented for two major substations at Kurukshetra and a proposed substation near Nitawali station.

EDFC 2

Existing projects

- 132 KV Power Substation, Near Vikas Bhawan, Chandauli.
- 25 MW Captive Power Plant at Sahupuri in Chandauli

Implementation Stage

- Mirzapur Thermal Power Plant in implementation stage.
- Kanpur Thermal Power Plant in implementation stage.
- Lalitpur Kanpur Dehat Thermal Power Plant in implementation stage.

Proposed Projects

- **Meja Thermal Power Station (3x660 MW), Allahabad:-** is an upcoming coal-based Thermal Power Plant located in Meja Tehsil in Allahabad district, Uttar Pradesh. The power plant is owned by the Meja Urja Nigam Private Limited (MUNPL) a joint venture between NTPC Limited and Uttar Pradesh Rajya Vidyut Utpadan Nigam.
- **Karchana Thermal Power Station (2x660 MW), Allahabad:-** is a proposed coal-based Thermal Power Plant located in Bara Tehsil in Allahabad district, Uttar Pradesh. The power plant will be owned and operated by Uttar Pradesh Rajya Vidyut Utpadan Nigam.
- **Bara Thermal Power Station (3X660 MW), Allahabad:-** is an upcoming coal-based thermal power plant located in Bara Tehsil in Allahabad district, Uttar Pradesh. The power plant is owned by Prayagraj Power Generation, a subsidiary of the Jaypee Group. The estimated cost of the project is INR 12,000 crores.
- **Anpara D Thermal Power Station (2x500 MW):-** Under State government's flagship power-generation company UPRVUNL, a new unit Anpara D is under construction in full swing. Units are configured for generating 2x500 MW and are manufactured by BHEL. Anpara Thermal Power Station is located at Anpara in Sonbhadra district in Uttar Pradesh, about 200 km (120 mi) from Varanasi on the Varanasi - Shakti Nagar route.

EDFC 3

- Major initiatives in the DMIC influence area include power plants at Hissar (1200MW Coal based plant in Haryana).

c) Health infrastructure

In order to provide a better quality of life the necessity of better ***health infrastructure*** will be required. In this context the government is improving the existing health infrastructure at both the urban and the rural level. There have been various health infrastructure systems improvement projects undertaken in the respective states. There are further similar projects in progress and would enhance the health facilities across the region. The demand for both basic and better high quality health infrastructure will increase with the concentrated

In addition to this the growth centres will also attract private health facilities which would be of different categories, there would *commercial health facilities, charitable health facilities and affordable health facilities* across the corridor locations. The necessity of affordable health facilities will be very much necessary as the influx of population to the growth centres would belong to the different sections of the middle income groups or lower income groups. The affordable health infrastructure will be

required to be integrated with the affordable housing facilities in general and around industrial centres along the corridor.

- Health systems development projects
- Affordable health facilities – urban and rural

d) Knowledge Infrastructure

In order to cater to the livelihood demand that is being visualized due to the various categories of developments like industrialization, real estate construction demand, water resources development, power systems improvement, health infrastructure and systems demand there is a need to develop appropriate knowledge centres with international level infrastructure. The need for planners, engineers, health professionals, skilled and semi-skilled vocational personnel, etc. the necessity for establishing training centres is important.

This infrastructure will again require appropriate positioning to address local demands and needs across the corridor. Thus in line with the growth centres like Varanasi, Lucknow, Kanpur, Noida, Ghaziabad, Meerut, Kashipur (in Uttarkhand, though offline will bring in lot of demand), Delhi itself, Hissar, Ludhiana, etc. will have to be provided with the facilities of training centres so that the communities locally are equipped with the capacities to be absorbed locally into these growth centres.
The locations like the Delhi – Agra highway which has a stream of educational institutions, Ghaziabad, Kanpur is another knowledge centre along with Lucknow (can be developed as twin knowledge centre) and Varanasi being a traditional education centre should be further strengthened with the demands of these growth centres.

e) Social Stressors

The above VECs will definitely have large scale land acquisition for establishing the various facilities as listed above. In addition to the above we hereby discuss the other social stressors that are to be considered during designing the project development.

The influx of outside population to the proposed development activities that will lead to growth centres will bring with it a multifarious issues which would be both positive and negative. In addition to this there would be certain social stressors that would be visible with the developments proposed across the DFCCIL corridor. In this context it is important to discuss the various social stressors so that these can be managed and mitigated in case there are adversaries attached to it.
At the outset it is important to enlist the various social stressors which would include:

- Impact on health in the region

The influx of population would lead to a population concentrations around the facilities being developed along with the DFCCIL project. Thus the mushrooming of semi-urban or urban centres will be a fall out of this facility development. Thus providing scope for increase communicable diseases and this would necessitate the requirement of increased health facilities. The influx of population due to available livelihood facilities will initially attract more male population

subsequently the female population or their families. However this influx of rural population to these centres will lead to uncontrolled unsafe sexual practices. This would lead to increase in incidence of HIV/AIDS.
The inappropriate solid waste management and waste disposal will lead to other communicable diseases. Thus increasing facilities without planning of waste disposal will have adverse effects to the local population.

The available facilities within the vicinity of the facilities would be remote, one is due to the location being in rural areas, and secondly if near urban center then too there would be shortage of necessary medical facilities.

  - Infant mortality
  - Communicable diseases
  - Other chronic diseases in the region
- Poverty in the region – concentrations
  - BPL distribution in the region
- Productive population
  - Population by age groups – 18-55 age group in the region
- Migration patterns in the region
  - Migration patterns in this region
- Reasons for siting the facilities for development – technical / political
  - Reason for location of the developments in the region
- Impact on minorities/low-income communities
  - What kind of impacts do we envisage to the minorities and the low income groups in this region due to the project developments?
- Job creation
  - What is the percentage of employment generated in this region due to the project development and what is the envisaged employability due to the project developments proposed?
- Strains on city services
  - Available public amenities and level of impact on existing amenities due to proposed developments.
- Favorable or adverse impacts on property value
  - Impact on property values in the region, is it positive or negative. Reasons for both.
- Limits to access to traditional livelihoods like fishing, etc.
  - Are the local population able to continue with their traditional livelihoods or is there a shift in the traditional livelihood patterns?

The impacts within 10 km radius of the corridor

The impacts have been identified along the EDFC corridor with the proposed DFCCIL stations to be established along this corridor. These include:

EDFC-1: Khurja - Bhaupur

Sr. No.	Stations	NH	SH	Project
1	Khurja	NH 93	SH 63	• Khurja Super Thermal Power Project
2	Kulwa	NH 91; NH 93	SH 63	Railway line doubling works: • Khurja-Kulwa • Kulwa-Aligarh
3	Mandrak	NH 91; NH 93	-	• Dedicated Freight Corridor Corp of India Ltd - has invited expressions of interest for the 300 km segment of the Eastern DFC between Bhaupur (near Kanpur) and Mandrak (near Aligarh).
4	Hathras	NH 93	SH 80; SH 33	-
5	Chamrola	-	SH 31	-
6	New Tundla	-	-	-
7	Firozabad	NH 2; NH 3; NH 93; NH 11	SH 31	• Environment improvement and sustainable development of the Agra-Mathura-Firozabad trapezium of Uttar Pradesh • Promotion of Cleaner and Environment Friendly Technology in the Highly Polluting Small-Scale Glass Industry Cluster at Firozabad • Supply and carrying of Earth work and blanketing including Box Culverts, Minor Bridges In Formation of Eastern Dedicated Freight Corridor, Firozabad
8	Tundla	NH 2; NH 3; NH-11; NH 93	SH 31	• Outdoor works in connection with the provision of Multi Section Digital Axle Counter for dual detection in 15 block sections (Jhinjhak - Kanchausi, Kanchausi - Phaphund, Phaphund - Pata, Pata - Achalda, Achalda - Samhon, Samhon - Bharthana, Bharthana - Ekdil, Ekdil - Etawah, Tundla - Mitawali, Jalesar Road - Pora, Pora - Hathras, Hathras - SSasni, Sasni - Mandrak, Mandrak - DDaud Khan, Daud Khan - Aligarh) of Panki - Aligarh section of Allahabad division of North Central Railway
9	Bhadan	NH 2; NH 92	SH 84; SH 85	-
10	Jaswant Nagar	NH 2; NH 91A; NH 92	SH 83; SH 84	• Additional supply & erection work for 33/11kV s/s Jaswant Nagar
11	Etawah	NH 2; NH 91; NH 91A; NH 92	SH 83; SH 84	• Multimodal Economic Zones proposed between Auriaya and Etwah
12	Ekdil	NH 2; NH 92	SH 83	• Logistic part in Ekdil
13	Achhalda	SH 91 A	SH 88	• Outdoor works in connection with the provision of Multi Section Digital Axle Counter for dual detection in 15 block sections (Jhinjhak - Kanchausi, Kanchausi - Phaphund, Phaphund - Pata, Pata - Achalda, Achalda - Samhon, Samhon - Bharthana, Bharthana - Ekdil, Ekdil - Etawah, Tundla - Mitawali, Jalesar Road - Pora, Pora - Hathras, Hathras - Sasni, Sasni - Mandrak, Mandrak - Daud Khan,

Sr. No.	Stations	NH	SH	Project
				Daud Khan - Aligarh) of Panki - Aligarh section of Allahabad division of North Central Railway
14	Phapund	NH 2	SH 21	• Outdoor works in connection with the provision of Multi Section Digital Axle Counter for dual detection in 15 block sections (Jhinjhak - Kanchausi, Kanchausi - Phaphund, Phaphund - Pata, Pata - Achalda, Achalda - Samhon, Samhon - Bharthana, Bharthana - Ekdil, Ekdil - Etawah, Tundla - Mitawali, Jalesar Road - Pora, Pora - Hathras, Hathras - Sasni, Sasni - Mandrak, Mandrak - Daud Khan, Daud Khan - Aligarh) of Panki - Aligarh section of Allahabad division of North Central Railway
15	Jhinjhak	-	SH 68	-
16	Rura	-	SH 46	-
17	Bhaupur	NH 2	-	- Logistic part in Ekdil

The identified developments along this EDFC 1 corridor would have medium to large scale land acquisition both from government and private owned lands. In addition to this the development will bring a large population of rural and other semi-urban work force (at all levels – skilled, semi-skilled and unskilled) to be engaged at these development locations. Especially the logistic parks and economic zones, industries and the thermal power plant proposed at Khurja.

The EDFC 2 will also have similar impacts. The developments along this corridor are provided in the table below.

EDFC 2: Developments along the corridor stations

No.	Stations	NH	SH	Project
1	Bhaupur	NH2	-	Ruma Industrial Area,Kanpur Special Economic zones Sector Textile Upsidc Area:103.72 Hec Formal Approvial:19.06.2007
2	Bhimsen	NH2	-	Name of Company: UPSIDC Sector: Leather Area: 103.85 Hectare Formal Approval: 19.06.2007 Address: A-1/4, Lakhanpur, Kanpur-208 024
3	Kanpur Central	NH2	-	Kanpur Logistic hub(6000hectares) Name of Company: UPSIDC Sector: Engineering goods Area: 102.75 Hectare Formal Approval: 19.06.2007 Address: A-1/4, Lakhanpur, Kanpur-208 024
4	Sirsauli	NH2	-	Dedicated Freight Corridor Corporation of India has proposed to provide rail connectivity to a Logistic Park proposed at Kanpur, which is to be built in PPP mode
5	Bindki	NH2,NH232	-	-

No.	Stations	NH	SH	Project
6	Malwa	NH2,NH232	13A	-
7	Fatehpur	NH2	-	-
8	Khaga	NH2	-	-
9	Kanwar	NH2	-	Vivek brick Sheld (Bhatta)Dhuayan
10	Sirathu	NH2	SH94	Shiv Rice Mill Sirathu New Shiv Rice Mill Sirathu
11	Bharwari	NH2	SH94	Flour Mills Bharwari
12	Saiyed sarawawan	NH2	-	-
13	Manauri	NH2	SH95	-
14	Bamruli	NH2	-	-
15	Allahabad	NH2,NH96,24B	SH07	Allahabad –Logistic hub (6000hectars) MughalSarai Varanasi Mirzapur Investment Zone(3000hectares)
16	Karchana	NH2	-	-
17	Mejaroad	NH2	-	-
18	Mandaroad	NH2	-	-
19	Vindyachal	NH76	-	South Vidhyanchal Industrial Area Mirzapur
20	Mirzapur	NH76	-	Mini Industrial Estate in Pathriya Mini industrial Estate in Rajgarh
21	Jhingura	NH76,NH7	SH5, 156E	Mini Industrial Estate in Khimaipur Mini Industrial Estate in Marhyan Mini Industrial Estate In Sikri
22	Dagmagpur	NH76	SH74	Mini Industrial Estate In Sadar
23	Chunar	NH76	-	Mini Industrial Estate in chunar Name of Company: M/s. Proto Developers & Technology Ltd. District: Chandauli/Varanasi Sector: IT/ITES Formal Approval: Recommendation sent by GoUP for In-Principle approval to GoI on 14.03.08
24	Jeonathpur	NH76	-	Matrix Riller Mill- Jeonathpur, S.A Iron-jeonathpur,Coke industries, S.A Iron Junadpur M,k Biscuits-B-18, Alaknanda Cement Pvt.Ltd Industrial Corridor Swastic Cement Products Industrial Area- Patnva Ramnagar
25	Mughal sarai	NH2	SH5A, SH69, SH97	Flour Mills,Chanduli Col Mills,Chanduli Rice Mills,Chandauli Plastic bag manufacturing industries

EDFC 3: Developments along the corridor stations

No	Stations	NH	SH	Projects
1	Ludhiana	NH1	-	Registered Micro &Small Units No.39091 Registered Medium &Large Units No.116
2	Sanshwal	NH1	-	Industrial Zones
3	Khanna	NH1	-	Pristine Inland Container Depot

No	Stations	NH	SH	Projects
				Ludhiana
4	Mandi Gobindgarh	NH1	-	Duraha :Industrial Textile Park Near existing industrial point Where 350 ha land is acquired
5	Sirhind	NH1	-	-
6	SaraiBanjara	NH1	-	Proposed Initiatives of Haryana state Government-
7	Ambala	NH1,NH65,NH73,NH22	-	-
8	Ambala Cant	NH1, NH65, NH73, NH22	-	-
9	Mustafabad	NH73	-	-
10	Saraswa	NH73	-	-
11	Saharanpur	NH73	SH59, SH57	-
12	Tapri	NH73	SH59, SH57	-
13	Taiheri buzurg	NH73	SH59, SH57	-
14	Deoband	NH73	SH59, SH57	-
15	Muzaffarnagar	NH58,	SH12, SH12A	-
16	Sakoti Tanda	NH58, NH119	SH14, SH82	-
17	Pabli Khas	NH58	SH14, SH82	-
18	Meerut City	NH58	SH14	-
19	Kaili	NH24, NH235	SH65	-
20	Hapur	NH24, NH235	-	-
21	Dadri	NH235	-	-
22	Khurja	NH91, NH235	SH65, SH18 SH63	-

The various developments as mentioned above will include large scale land requirement and private land acquisition. The land area requirement along the DFCCIL corridor includes:

- Khurja Super Thermal Power Project – 1362 acres of land requirement.
- 150 km wide industrial corridor has been proposed along the EDFC is proposed by the Government of Uttar Pradesh. In addition to his the other projects include two 5,000 hectare National Investment and Manufacturing Zone in Jhansi and Auraiya, the 2,000 hectare Paschimanchal Investment Zone in Muzaffarnagar, Meerut, Modinagar and Beghrajpur, the Braj Investment Zone of 2,000 hectares in Chola, Aligarh and Khurja, a Etawah-Auraiya-Kannauj investment zone of 6,000 hectares, a logistic hub in Kanpur of 6,000 hectares, the Allahabad-Naini-Bara investment zone of 3,000 hectares and Mughalsarai-Varanasi-Mirzapur investment zone.
- The plastic city in Auraiya is being developed on *usar* land, land acquisition will not be a problem in Jhansi and Mirzapur and in Bara thousands of acres acquired for building a power house is lying vacant.
- Integrated Industrial Township Project-Greater Noida; Multi Modal Logistics Hub, Dadri; High Speed Seamless Connectivity between Delhi-Greater Noida and Faridabad; Integrated Transportation Hub Project at Boraki
- Land requirement for development of industrial estate and industrial infrastructure is about 27000 acres and is being acquired since last 9 years in Haryana.
- There are food parks (50-75 acre plots) is being proposed in Panipat along with Textile parks (88 acres) at Panipat again.There is electronics manufacturing cluster proposed at Rojka Meo

(Mewat) in about 108 acres[9].

The general impacts enlisted as per the cumulative impact assessment include:

Industries	Positive Impacts	Negative Impacts
– Industrial area development/ Integrated Industrial Development Parks/areas – Industrial Corridors/ Long Stretch Identified only for Industrial Development – Industrial SEZs – Logistic Parks – Local Communities	▪ Increase in employment opportunity in the related and allied sector ▪ Price of land will increase. ▪ Land will be acquired in good rates. ▪ Property rates will increase. ▪ Employment opportunities for the local youth and Opportunities to the local communities to establish Small and medium business. ▪ Preference of employment may be given to the local villagers.	▪ Land acquisition. ▪ Loss of agriculture land. ▪ Loss of agriculture productivity. ▪ Development of slums and illegal colonies ▪ Pollution and sanitation problem. ▪ Immigration from other states. ▪ Traffic jam. ▪ Population increase ▪ Crime rate may increase.
Transportation		
<u>Near the corridor being developed/10 km radius</u> – National Highways – State Highways – Express ways	▪ Increase in employment opportunity in the related and allied sector ▪ Road transportation will be smooth and less load/pressure on roads of the traffic ▪ Better connectivity to railway stations ▪ Construction of new roads and other approach roads. ▪ Traffic blockage will be less ▪ Accessibility to stations from nearer villages to export their products ▪ Heavy Commercial traffic will be less on the road ▪ Pollution will be less due to less commercial vehicles	▪ Accessibility may be affected in many places due to the track ▪ Drainage , sewage and water logging problem ▪ Land acquisition for new roads/ways and subways
▪ Transport Nagar/Dedicated trade parking areas within 10 km radius ▪ TOD	▪ Increase in employment opportunity in the related and allied sector ▪ Urbanization ▪ Proper parking areas ▪ New business opportunities for the local communities	▪ Traffic load may increase ▪ Illegal parking will affect the traffic ▪ Development of slums ▪ Pollution and sanitation problem
▪ Aviation/Airport within 10 km radius	▪ Increase in employment opportunity in the related and allied sector ▪ Fast mode of transportation	▪ Traffic will increase ▪ Land acquisition ▪ Agriculture activities will be less and will affect the production of agriculture

[9] *Northern India; Heralding the next chapter of growth and development, CII, 2014.*

Industries	Positive Impacts	Negative Impacts
		also.
Others		
▪ Agriculture/irrigation projects	▪ Transportation Facilities for the crops and other agriculture products. ▪ Transportation rates will be less and may be benefiting to the farmers. ▪ Easily availability of seeds and fertilizers. ▪ Wastage will be less due to timely transportation. ▪ Easy, Simple safe and time saving process of transportation will be beneficial to both government as well as farmers.	▪ Loss of agriculture land due to land acquisition ▪ Loss of livelihood for farmers who are dependent upon agriculture ▪ Income loss ▪ Difficulty in accessibility to both side the track where land is divided into two parts. ▪ Loss of agriculture land ▪ Loss of agriculture production ▪ Water table may go down
▪ Waterways/within 10 km radius	▪ Increase in employment opportunity in the related and allied sector ▪ Connectivity to Waterways ▪ Heavy Commercial traffic will be less on the road ▪ Pollution will be less due to less commercial vehicles Employment opportunities will increase in waterways ,DFCCIL, and road connectivity ▪ Availability of cheaper goods in the market due to less freight charges	▪ Land acquisition for all the development projects ▪ Agriculture activities will be less and will affect the production of agriculture also.
▪ Power projects – Substations/Transmission lines	▪ Better power supply for DFC ▪ Power may be available 24 hours in the village separate lines are installed.	▪ Land acquisition for substation and transmission line ▪ Agriculture activities will be less and will affect the production of agriculture also.
▪ Hospitals/Medical facilities ▪ Real estate developments	▪ Increase in land price ▪ Basic infrastructure facilities will be more with urbanization ▪ provision of health facilities in the area ▪ New developments of health institutions with latest health facilities (Laboratory, Operation Theatres, etc.) ▪ Urbanization ▪ Employment opportunities	▪ Slums may develop ▪ In immigration of labour from other states ▪ Pollution and sanitation problem in the area ▪ Irritation ▪ Health problems may increase ▪ Excessive population ▪ Immigration of labour from other state ▪ Crime rate may increase

Other than the impacts discussed above, detailed impact assessment has been carried out along the each of EDFC-1, EDFC-2 & EDFC-3 and is attached **Enclosure 1.**

Migration

The issue of migration will be viewed as the largest challenge in the overall scheme of things that would be necessary to understand and propose strategies to handle the out-migration especially the rural-urban which would be on the increasing trend with the developments that we envisage to be implemented in the ensuing decade. The migration pattern would extensive towards the development centres which would covert to semi-urban or urban centres and also be extensions of existing urban agglomeration. In this context though we have been witnessing a downward trend in the population growth the movement from rural to urban is envisaged to be high. The four main reasons for internal migration are generally Marriage, Employment, Education, and Lack of Security. In our case we presume that though employment will be the major factor the other factors would also play a role in encouraging the movement from rural to urban.

Internal migration spurred primarily by employment and marriage helps shape the economic, social, and political life of India's sending and receiving regions. About two out of ten Indians are internal migrants who have moved across district or state lines—a rate notable for the numbers who move within a country with a population of above 1.2 billion.

While marriage is a common driver of internal migration in India, especially among women, a significant share of internal movements are driven by long-distance and male-dominated labor migration. These flows can be permanent, semi-permanent, or seasonal. Seasonal or circular migrants in particular have markedly different labor market experiences and integration challenges than more permanent migrants, but precise data on seasonal migration flows and a systematic accounting of the experiences of these migrants are major gaps in existing knowledge.

Regardless of the duration of their stay, labor migrants face myriad challenges at their destinations in a country that is dizzying in its diversity of languages and cultures. Among the challenges: restricted access to basic needs such as identity documentation, social entitlements, housing, and financial services. Many migrants—especially those who relocate to a place where the local language and culture is different from that of their region of origin—also face harassment and political exclusion.

Government responses to India's significant internal migration are limited. The little legislation that does have provisions for workers' rights is seldom enforced. The response of India's diverse civil-society organizations has been more active, with the nongovernmental sector often stepping in to fill the gaps in welfare services, education, and labor rights that are left by the government.

More than two-thirds (69 percent) of India's 1.21 billion people live in rural areas, according to the 2011 Census of India, but the country is rapidly urbanizing as it is revealed by the developments that have been enlisted in this section of the report above.

A significant source of this growth is rural-to-urban migration, as an increasing number of people do not find sufficient economic opportunities in rural areas and move instead to towns and cities. Here

it is important to mention that in our project scenario also the movement is expected to be high in the rural-to-urban migration due to the canvas of livelihood opportunities that the developments are being implemented. Thus leading to extending existing urban/semi-urban centres, congesting these existing urban/semi-urban centres and increasing the social stresses on these centres. Further to this the projects will enable mushrooming of new urban/semi-urban centres.

Provisional 2011 census data show that for the first time, India's urban population has grown faster than its rural population since the last census. Thirty-one percent of India's population is now classified as urban, up from almost 28 percent in 2001. In 2007-08, the National Sample Survey measured the migration rate (the proportion of migrants in the population) in urban areas at 35 percent. In addition to migration, natural population increase and the inclusion in census data of newly-defined urban areas also account for some of this urban growth.

Despite India's impressive rates of economic growth over the past three decades, vast numbers of Indians are unable to secure a meaningful livelihood. In 2010, 29.8 percent of all Indians lived below the national poverty line, while 33.8 percent of rural Indians lived below the national rural poverty line, according to World Bank data. While wage and education gaps between rural and urban Indians are declining, rural India is still characterized by agrarian distress, a chronic lack of employment, and farmer suicides. Thus, the rural-urban divide has been one of the primary reasons for India's labor mobility. Box 1 indicates the various types of internal migration in India which is an eye opener in providing an understanding of the categories of migration that exist in our country.

Box 1. Types of Internal Migration in India

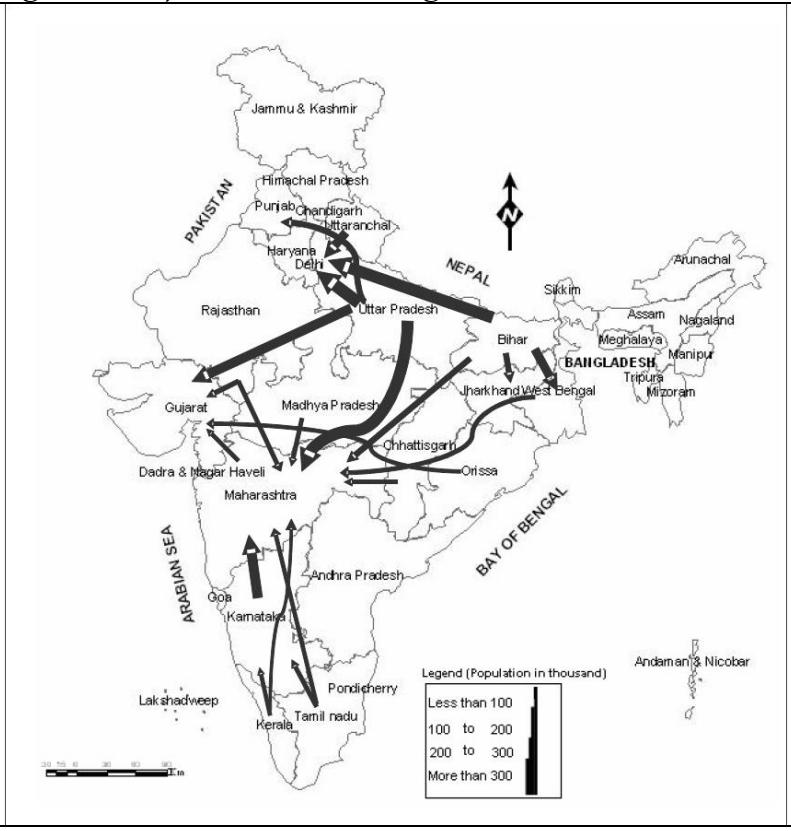
- Labor migration flows include permanent, semi-permanent, and seasonal or circular migrants. Much of the available data polls migrants in the permanent and semi-permanent categories, and considerably less large-scale statistical data are available on the numbers and characteristics of circular migrants.
- Semi-permanent migrants are those who are likely to have precarious jobs in their destination areas, or lack the resources to make a permanent move. While they may reside in their destination cities for years or decades, they likely have homes and families in their sending district.
- Seasonal or circular migrants, by contrast, are likely to move from place to place in search of employment, or to continue returning to the same place year after year. Such circular flows encompass migrants who may stay at their destination for six months or more at a time and hence need social services at their destination. Scholars have long characterized this migration as a type in which the permanent residence of a person remains the same, but the location of his or her economic activity changes.
- Many of the women who migrate for marriage are also participants in the labor market, even if their primary reason for migration is marriage. The domestic maid industry in urban areas, for example, is a rapidly growing sector that employs women, most of whom are rural-to-urban migrants[10].

The North Indian states of *Uttar Pradesh* and Bihar have the highest percentages of rural populations, with 18.6 percent and 11.1 percent of people living in villages, respectively, as of the 2011 Census. These states are also the largest migrant-sending states. Substantial flows of labor migrants relocate from *Uttar Pradesh to Maharashtra*, *Delhi,* West Bengal, *Haryana*, Gujarat, and other states across northern and central India. Migrants from Bihar relocate to the same destinations, with the highest numbers to Delhi and West Bengal. Other major migrant-sending states are Rajasthan, Madhya

[10] *Internal Labor Migration in India Raises Integration Challenges for Migrants, March 3, 2014, Feature By, Rameez Abbas and Divya Varma.*

Pradesh, Andhra Pradesh, Chhattisgarh, Jharkhand, and Orissa. Predictably, all of the major sending states are characterized by very low social and economic development indices and the major urban destinations (indicated in **Figure 1**) are the growing economic magnets in an increasingly liberalized Indian economy.

Figure 1. Major Net Internal Migration Flows in India, 2001



Source: R.B. Bhagat and S. Mohanty, "Emerging Pattern of Urbanization and the Contribution of Migration in Urban Growth in India," Asian Population Studies, vol. 5 no. 1 (2009): 5-20.

The reason for discussing this issue is that internal migration will bring in the following issues that need to be addressed, these include:

No.	Item	Description
1	Documentation and identity	Proving their identity is one of the core issues impoverished migrants face.
2	Housing	Migration and slums are inextricably linked, as labor demand in cities and the resulting rural-to-urban migration creates greater pressures to accommodate more people.
3	Limited Access to Formal Financial Services	Despite the economic imperatives that drive migration, migrant workers essentially remain an unbanked population
4	Political Exclusion	Due to a state of continuous drift, migrant workers are deprived of many opportunities to exercise their political rights.
5	Rampant Exploitation	Migrants, completely dependent on the middlemen for information, end up working in low-end, low-value, hard, and risky manual labor and are constantly subject to exploitation with little or no

		opportunity for legal recourse.

A detailed study would have to be initiated to understand the migration within this region and the project area in particular.

ASSESSMENT OF SIGNIFICANCE OF PREDICTED CUMULATIVE IMPACTS

The predicted cumulative impacts due to the project developments and as identified through the VECs are listed below. These include:

No.	Item	Scale (0=no significance, 1=low significance, 2=moderately significance, 3=Significant 4=Most significant)
1.	Land Acquisition	4
2.	Out-migration from Villages or rural areas to the growth centres (rural-urban)	4
3.	Loss of productive population in rural areas	3
4.	Increased stress on public amenities – water supply, etc. in development centres or to existing urban/semi urban centres	4
5.	Loss of properties to people due to large scale developments planned or proposed	4
6.	Rural-to-Urban Migration	4
7.	Decreased labor force to agriculture sector	3
8.	Stress on appropriate and integrated planning	3
9.	Long gestation periods for implementation of development projects, thus putting pressure on investments	2
10.	Lack of policies for appropriate execution of proposed plans	3
11.	Change in land use due to:	
a.	Water resources projects	3
b.	Power Projects	2
c.	Health infrastructure	2
d.	Knowledge infrastructure	3
e.	Social Stressors	4

In accordance with the above information the level of impacts have been quantified based on the importance of each of the envisaged accrued losses cumulative project impacts. Under this we have been considered as follows:

- Land losses as the most significant and the other impacts as manageable impacts have been provided with lower ranking and accruing limited or lower level of impacts in comparison to the land losses.
- Secondly the availability of labor and the loss of out migration as one of the most hostile situations for progressing agriculture sector in India.
- Other impacts have been subsequently ranked with respect to the importance and the extent of impact being low or insignificant.

MANAGEMENT OF CUMULATIVE IMPACTS – DESIGN AND IMPLEMENTATION

At the outset it is important to understand the various policies that have been formulated to support infrastructure development across these EDFC corridors. As mentioned above it is seen that there are three states through which the corridor traverses which is, Uttar Pradesh, Haryana and Punjab. These three states have been able to formulate various policies that would facilitate not only the DFCCIL project development, but also the other developments like, industrial development, the affordable housing facilities, land acquisition, urban and area planning, policy for providing basic amenities to the urban / rural population, Transit Oriented Development (TOD) policies, addressing grievances at all levels for timely project implementation, etc.

There would be need to have a controlled urban growth with appropriate planning and execution and identification of appropriate locations for:

- Industrial area development
- Logistic parks
- Housing and Affordable housing facilities
- TOD development
- Transportation network and related infrastructure like Transport Nagar, etc.
- Agriculture Producers Marketing Yards
- Establishing the basic amenities – power systems (transmission and distribution lines and sub-stations), water supply, sewerage facilities, waste disposal and management – both liquid and solid waste, etc.
- Any other that may require land area for development.

In addition to the above, the following issues will have to be addressed also:

- Appropriate urban or area planning
- Appropriate land use planning
- Updating land records by digitization and ownership records
- Appropriate public amenities planning
- Equity in providing public services
- Insurance to mitigate social adversaries against any mishaps due to DFCC development and other similar developments, as the DFCCIL facility would carry highly inflammable petroleum products and explosives (Kanpur Ordinance Factory etc.), this was also reflected in community consultations.
- Insurance facilities to the fishing community that are not covered presently by the insurance companies.

The overall scenario within this region is encouraging with various development activities planned or already in the implementation stages. But it has to be understood that in order to make way for all these developments what are we arriving at and how do we address the challenges that would arise from this development.

The main issues that needs to be addressed is the following:

Migration – largest challenge for any development, this cannot be arrested, but designs can be formulated to decongest existing semi-urban or urban centres. This could be possible to provide better facilities within the adjacent (maybe 50 km radius of any development) rural areas with adequate and reliable transport connectivity;
Appropriate urban planning and governance methods to be designed and adopted – existing semi-urban or urban centres to have policies restricting further development and demarcate the development zones. This will enable further congestions at existing urban locations.

Design Transit oriented development concepts: there is a need for a TOD policy that could be implemented. This would require relocation of structures from within urban centres and integrated design for proposed developments, especially the industrial developments.

Affordable housing policies to be implemented: all the three states have their own Affordable Housing policies and this needs to be enforced and large scale housing projects should be integrated with the development projects. Especially industrial development projects should have an integrated development plan which would be approved by the Department of Industries and the Housing before the implementation begins.

Transportation facilities to link the DFCCIL corridor with the industrial development projects which is appropriate networking with existing roads (NH, SH, MDR, ODR, etc.) or water ways for movement of cargo both raw material and finished products. This sector of development is available and the proposed developments would envisage further expansion of the existing transportation network. This has been indicated in the sections above.

Land acquisition has been one of the main issues that envisages large time delays and conflicts on all development projects. In addition to this the issue of *resettlement and rehabilitation*. The major issue is the updation of the land ownership records with clear titles. This is a major hurdle in all projects. The respective state governments should initiate the land record updation on a mission and target mode which would facilitate the development planning and implementation on a faster pace.

Plan public amenities for estimated population growth and urbanisation. This would enable the governments to be prepared with implementable plans to provide basic minimum services within the urban centres and the proposed urban centres that would emerge due to the development activities. This means adequate water supply, power, waste management and internal roads for movement.

In view of this the DFCCIL team would have to integrate its implementation and development plan with the Department of Industries, Urban Housing and Development Departments, the Inland Water ways, etc. The most important would be the department of industries which has a direct linkage with the performance of the DFCCIL. Thus the issue related to land acquisition, resettlement and rehabilitation, livelihood opportunities and housing is an integrated issue between DFCCIL and other departments.

However the urban development department would have to address the rural – urban migration, affordable housing, and providing equitable public amenities on an urgency basis to facilitate the success of other developments like the industrial development and the DFCCIL corridor development. The revenue department plays an important role in the overall scenario because without the support and direct intervention of this department none of the development projects can be initiated or even proposed.

Stake holders consultations

The stakeholders under this project have been classified under two categories, institutional stakeholders and community stakeholders. The institutional stakeholders included contacts with departments of industries, irrigation, housing, State PWD, National Highway Authority, etc. The community stakeholders included the village panchayat members and the general village communities. The details of the all the consultations is given in Chapter 4 of CIA report. However the inputs from all the consultations have been incorporated in designing this cumulative assessment.

Concluding Remarks

The project study to elucidate the Cumulative Impacts related to the DFCCIL corridor is a challenging task. However through various stakeholder discussions, field visits and the literature review has enabled us to consolidate most of the projects that are proposed to be developed could be in line with the DFCCIL project or other large development projects. This consolidation has provided the baseline, impacts and the understanding of the mitigation that could be achieved by DFCCIL along with the other development projects and line agencies in the region.

Enclosure 1

DFCCIL Corridor Impacts from other Development Projects – I

Item	Positive Impacts	Negative Impacts
Industrial area development		
Industrial area development/ Integrated Industrial Development Parks/areas	▪ Livelihoods as wage labour, petty business & hotels will enable improvement in economic status of the villages around the proposed projects. ▪ Emergence of growth centres around the junction stations/ logistic parks, ▪ Satellite units of Small & medium industries with differentiated products profile are likely to be established thus enhancing employment potentials. ▪ In-migration of semi-skilled & skilled labour of villages within 10 km radius is likely to increase. ▪ With the numerous economic activities in and around the proposed projects, there is likely increase in the purchasing power of the local community/ petty business/ service providers. ▪ Increase in inflow of agriculture produce in the neighbouring market. ▪ Cold storage business and forwarding agents will establish around the stations. ▪ Skill training centres for skill development of local youth will be established ▪ Private housing properties will be established in 10 km radius from DFCCIL.	▪ Increase in the pressure of resources such as ground water & ambient air (micro-climates will get negatively affected). ▪ Pollution such as Air, Particulate emissions, land (disposal of solid wastes from logistic parks) & water sources will increase. Indiscriminate disposal of the muck is likely to affect the agricultural fields. ▪ Natural habitats such as wetlands will get demolished. ▪ With the growth centres, social evils like alcoholism and red light areas will increase. ▪ Socio-cultural impacts will be apparent. ▪ Loss of cultivable lands will affect livelihoods of the farmers thus out-migration may be visible. ▪ Neighboring areas of the Industrial SEZs & Logistic parks will experience change in land use pattern (agriculture lands will be unfit for production due to waste water & solid wastes). ▪ Social threats like cases of crimes e.g. robbery & arson, assault will increase around the growth centres thus creating pressures on the neighboring villages. ▪ Villagers loosing cultivable lands will experience loss of livelihoods. ▪ Culture and ethnic practices will get affected due to influx of multi-cultural assimilation. ▪ Traditional access roads are likely to be covered under DFCCIL thus causing infringement of access rights of the villagers. ▪ Movements of the vehicles carrying construction materials would dismantle the village roads and create dust pollution leading to respiratory illnesses among the high risk groups in the villages. ▪ Removal of the top soil for filling from the cultivable lands/ agriculture fields within 10 km of DFCCIL corridor creating not only loss of capacity of agricultural lands but also leaving behind the 25 meters pitch on the

Item	Positive Impacts	Negative Impacts
		fields. The DFCCIL is responsible for such kind of indiscriminate procurement of soil from the agricultural fields. The DFCCIL should ensure that the contractors procure soil from the sodic lands or/and barren land areas and not from the agriculture fields. This top soil extraction from agriculture fields is likely to go above limits with the upcoming projects thus creating irreversible damage to the farmers and to the environment (a lot of countries are spending millions of Dollars for top soil regeneration and when are we going to consider this as a liability to environment).
Transportation		
– National Highways – State Highways / Near the corridor being developed/10 km radius – Transport Nagar / Dedicated trade parking areas within 10 km radius. – Expressways being proposed/ within 10 km radius – Waterways/within 10 km radius – Aviation/Airport within 10 km radius – Local Communities	• Growth centres will emerge on the area adjoining upcoming proposed projects. • Employment potentials will emerge thus positive changes in livelihoods profile and land –use pattern will be observed. • Livelihoods options such as wage labour, petty business etc. will be observed.	Negative impacts due to proposed DFCCIL corridor

DFCCIL Corridor Impacts from other Development Projects - II

Item	Positive Impacts	Negative Impacts
Industrial development		
Industries	• Generation of additional economic activity • Promotion of exports of goods and services • Promotion of investment from domestic and foreign sources • Creation of employment opportunities • Development of infrastructure facilities • Direct employment generation (Skilled and Unskilled laborer) • Indirect employment generation • Employment for woman • Skill formation (Human capital formation) effects • Technology upgrading effects • Provide a wide range of logistics services by rail to handle domestic and EXIM freight. • Improve supply chain efficiencies and help the logistics service providers to better serve the trade flow between manufacturers and producers. • Reduce logistic costs; increase efficiency using DFCC corridor. • The impact of a major infrastructure intervention in terms of EDFC is quite strong for all the clusters who view it as a significant development for improvement in logistical facilities. However the need is strongest for the plastic and leather & leather product units for reasons that the former caters to markets in Kolkata and Assam and the latter sector views EDFC as an opportunity for faster evacuation of finished cargo to an interchange point with DMIC and hence faster movement to JNPT port. • Industry is likely to gain in terms of logistics improvement as a result of the dedicated corridor. • Players see EDFC as an opportunity for evacuation of finished cargo to an interchange point with DMIC and hence faster movement to JNPT port. • EDFC is viewed as an opportunity for improvement in logistics for the sector. • Need for EDFC is strong for this industry as it caters to markets in Kolkata and Assam. • EDFC is looked at as an opportunity for improvement in the logistics and easier movement of goods. • Kanpur Cotton Hosiery are less power-intensive and are therefore, less dependent on	• Labor rights are denied for workers • Shrinking of agriculture land. • Conversion of agriculture land to Non agriculture land • Snatching agriculture land from farmers/poor. • Buy agriculture land from farmers/poor at very low cost. • Sells these land to corporate at high prices. • Promote food insecurity and suicide. • Increase in the congestion on the roads • Increased the logistics costs • Inefficiencies increase transport time • Damaged roads resulting in high maintenance costs to the government • Shrinking of agriculture land. • Conversion of agriculture land to Non agriculture land • Snatching agriculture land from farmers/poor. • Buy agriculture land from farmers/poor at very low cost. • Sells these land to corporate at high prices. • Promote food insecurity and suicide. • Increase in the congestion on the roads • Increased the logistics costs • Inefficiencies increase transport time • Damaged roads resulting in high maintenance costs to the government • Access to credit remains weak in this cluster. However, recently leading bank has been approving loan applications for the knitwear/hosiery sectors.

Item	Positive Impacts	Negative Impacts
	power availability. • Labour is available abundantly within the region, for employment into this cluster.	
Transportation Sector	• Improvement in connectivity. • Time saving • Long distance can be travelled in less time and efforts. • Improve economy • Provide smooth journey. • Alternate mode of transport. • Faster, Cheaper and better connectivity • Huge quantities of bulk cargo can be transported. • Reduce transport cost for shippers • Reduces congestion and accidents on highways. • Provide savings in carbon emissions for traffic. • Economic development of the region will increase. • Open door of employment to local fisherman, villagers and vessels crew. • Domestic and international travel will be easy. • Quality of road infrastructure is a constraint for most of the clusters in the sub-region. • Warehousing, Multi Modal Logistics Parks, etc. – is considered strong for those clusters which have accessibility to good quality roads to markets.	• Increase road accident cases. • Pollute environment through movement of traffic. • Non-availability of Airport in Kanpur is supposed as one of the major obstacle by industry players • Lack of quality roads come outs to be a major obstruction to growth for clusters across the sub region especially for Kanpur. As roads are the most preferred mode of transport (for accessing the inputs and markets). • Poor quality of road infrastructure affects the lead times between procurement of inputs and distribution of final products in the market. • Quality of road infrastructure poses as a key constraint for almost all the units belonging to the Varanasi Silk cluster across the sub-region. Though Varanasi is served by major National Highways (NH29, NH56, NH2), their quality is quite poor due to lack of adequate maintenance focus. The highway sections close to the city, as well as internal city roads face major congestion. The internal road capacity seems to be overburdened with burgeoning traffic over the years, while the national highways remains cluttered as they have too many bottlenecks while entering the city.
Irrigation Sector	• Hydro-electric power generation • Eco Friendly (since the dam is using a natural element to produce energy, it will not emit carbon dioxide and monoxide to the atmosphere. • Dam is used for water supply purpose in urban area abstracted from rivers • Dams are often used to control and stabilize water flow, often for Agricultural and Irrigation purposes. • Dam can help to stabilize or restore the water levels of inland lakes and seas.	• Relocation or displacement of local habitations. • Negative Environmental Impacts (death of river life, erosion, submerging thousands of acres of land from nearby area. It also threatened the lives of countless species of animals including dolphins). • Inefficient energy allotment (power allotment is intended to urban population, which in turn deprive the rural population.

Item	Positive Impacts	Negative Impacts
	• Flood Prevention (Dams are created for flood control). • Water Diversion (small dam used to divert water for irrigation, power generation, or other uses) • Weirs Dam and Locks Dams are used for navigation of water vessels • Recreation and aquatic beauty	• Perished Vital Archeological Sites
Power Sector	• Eastern Freight Corridor will provide connectivity to the eastern coalfields of India – which is very important for thermal power projects. • Eradicate the shortfall in availability of power.	• Unreliable and intermittent power supply creates uncertainties with respect to scheduling and completion of production processes. • The impact of intermittent power supply is mainly on units in Kanpur – Leather and Leather Products and Plastic Packaging

DFCCIL Corridor Impacts from other Development Projects - III

Item	Positive Impacts	Negative Impacts
Industrial Development		
Industrial area development/ Integrated Industrial Development Parks/areas, Industrial Corridors/ Long Stretch Identified only for Industrial Development, Industrial SEZs, Logistic Parks, Local Communities	▪ Increase in employment opportunity in the related and allied sector ▪ Price of land will increase. ▪ Land will be acquired in good rates. ▪ Property rates will increase. ▪ Employment opportunities for the local youth and Opportunities to the local communities to establish Small and medium business. ▪ Preference of employment may be given to the local villagers.	▪ Land acquisition. ▪ Loss of agriculture land. ▪ Loss of agriculture productivity. ▪ Development of slums and illegal colonies ▪ Pollution and sanitation problem. ▪ Immigration from other states. ▪ Traffic jam. ▪ Population increase ▪ Crime rate may increase.
Transportation		
National Highways State Highways/ Express ways Near the corridor being developed/10 km radius	▪ Increase in employment opportunity in the related and allied sector ▪ Road transportation will be smooth and less load/pressure on roads of the traffic ▪ Better connectivity to railway stations ▪ Construction of new roads and other approach roads. ▪ Traffic blockage will be less ▪ Accessibility to stations from nearer villages to export their products ▪ Heavy Commercial traffic will be less on the road ▪ Pollution will be less due to less commercial vehicles	▪ Accessibility may be affected in many places due to the track ▪ Drainage , sewage and water logging problem Land acquisition for new roads/ways and subways
Transport Nagar/Dedicated trade parking areas within 10 km radius	▪ Increase in employment opportunity in the related and allied sector ▪ Urbanization ▪ Proper parking areas ▪ New business opportunities for the local communities	▪ Traffic load may increase ▪ Illegal parking will affect the traffic ▪ Development of slums ▪ Pollution and sanitation problem
Waterways/within 10 km radius	▪ Increase in employment opportunity in the related and allied sector ▪ Connectivity to Waterways ▪ Heavy Commercial traffic will be less on the road ▪ Pollution will be less due to less commercial vehicles Employment opportunities will increase in waterways ,DFCCIL, and road connectivity	▪ Land acquisition for all the development projects ▪ Agriculture activities will be less and will affect the production of agriculture also.

Item	Positive Impacts	Negative Impacts
	▪ Availability of cheaper goods in the market due to less freight charges	
Aviation/Airport within 10 km radius	▪ Increase in employment opportunity in the related and allied sector ▪ Fast mode of transportation	▪ Traffic will increase ▪ Land acquisition ▪ Agriculture activities will be less and will affect the production of agriculture also.
Agriculture/irrigation projects	▪ Transportation Facilities for the crops and other agriculture products. ▪ Transportation rates will be less and may be benefiting to the farmers. ▪ Easily availability of seeds and fertilizers. ▪ Wastage will be less due to timely transportation. ▪ Easy, Simple safe and time saving process of transportation will be beneficial to both government as well as farmers.	▪ Loss of agriculture land due to land acquisition ▪ Loss of livelihood for farmers who are dependent upon agriculture ▪ Income loss ▪ Difficulty in accessibility to both side the track where land is divided into two parts. ▪ Loss of agriculture land ▪ Loss of agriculture production ▪ Water table may go down
Power projects – Substations/ Transmission lines	▪ Better power supply for DFC ▪ Power may be available 24 hours in the village separate lines are installed.	▪ Land acquisition for substation and transmission line ▪ Agriculture activities will be less and will affect the production of agriculture also.
Real estate developments, Hospitals/Medical facilities, Local Communities	▪ Increase in land price ▪ Basic infrastructure facilities will be more with urbanization ▪ provision of health facilities in the area ▪ New opening of health institution with latest health facilities (Lab, OT, etc.) ▪ Urbanization ▪ Employment opportunities	▪ Slums may develop ▪ In immigration of labour from other states ▪ Pollution and sanitation problem in the area ▪ Irritation ▪ Health problems may increase ▪ Excessive population ▪ Immigration of labour from other state ▪ Crime rate may increase

Annexure - 6.4: District Through which EDFC Traverses

Village-Wise

EDFC-1

Sr. No	District Name	Tahsil	Village Name	Approx Area (ha)
1	Kanpur Dehat	Akbarpur	Bhaupur	0.18
2	Kanpur Dehat	Akbarpur	Singhpur Derni	**3.46**
3	Kanpur Dehat	Akbarpur	Bhikhar	3.20
4	Kanpur Dehat	Akbarpur	Aat	17.50
5	Kanpur Dehat	Akbarpur	Sabalpur Bithur	1.63
6	Kanpur Dehat	Akbarpur	Raipalpur	34.76
7	Kanpur Dehat	Akbarpur	Bhatuamau	4.80
8	Kanpur Dehat	Akbarpur	Pitrapur	8.90
9	Kanpur Dehat	Akbarpur	Kharagpur Bithur	6.80
10	Kanpur Dehat	Akbarpur	Aliyapur	4.90
11	Kanpur Dehat	Akbarpur	Behata	1.10
12	Kanpur Dehat	Akbarpur	Sunbarsa	1.40
13	Kanpur Dehat	Akbarpur	Chandwa Kishanpur	0.30
14	Kanpur Dehat	Akbarpur	Kairani	0.90
15	Kanpur Dehat	Akbarpur	Mandouli	0.80
16	Kanpur Dehat	Akbarpur	Asaini	0.61
17	Kanpur Dehat	Akbarpur	Patra tipa	0.00
18	Kanpur Dehat	Akbarpur	Roshan Mau	0.60
19	Kanpur Dehat	Akbarpur	Ekghara	3.90
20	Kanpur Dehat	Akbarpur	Gaiju Mau	1.90
21	Kanpur Dehat	Akbarpur	Rura	1.50
22	Kanpur Dehat	Akbarpur	Jagdishpur	2.00
23	Kanpur Dehat	Akbarpur	Saraya I	6.00
24	Kanpur Dehat	Derapur	Injuwarampur	3.20
25	Kanpur Dehat	Derapur	Mamoripur	0.10
26	Kanpur Dehat	Derapur	Ambiyapur	3.40
27	Kanpur Dehat	Derapur	Alawalpur	0.70
28	Kanpur Dehat	Derapur	Sarkauda	0.40
29	Kanpur Dehat	Derapur	Amauli Thakurana	7.50
30	Kanpur Dehat	Derapur	MuderaVikram Singh	1.70
31	Kanpur Dehat	Derapur	Kamalpur	1.40
32	Kanpur Dehat	Derapur	Khanpur Chain	11.60
33	Kanpur Dehat	Derapur	Khamaila	13.10
34	Kanpur Dehat	Derapur	Nasir Kheda	2.30
35	Kanpur Dehat	Derapur	Turna	0.20
36	Kanpur Dehat	Derapur	Jhinjhak	0.20
37	Kanpur Dehat	Derapur	Badgawan	2.80
38	Kanpur Dehat	Derapur	Shahpur Derapur	5.10
39	Kanpur Dehat	Derapur	Parjani	3.60
40	Kanpur Dehat	Derapur	Ranipur Rasulabad	4.10
41	Kanpur Dehat	Derapur	Bankhas	7.50
42	Auraiya	Bidhuna	Naugawan	1.70
43	Auraiya	Bidhuna	Dhekiyapur	5.70
44	Auraiya	Bidhuna	Sukhampur	3.70
45	Auraiya	Bidhuna	Hartauli	2.10

Sr. No	District Name	Tahsil	Village Name	Approx Area (ha)
46	Auraiya	Bidhuna	Bijhai-I	4.30
47	Auraiya	Auraiya Sadar	Umari	4.60
48	Auraiya	Auraiya Sadar	Kakarahi	2.30
49	Auraiya	Auraiya Sadar	Lakhanapur	1.80
50	Auraiya	Auraiya Sadar	Jamuha	0.30
51	Auraiya	Auraiya Sadar	Kanjari	6.30
52	Auraiya	Auraiya Sadar	Siganpur	2.20
53	Auraiya	Bidhuna	Kanho	5.00
54	Auraiya	Bidhuna	Pata	5.10
55	Auraiya	Bidhuna	Kamara	2.70
56	Auraiya	Bidhuna	Purwasa	2.00
57	Auraiya	Bidhuna	Chandrua Phaphood	2.50
58	Auraiya	Bidhuna	Dashehara	2.10
59	Auraiya	Bidhuna	VeerpurI	18.50
60	Auraiya	Bidhuna	Banshi	2.30
61	Auraiya	Bidhuna	Bajhera	0.50
62	Auraiya	Bidhuna	Gunauli	5.50
63	Auraiya	Bidhuna	Nagaria	4.40
64	Auraiya	Bidhuna	Baisoli Dehat	15.90
65	Auraiya	Bidhuna	Chhachhud	0.01
66	Auraiya	Bidhuna	Ghasara	9.60
67	Etawah	Bharthana	Samhon	15.30
68	Etawah	Bharthana	Kathamau	0.60
69	Etawah	Bharthana	Thari	8.00
70	Etawah	Bharthana	Pali Khurad	3.40
71	Etawah	Bharthana	Pali Kala	18.60
72	Etawah	Bharthana	Sujipur	5.60
73	Etawah	Bharthana	Sahajpur Gyanpur	6.40
74	Etawah	Bharthana	Modhi	6.70
75	Etawah	Bharthana	Turkpur PP	9.20
76	Etawah	Bharthana	Asafpur	3.10
77	Etawah	Bharthana	Kandhesi Pachar	7.50
78	Etawah	Bharthana	Singhpura	2.50
79	Etawah	Bharthana	Ikarpur	3.30
80	Etawah	Bharthana	Medhi Dudhi	13.50
81	Etawah	Bharthana	Nigoha Ikarpur	4.60
82	Etawah	Bharthana	Buapur	15.80
83	Etawah	Bharthana	Ritaur	6.80
84	Etawah	Etawah	Shekhupur Jakhauli	15.30
85	Etawah	Etawah	Chandanpur	9.90
86	Etawah	Etawah	Nauli	24.70
87	Etawah	Etawah	Chitbhawan	12.30
88	Etawah	Etawah	Lakhapur	10.40
89	Etawah	Etawah	Hariharpur	8.40
90	Etawah	Etawah	Ahladpur	8.90
91	Etawah	Etawah	Etgaon	12.70
92	Etawah	Safai	Umrai	3.40
93	Etawah	Safai	Chakoopur	2.60
94	Etawah	Jaswant Nagar	Hazaratpur	0.30
95	Etawah	Jaswant Nagar	Jaitia	11.50
96	Etawah	Jaswant Nagar	Sonai	6.70
97	Etawah	Jaswant Nagar	Bhainsrai	13.30

Sr. No	District Name	Tahsil	Village Name	Approx Area (ha)
98	Etawah	Jaswant Nagar	Adhiyapur	5.70
99	Etawah	Jaswant Nagar	Nidarpur	5.50
100	Etawah	Jaswant Nagar	Siyapur Etgaon	2.90
101	Etawah	Jaswant Nagar	Malhupur	9.60
102	Etawah	Jaswant Nagar	Malahjani	16.95
103	Etawah	Jaswant Nagar	Bhataura	19.07
104	Etawah	Jaswant Nagar	Kaist	13.20
105	Etawah	Jaswant Nagar	Ludhpura	1.41
106	Etawah	Jaswant Nagar	Sisahat	5.88
107	Etawah	Jaswant Nagar	Tamera	3.69
108	Etawah	Jaswant Nagar	Rajpur	1.13
109	Etawah	Jaswant Nagar	Tamheri	2.33
110	Etawah	Jaswant Nagar	Gharwar	6.23
111	Etawah	Jaswant Nagar	Balrai	4.05
112	Etawah	Jaswant Nagar	D Gopalpur	4.53
113	Etawah	Jaswant Nagar	Rautai	1.16
114	Etawah	Jaswant Nagar	Bibamau	10.28
115	Etawah	Jaswant Nagar	Manikpurr	1.75
116	Etawah	Jaswant Nagar	Bauth	1.19
117	Firozabad	Shikohabad	Korari	4.24
118	Firozabad	Shikohabad	Mai Gadhokha	2.54
119	Firozabad	Shikohabad	Khorai Azanaura	3.58
120	Firozabad	Shikohabad	Bhadan	29.56
121	Firozabad	Shikohabad	Alampur Jhapata	2.59
122	Firozabad	Shikohabad	Lahatai	1.48
123	Firozabad	Shikohabad	Bachemai	2.74
124	Firozabad	Shikohabad	Jayamai	1.81
125	Firozabad	Shikohabad	Bithauli	2.48
126	Firozabad	Shikohabad	Ujarai	4.27
127	Firozabad	Shikohabad	Korara Khurd	10.49
128	Agra	Etmadpur	Nagla Pachauri	4.15
129	Agra	Etmadpur	Jamal Nagar Bhais	9.04
130	Agra	Etmadpur	Jampur	2.78
131	Mahamaya Nagar	Sadabad	Maharara	7.30
132	Mahamaya Nagar	Sadabad	Sedhariya	0.86
133	Mahamaya Nagar	Sadabad	Manikpur	2.80
134	Mahamaya Nagar	Sadabad	Makanpur	2.50
135	Mahamaya Nagar	Sadabad	Ishonda	2.70
136	Mahamaya Nagar	Sadabad	Kokna Khurd	8.50
137	Mahamaya Nagar	Sadabad	Khreya	2.50
138	Mahamaya Nagar	Sadabad	Salehpur Candwara	1.00
139	Mahamaya Nagar	Sadabad	Bhakulara	5.60
140	Mahamaya Nagar	Hathras	Aihan	1.90
141	Mahamaya Nagar	Hathras	Pura Khurd	0.90
142	Mahamaya Nagar	Hathras	Gadhi Khurti	0.70
143	Mahamaya Nagar	Hathras	Pura kala	7.60
144	Mahamaya Nagar	Hathras	Kharwa	0.40
145	Mahamaya Nagar	Hathras	Ber gaun	1.60
146	Mahamaya Nagar	Hathras	Veer Nagar	10.90
147	Mahamaya Nagar	Hathras	Gaugauli	10.30
148	Mahamaya Nagar	Hathras	Sikandarpur	7.70
149	Mahamaya Nagar	Hathras	Sithrauli	3.80

Sr. No	District Name	Tahsil	Village Name	Approx Area (ha)
150	Mahamaya Nagar	Hathras	Jalalpur	3.90
151	Mahamaya Nagar	Hathras	Rajpur	4.60
152	Mahamaya Nagar	Hathras	Suratpur	5.90
153	Mahamaya Nagar	Hathras	Mendu	15.30
154	Mahamaya Nagar	Hathras	Nagla Kharag	1.30
155	Mahamaya Nagar	Hathras	Rampur	4.04
156	Mahamaya Nagar	Hathras	Bhopatpur	4.40
157	Mahamaya Nagar	Hathras	Ajitpur	0.66
158	Mahamaya Nagar	Hathras	Dariyapur	7.04
159	Mahamaya Nagar	Sasani	Lutsan	12.30
160	Mahamaya Nagar	Sasani	Sitahari	11.00
161	Mahamaya Nagar	Sasani	Harauli	2.20
162	Mahamaya Nagar	Sasani	Nagla Kehariya	2.90
163	Mahamaya Nagar	Sasani	Bandhnu Sikohabad	2.70
164	Mahamaya Nagar	Sasani	Virra	3.70
165	Mahamaya Nagar	Sasani	Jalalpur sasni	1.50
166	Mahamaya Nagar	Sasani	Nagla Singh	1.30
167	Mahamaya Nagar	Sasani	Nagla Sewa	1.30
168	Mahamaya Nagar	Sasani	Patti Fateli	1.60
169	Mahamaya Nagar	Sasani	Gohana	11.68
170	Mahamaya Nagar	Sasani	Khera Firozpur	1.02
171	Mahamaya Nagar	Sasani	Nagla Fatela	3.51
172	Mahamaya Nagar	Sasani	Nagla Jaheru	7.08
173	Mahamaya Nagar	Sasani	Tatarpur Mauhariya	5.53
174	Mahamaya Nagar	Sasani	Naujarpur	2.20
175	Mahamaya Nagar	Sasani	Mahmauta Khurd	6.80
176	Aligarh	Kaul	Pali Rajapur	3.30
177	Aligarh	Kaul	Alipur	3.50
178	Aligarh	Kaul	Mandrak	5.60
179	Aligarh	Kaul	Musepur Jalal	1.40
180	Aligarh	Kaul	Ghasipur	3.30
181	Aligarh	Kaul	Hazipur Fateh Khan	4.20
182	Aligarh	Kaul	Chirauli Daud Khan	7.20
183	Aligarh	Kaul	Parhawali	9.30
184	Aligarh	Kaul	Rustampur Sakt Khan	5.20
185	Aligarh	Kaul	Hazipur Chauhta	2.90
186	Aligarh	Kaul	Kasba Kol	1.00
187	Aligarh	Kaul	Daultabad	3.30
188	Aligarh	Kaul	Mulla para Bhujpura	7.60
189	Aligarh	Kaul	Talaspur Khurd	5.50
190	Aligarh	Kaul	Chamrola	2.70
191	Aligarh	Kaul	Shahpur Kutub	3.10
192	Aligarh	Kaul	Ibrahimpur	8.40
193	Aligarh	Kaul	Salempur Mafi	5.00
194	Aligarh	Kaul	Keshopur Jofari	7.90
195	Aligarh	Kaul	Lahausra Visawan	9.70
196	Aligarh	Kaul	Rustampur Ankhan	2.40
197	Aligarh	Kaul	Jatanpur Chikavati	8.50
198	Aligarh	Kaul	Lekhrajpur	6.80
199	Aligarh	Kaul	Khera Khush Khabar	9.20
200	Aligarh	Kaul	Bhakari Khas	9.10
201	Aligarh	Kaul	Hayatpur Bajhera	7.10

Sr. No	District Name	Tahsil	Village Name	Approx Area (ha)
202	Aligarh	Gabhana	Barauth Chhajmal	6.30
203	Aligarh	Gabhana	Kaurah Rustampur	9.10
204	Aligarh	Gabhana	Pala Sallu	10.70
205	Aligarh	Gabhana	Chuharpur	8.50
206	Aligarh	Gabhana	Ogar Nagla Raju	8.20
207	Aligarh	Gabhana	Kanoh	0.00
208	Aligarh	Gabhana	Rampur	0.00
209	Aligarh	Gabhana	Somana	0.00
210	Aligarh	Gabhana	Dyorau Chandpur	0.00
211	Aligarh	Gabhana	Nurullapur	0.00
212	Aligarh	Gabhana	Pahawati	0.00
213	Aligarh	Gabhana	Baghwanpur	0.00
214	Aligarh	Gabhana	Kinhua	0.00
215	Aligarh	Gabhana	Bhogpur	0.00
216	Aligarh	Gabhana	Dilawarpur	0.00
217	Bulandshahar	Khurja	Bagpura	0.00
218	Bulandshahar	Khurja	Dabour	0.00
219	Bulandshahar	Khurja	Naglacut	0.00
220	Bulandshahar	Khurja	Tahagora	0.00
221	Bulandshahar	Khurja	Nayawas Naysar	0.00
222	Bulandshahar	Khurja	Sahapur Mevgadi	0.00
223	Bulandshahar	Khurja	Kamarpur Majra Naysar	0.00
224	Bulandshahar	Khurja	Keyuli Kala	0.00
225	Bulandshahar	Khurja	Doshpur Dadupur	0.00

EDFC-2

District	Tahsil	Village	Affected Area
Kanpur Nagar	Sadar	Pakari	1.65
Kanpur Nagar	Sadar	Dhar mangatpur	1.30
Kanpur Nagar	Sadar	Taudhakpur	0.21
Kanpur Nagar	Sadar	Tikariyan	2.10
Kanpur Nagar	Sadar	Gadhi kanpur	1.04
Kanpur Nagar	Sadar	Nagawan	4.03
Kanpur Nagar	Sadar	Fufwar	7.78
Kanpur Nagar	Sadar	Hathigaon	2.65
Kanpur Nagar	Kanpur Sadar	Binor	6.51
Kanpur Nagar	Kanpur Sadar	Bhisar	4.16
Kanpur Nagar	Kanpur Sadar	Pathehuri	1.86
Kanpur Nagar	Kanpur Sadar	Rampur khash	0.25
Kanpur Nagar	Kanpur Sadar	Gopalpur	3.24
Kanpur Nagar	Kanpur Sadar	Sanigaoun	2.80
Kanpur Nagar	Kanpur Sadar	Imlipur	3.13
Kanpur Nagar	Kanpur Sadar	Chatmara	15.01
Kanpur Nagar	Kanpur Sadar	Subhuli	4.57
Kanpur Nagar	Kanpur Sadar	Bingaon	1.11
Kanpur Nagar	Kanpur Sadar	Sajari	0.47
Kanpur Nagar	Kanpur Sadar	Tikra pagambarpur	2.41
Kanpur Nagar	Kanpur Sadar	Rampur bhimsen	11.21
Kanpur Nagar	Kanpur Sadar	Shen pachimpara	3.33
Kanpur Nagar	Kanpur Sadar	Shen purabpara	6.37

Kanpur Nagar	Kanpur Sadar	Sarsholl	0.76
Kanpur Nagar	Kanpur Sadar	Sachendi	9.94
Kanpur Nagar	Kanpur Sadar	Dhuruvakheda	11.16
Kanpur Nagar	Kanpur Sadar	Hathipur	5.16
Kanpur Nagar	Kanpur Sadar	Mharajpur	1.64
Kanpur Nagar	Kanpur Sadar	Katongar	0.28
Kanpur Nagar	Kanpur Sadar	Katraghanshyam	0.85
Kanpur Nagar	Kanpur Sadar	Naugava	0.34
Kanpur	Kanpur Sadar	Badagaon	1.15
Kanpur	Kanpur Sadar	Karbigwan	2.60
Fatehpur	Bindki	Rampur	0.93
Fatehpur	Bindki	Sikrodhi	5.05
Fatehpur	Bindki	Habibpur	0.39
Fatehpur	Bindki	Aung	0.34
Fatehpur	Bindki	Bsawanpur	1.82
Fatehpur	Bindki	Pahbehta	0.53
Fatehpur	Bindki	Umrauli klyanpur	0.28
Fatehpur	Bindki	Umargahna	0.18
Fatehpur	Bindki	Dagdaiya	0.49
Fatehpur	Sadar	Mitthanpur khurana	8.26
Fatehpur	Sadar	Astibajyapti	2.49
Fatehpur	Sadar	Sathariyav	4.42
Fatehpur	Fatehpur	Ajmabad bhaisai	1.07
Fatehpur	Fatehpur Sadar	Bhairampur	0.37
Fatehpur	Fatehpur Sadar	Ikari	1.92
Fatehpur	Fatehpur	Daniyalpur	0.17
Fatehpur	Fatehpur	Sangaon	1.25
Fatehpur	Fatehpur	Gauri	1.71
Fatehpur	Fatehpur	Andauli	0.06
Fatehpur	Fatehpur	Malaka	2.49
Fatehpur	Fatehpur	Mau	1.40
Fatehpur	Fatehpur	Rampur khurana	1.76
Fatehpur	Fatehpur	Sadanpur	1.72
Fatehpur	Fatehpur	Bibipur	0.86
Fatehpur	Fatehpur	Birahimpur	0.24
Fatehpur	Fatehpur	Bakshpur	3.43
Fatehpur	Fatehpur	Khambapur	2.87
Fatehpur	Fatehpur	Kandhi	0.61
Fatehpur	Fatehpur	Bhojpur	2.85
Fatehpur	Fatehpur	Khumaripur	0.45
Fathaipur	Bindki	Hasanpur	0.24
Fathaipur	Bindki	Baswan kheda	0.11
Fathaipur	Bindki	Birbudhanpur	0.07
Fathaipur	Bindki	Ashwha bakshpur	0.17
Fathaipur	Bindki	Korai	1.98
Kanpur	Kanpur sadar	Nawgawa	0.23
Fathaipur	Bindki	Mamrejpur	2.95
Fatehpur	Fatehpur Sadar	Chakheri	0.09
Fatehpur	Fatehpur Sadar	Chak teksari	0.04
Fatehpur	Fatehpur Sadar	Faijullapur	0.19
Fatehpur	Fatehpur Sadar	Jamalpur	0.41
Fatehpur	Fatehpur Sadar	Imadpur	0.43

Fatehpur	Fatehpur Sadar	Chaksada	0.50
Fatehpur	Fatehpur Sadar	Birabudhanpur	0.12
Fatehpur	Fatehpur Sadar	Kursti kala	0.35
Fatehpur	Fatehpur Sadar	Ramwa panthua	0.97
Fatehpur	Fatehpur Sadar	Bahrampur	0.56
Fatehpur	Fatehpur Sadar	Alavalpur	0.67
Fatehpur	Fatehpur Sadar	Musaidpur	0.33
Fatehpur	Fatehpur Sadar	Atraha	1.33
Fatehpur	Khaga	Pambipur	2.35
Fatehpur	Khaga	Chhimi	9.65
Fatehpur	Khaga	Chak katoghan	0.31
Fatehpur	Khaga	Shujarhi	0.20
Fatehpur	Khaga	Puraen	0.18
Fatehpur	Khaga	Kukra	0.54
Fatehpur	Khaga	Sahjadpur khaga	0.47
Fatehpur	Khaga	Majhteni	0.51
Kausambhi	Sirathu	Sirathu	13.33
Kaushambi	Shirathu	Garai	0.30
Kaushambi	Shirathu	Shinghiya amadkrari	0.66
Kaushambi	Sirathu	Bamhrauli	3.47
kaushambhi	Sirathu	Dhamai	0.68
kaushambhi	Sirathu	Govindpur goriyo	12.16
Kausambhi	Sirathu	Dodapur	0.28
Kaushambi	Sirathu	Bidanpur	1.94
Kausambhi	Sirathu	Rasulpur girchha	1.38
Kausambhi	Sirathu	Kanwar	1.34
Kausambhi	Sirathu	Nagiamai	0.10
Kausambhi	Sirathu	Sayaramithepur	1.60
Kausambhi	Sirathu	Sarho	0.54
Kausambhi	Sirathu	Kuramuridan	0.40
Kausambhi	Sirathu	Naudiya ahmad karari	1.26
Kaushambi	Chayal	Khanpur satawan	7.11
Kausambhi	Chayal	Parasara	4.07
Kausambhi	Chayal	Daniyalpur	0.27
Kausambhi	Chayal	Malak nagar	0.36
Kausambhi	Chayal	Mahmudpur	0.33
Kausambhi	Chayal	Chilla shah baji	0.59
Kausambhi	Chayal	Mahgoan	0.20
Kausambhi	Chayal	Jalalpur borio	0.54
Kausambhi	Chayal	Amanilokipur	0.33
Kausambhi	Chayal	Sarawan kaji	0.30
Kausambhi	Chayal	Raiyadehmafi	0.01
Kausambhi	Chayal	Faridpur tappa malak	0.83
Kausambhi	Chayal	Malak muddinpur	0.23
Kausambhi	Chayal	Asarafpur ta asadullah	3.91
Kausambhi	Chayal	Ashdullahpur rohi	0.32
Kausambhi	Chayal	Bhithi deh mafi	0.23
Allahabad	Allahabad	Bhagwatpur	0.62
Allahabad	Allahabad	Bhiti	2.29
Allahabad	Allahabad Sadar	Damupur	3.77
Allahabad	Allahabad	Peepalgaon	1.72
Allahabad	Allahabad Sadar	Kuswa	4.48

Allahabad	Allahabad Sadar	Kak bajha	0.11
Allahabad	Allahabad sadar	Baksihmoda	4.93
Allahabad	Allahabad sadar	Nashirpu silna	0.68
Allahabad	Allahabad sadar	Mandari	2.58
Allahabad	Allahabad sadar	Lakhanpur	2.20
Allahabad	Allahabad sadar	Manauri	2.28
Allahabad	Karchna	Gandhiyav	0.26
Allahabad	Karchana	Mohinudinpur	2.01
Allahabad	Karchana	Dandupur	2.28
Allahabad	Karchana	Byohara	4.20
Allahabad	Karchana	Gadhuva kala	5.79
Allahabad	Karchana	Piparasa	0.48
Allahabad	Karchana	Baswar	2.87
Allahabad	Karchana	Mohabbat ganj	3.89
Allahabad	Karchana	Nivi taluka khurd	6.69
Allahabad	Karchana	Bharauha	1.03
Allahabad	Karchana	Chakvishuni	1.27
Allahabad	Allahabad Sadar	Katauhla gauspur	0.21
Allahabad	Karchana	Chakdurgadutt	0.33
Allahabad	Karchana	Chakghinadu	0.95
Allahabad	Karchana	Baramar	0.85
Allahabad	Karchana	Jamauli	4.70
Allahabad	Karchana	Chakpremgiri	0.68
Allahabad	Karchana	Bharaha	1.61
Allahabad	Karchana	Tendue khurd	1.75
Allahabad	Karchana	Rampur	0.25
Allahabad	Karchana	Chakpure miyakhurd	3.26
Allahabad	Karchana	Gandhiyaw	3.30
Allahabad	Karchana	Hardua	0.45
Allahabad	Karchana	Basriya	2.40
Allahabad	Karchana	Ghodedih	2.52
Allahabad	Karchana	Puraini	0.38
Allahabad	Karchana	Mungari	3.54
Allahabad	Karchana	Bajha	5.96
Allahabad	Karchana	Naini ta dadri	0.10
Allahabad	Karchana	Rampu ta manguri	0.18
Allahabad	Karchana	Bhandra umar ganj	1.43
Allahabad	Karchana	Masika	7.81
Chandauli	Chandauli	Sengar	9.43
Chandauli	Chandauli	Patanwa	6.16
Chandauli	Chandauli	Jeevnathpur	10.30
Chandauli	Chandauli	Doulatpur	12.43
Chandauli	Chandauli	Hinduari	4.78
Mirzapur	Chunar	Aangapur	12.80
Mirzapur	Chunar	Bhabhuar	9.04
Mirzapur	Chunar	Kailhat	42.41
Mirzapur	Chunar	Gurkhuli	7.33
mirzapur	Chunar	Bakunthpur	3.48
MIRZAPUR	Sadar	Kathinai	19.78
Mirzapur	Chunar	Jairampur	9.37
Mirzapur	Chunar	Jamalpur	17.06
Mirzapur	Chunar	Narayanpur	5.76

Mirzapur	Chunar	Pachewra	22.52
Mirzapur	SADAR	Chandaipur	42.17
Mirzapur	Chunar	Bahramganj	12.73
Mirzapur	Chunar	Bisunpur	15.49
Mirzapur	Chunar	Dikdhitpur	10.44
Mirzapur	Chunar	Kundhadeh	9.72
Mirzapur	Sadar	Devpur	24.64
Mirzapur	Sadar	Halka	9.32
Mirzapur	Sadar	Mulhava	0.61
Mirzapur	Sadar	Purendi	4.05
Mirzapur	Sadar	Sadako	1.08
Mirzapur	Chunar	Bhormarmafi	36.54
Chandauli	Chandauli	Hisampur	12.60
Mirzapur	Chunar	Kashipur	17.05
Mirzapur	Chunar	Khairuddin pur	2.62
Mirzapur	Chunar	Naugraho	0.75
Mirzapur	chunar	Sahaspur	5.38
Mirzapur	Chunar	Ughi pur	23.61
Mirzapur	Sadar	Adhawar	12.33
Mirzapur	Sadar	Akodhi	0.90
Mirzapur	Sadar	Akodhi	0.89
Mirzapur	Sadar	Amoi	53.55
Mirzapur	Sadar	Chapagahana	13.54
Mirzapur	Sadar	Devahi	12.88
Mirzapur	Sadar	Kantit	19.99
Mirzapur	Sadar	Karanpur	21.27
Mirzapur	Sadar	Niwadiya	9.51
Mirzapur	Sadar	Raipura	20.25
Mirzapur	Sadar	Ranibari	13.96
Mirzapur	Sadar	Shivpur [rashul]	4.48
Mirzapur	Sadar	Shindhora	26.55
Mirzapur	Sadar	Sirsi bghael	6.30
Mirzapur	Chunar	Barjivanpur	41.17
Allahabad	Chunar	Nakahara	49.96
Mirzapur	Chunar	Darra	85.43
Mirzapur	Chunar	Dhaurhara	75.19
Mirzapur	Chunar	Jamui	5.81
Mirzapur	Chunar	Karhat	18.75
Mirzapur	Chunar	Kolaundh	19.48
Mirzapur	Chunar	Lalapur	1.17
Mirzapur	Chunar	Fulwari	6.72
Mirzapur	Chunar	Gosaipur	8.30
Mirzapur	Chunar	Salempur	2.61
Mirzapur	Sadar	Belwan	181.26
Mirzapur	Sadar	Rampur	0.35
Mirzapur	Sadar	Belwan	0.00
Mirzapur	Sadar	Gopal pur	43.12
Mirzapur	Sadar	Sirsi gaharvar	32.06
Mirzapur	Sadar	Bhiskuri	34.90
Mirzapur	Sadar	Barji mukundpur	31.08
Mirzapur	Sadar	Chandaipur	45.08
Mirzapur	Sadar	Lauriya	18.54

Mirzapur	Sadar	Mahraura	0.02
Mirzapur	Sadar	Baudari	16.10
Mirzapur	Sadar	Rajapur	33.37
Allahabad	Meja	Vabhani hethar	23.95
Allahabad	Meja	Dighiya	34.26
Allahabad	Meja	Kathauli	29.74
Allahabad	Meja	Lahedi	30.55
Allahabad	Meja	Sorawpatti	29.47
Allahabad	Meja	Sonai	30.36
Allahabad	Meja	Baksandi	2.24
Fatehpur	Meja	Hempur	8.60
Allahabad	Meja	Kukhuri	8.88
Allahabad	Meja	Chakdeeha	1.21
Allahabad	Meja	Sarwanpur	3.54
Allahabad	Meja	Manpur	6.14
Allahabad	Meja	Tikari	32.11
Fatehpur	Meja	Umapur kalan	18.10
Allahabad	Meja	Umapur khurd	17.39
Allahabad	Meja	Garetha	6.17
Allahabad	Meja	Chorbna	2.64
Allahabad	Meja	Amliyakala	48.94
Allahabad	Meja	Kotaha	22.08
Allahabad	Meja	Bishijan khurd	9.62
Allahabad	Meja	Bisajhjan kala	39.61
Allahabad	Meja	Kathar	23.67
Allahabad	Meja	Samhan	127.29
Allahabad	Karchana	Ghodedih	19.51
Allahabad	Karchana	Tendue khurd	8.09
Allahabad	Karchana	Gandhiyaw	40.63
Allahabad	Karchana	Hardua	22.44
Allahabad	Karchana	Puraini	3.61
Allahabad	Karchana	Bharaha	15.07
Allahabad	Karchana	Basriya	22.71
Allahabad	Karchana	Mungari	45.03
Allahabad	Karchana	Rampur	14.04
Chandauli	Chandauli Sadar	Sindhi tali	33.04

EDFC-3

S. No	District Name	Tahsil	Village Name	Approx Area (ha)
1	2	3	4	5
1	Bulandsahar	Khurja	Samaspur	8.2848
2			Sultanpur	1.9899
3			Kamalpur Mazra Bhadaura	3.7321
4			Bhadaura	1.0304
5			Khabra	3.0589
6		Sikandarabad	Khanpur	9.1773
7			Kadarpur	0.7212
8			Gangraul	10.1758
9			Fatehpur Jado	4.6855
10			Aroda	2.7209
11			Salauni Alias Rauni	4.1868
12			Makrandpur alias Fatehpur	3.3578
13			Mukundpur Gadhi / Mahepa jageer	1.2950
14			Wair Badshahpur	12.5209
15			Bhaura	9.2765
16	Gautam Budh Nagar	Sadar	Astauli	4.5384
17			Devta	4.7038
18			Kherli hafizpur	1.6370
19			Jamalpur	2.1500
20			Raghunathpur	3.9139
21			Chersi	6.0484
22		Dadri	Rithauri	4.0652
23			Ajayabpur	1.8780
24			Kaimrala Chakrasenpur	0.2529
25			Ghodi Bachheda	2.7687
26			Chamrawali Ramgarh	3.6609
27			Hazratpur	3.1707
28			Chamrawali Boraki	5.0844
29			Thapkheda	0.7028
30			Palla	4.9670
31			Pali	6.3998
32			Mayacha	0.2189

Annexure 7.1: Poverty alleviation programmes

In addition to the provisions designed in the Resettlement Plans the DFCCIL should also integrate State Government and Central Government level livelihood programs like the Skills Development programs so that other family members of these vulnerable and affected families could be benefitted. These programs are both available at the State level and the Central Level Schemes.

Keeping in view the fact that a large number of vulnerable persons are being affected it is important to have a higher level of coordination with the relevant State government departments and the Central government departments. The program and the description of each program has been provided below in this document. The package wise NGOs appointed for implementation of the respective Resettlement Plans should evaluate the applicability of each program on a case to case basis for the affected families/persons and arrange for facilities under the government schemes as necessary. The programmes are given:

Poverty alleviation programmes

- National Old Age Pension Scheme (NOAPS)
- National family Benefit Scheme (NFBS)
- National Maternity Benefit Scheme
- Annapurna
- Integrated Rural Development Program(IRDP)
- Rural Housing-Indira awas Yojana (IAY) (initiated in 1985)
- National Rural Employment Guarantee Act (NREGA)

No.	Name of the program	Description of the program
1.	National Old Age Pension Scheme (NOAPS)	As the name suggests this scheme provides pension to old people who were above the age of 65['Now 60']who could not fend for themselves and did not have any means of subsistence. The pension that was given was Rs 200 a month. This pension is given by the central government. The job of implementation of this scheme in states and union territories is given to panchayats and municipalities. The amount of old age pension is Rs. 200 per month for applicants aged 60–79. For applicants aged above 80 years, the amount has been revised in Rs. 500 a month according to the (2011–2012) Budget.
2.	National family Benefit Scheme (NFBS)	This scheme provides a sum of 20000 Rs to a person of a family who becomes the head of the family after the death of its primary breadwinner. The breadwinner is defined as a

No.	Name of the program	Description of the program
		person who is above 18 who earns the most for the family and on whose earnings the family survives. It is for families below the poverty line.
3.	National Maternity Benefit Scheme	This scheme provides a sum of 500 Rs to a pregnant mother for the first two live births. The women have to be older than 19 years of age. It is given normally 12–8 weeks before the birth and in case of the death of the child the women can still avail it.
4.	Annapurna	This scheme was started by the government to provide food to senior citizens who cannot take care of themselves and are not under the National Old Age Pension Scheme (NOAPS), and who have no one to take care of them in their village. This scheme would provide 10 kg of free food grains a month for the eligible senior citizens.
5.	Integrated Rural Development Program(IRDP)	IRDP in India is among the world's most ambitious programs to alleviate rural poverty by providing income-generated assets to the poorest of the poor. The main objective of IRDP is to raise families of identified target group below poverty line by creation of sustainable opportunities for self-employment in the rural sector. Assistance is given in the form of subsidy by the government and term credit advanced by financial institutions (commercial banks, cooperatives and regional rural banks). The target group under IRDP consists of small and marginal farmers, agricultural laborers and rural artisans having annual income below Rs. 11,000 defined as poverty line in the Eighth Plan. In order to ensure that benefits under the program reach the more vulnerable sectors of the society, it is stipulated that at least 50 per cent of assisted families should be from scheduled castes and scheduled tribes with corresponding flow of resources to them. Furthermore, 40 per cent of

No.	Name of the program	Description of the program
		the coverage should be of women beneficiaries and 3 per cent of physically challenged persons. At the grassroots level, the block staff is responsible for implementation of the program. The State Level Coordination Committee (SLCC) monitors the program at state level whereas the Ministry of Rural Areas and Employment is responsible for the release of central share of funds, policy formation, overall guidance, monitoring and evaluation of the program.
6.	Rural Housing-Indira Awas Yojana (IAY)	This scheme aimed at creating housing for everyone. It aimed at creating 20 lakhs housing units out of which 13 lakhs were in rural area. This scheme also would give out loans to people at subsidized rates to make houses.
7.	National Rural Employment Guarantee Act (NREGA)	This scheme guarantees 150 days of paid work to people in the rural areas. The scheme has proved to be a major boost in Indian rural population's income.

List of Government Programs

No.	Name of Program/Scheme
1.	Community Development Programme (CDP) overall development of rural areas and people's participation
2.	Intensive Agriculture Development program (IADP) To provide loan for seeds and fertilizers to farmers
3.	Intensive Agriculture Area Programme (IAAP) To develop special harvest in agriculture area.
4.	Credit Authorization Scheme (CAS) Involved qualitative credit control of reserve bank of India

5.	High yielding variety programme (HYVP) To increase the productivity of food grains by adopting latest varieties of inputs of crops.
6.	Green Revolution: To Increase productivity. Confined to wheat production
7.	Rural Electrification Corporation to provide electricity in rural areas
8.	Scheme of Discriminatory Interest Rate to provide loan to the weaker sections of society at a concessional interest rate of 4%
9.	Accelerated Rural Water Supply Programme (ARWSP) Providing drinking water in villages
10.	Drought Prone Area Programme: Protection from drought by achieving environment balance and by developing ground water
11.	Crash Scheme for Rural Employment CSRE For rural employment
12.	Marginal Farmer and Agriculture Labor Agency (MFALA) Technical & financial assistance to marginal farmers
13.	Small Farmer Development Scheme SFDS Technical & financial assistance to small farmers
14.	Command Area Development Programme: (CADP) Better utilization of irrigational capacities
15.	Twenty Point Programme (TPP) Poverty eradication and an overall objective of raising the level living
16.	National Institution of Rural Development Training, investigation and advisory for rural development
17.	Desert Development Programme: (DDP) To control the desert expansion by maintaining environment balance
18.	Food For Work Programme: providing food grains to labor

19.	Antyodaya Yojna : Scheme of Rajasthan, providing economic assistance to poorest families
20.	Training Rural Youth for Self Employment TRYSEM (launched on 15th August) educational and vocational training
21.	Integrated Rural Development Programme: IRDP (launched on October 2, 1980) overall development of rural poor
22.	National Rural Development programme NREP employment for rural manforce
23.	Development of Women & Children in Rural Areas (DWCRA) sustainable opportunities of self employment to the women belonging to the rural families who are living below the poverty line.
24.	Rural Landless Employment Guarantee Programme (RLEGP) (Launched on August 15) employment to landless farmers and laborers
25.	Farmers Agriculture Service Centers FASCs Tell the people use of improved instruments of agriculture
26.	National Fund for Rural Development : To grant 100% tax rebate to donors and also to provide financial assistance for rural development projects
27.	Comprehensive Crop Insurance Scheme: Crop Insurance
28.	Council of Advancement of People's Action & Rural Technology (CAPART) Assistance to rural people
29.	Self Employment Programme for the Poor SEPUP Self employment through credit and subsidy
30.	National Drinking Water Mission: For rural drinking water renamed and upgraded to Rajiv Gandhi National Drinking Water Mission in 1991.
31.	Service Area Account Rural Credit

32.	Jawahar Rozgar Yojna : JRY Employment to rural unemployed 1989: Nehru Rozgar Yojna NRY Employment to Urban unemployed
33.	Agriculture & Rural Debt Relief Scheme: ARDRS Exempt Bank loans up to Rs. 10000 for rural artisans and weavers
34.	Scheme for Urban Micro Enterprises SUME Assist urban small entrepreneurs
35.	Scheme of Urban wage Employment SUWE Scheme for urban poor's
36.	Scheme of Housing and Shelter Upgradation (SHASU) Providing employment by shelter Upgradation
37.	National Housing Bank Voluntary Deposit Scheme Using black money by constructing low cost housing for the poor.
38.	National Renewal Fund This scheme was for the employees of the public sector
39.	Employment Assurance Scheme (EAS) (Launched on October, 2) Employment of at least 100 days in a year in villages
40.	Members of parliament Local Area Development Scheme MPLADS (December 23, 1993) Sanctioned 1 crore per year for development works
41.	Scheme for Infrastructural Development in Mega Cities: SIDMC Water supply, sewage, drainage, urban transportation, land development and improvement slums projects in metro cities
42.	District Rural Development Agency DRDA Financial assistance to rural people by district level authority
43.	Mahila Samridhi Yojna (October 2, 1993) Encourage rural women to deposit in Post office schemes
44.	Child labor Eradication Scheme Shift child labour from hazardous industries to schools

45.	Prime Minister Integrated Urban Poverty Eradication programme PMIUPEP to eradicate urban poverty
46.	Mid-day Meal Scheme: Nutrition to students in primary schools to improve enrolment, retention and attendance
47.	1996: Group Life Insurance Scheme for Rural Areas Insurance in rural area for low premium
48.	National Social Assistance programme: Assist BPL people.
49.	Ganga Kalyan Yojna Provide financial assistance to farmers for exploring ground water resources
50.	Kastoorba Gandhi Education Scheme: (15 August 1997) Establish girls' schools in low female literacy areas (district level)
51.	Swaran Jayanti Shahari Rojgar Yojna: Urban employment
52.	Bhagya Shree Bal Kalyan Policy Upliftment of female childs March
53.	Annapurna Yojna 10 kgs food grains to elderly people
54.	Swaran Jayanto Gram Swarojgar Yojna Self employment in rural areas
55.	Jawahar Gram Samriddhi Yojna Village infrastructure
56.	Jan Shree Bima Yojna Insurance for BPL people
57.	Pradhan Mantri Gramodaya Yojna Basic needs of rural people
58.	Antyodaya Anna Yojna To provide food security to poor
59.	Pradhan Mantri Gram Sadak Yojna: Connect all villages with nearest pukka road.
60.	Sampoorna Grameen Rozgar Yojna Employment and food security to rural people

61.	Valmiki Ambedkar Awas Yojna VAMBAY Slum houses in urban areas
62.	Universal health Insurance Scheme: Health insurance for Rural people
63.	Vande mataram Scheme VMS Initiative of public Private partnership during pregnancy check up.
64.	National Food for Work programme Supplementary wage as food grains for work
65.	Kastoorba Gandhi Balika Vidyalaya Setting up residential schools at upper primary levels for girls belonging to predominantly OBC, SC & ST
66.	Janani Suraksha Yojna Providing care to pregnant women
67.	Bharat Nirman Development of India through irrigation, Water supply, Housing, Road, Telephone and electricity
68.	National Rural Health Mission: Accessible, affordable, accountable, quality health services to the poorest of the poor on remotest areas of the country.
69.	Rajeev Gandhi Grameen Vidyuti Karan Yojna: Extending electrification of all villages and habitations and ensuring electricity to every household.
70.	Jawahar Lal Nehru national Urban Renewal Mission: (JNNURM) Click here to read more
71.	National Rural Employment Guarantee Scheme NREGS 100 days wage employment for development works in rural areas
72.	Rastriya Swasthya Bima Yojna : Health insurance to all workers in unorganized area below poverty line.
73.	Aam Aadmi Bima Yojna Insurance cover to the head of the family of rural landless households in the country.
74.	Rajiv Awas Yojna To make India slum free in 5 years

Other Central Programmes

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
1.	Atal Pension Yojana [1]		May 9, 2015	Pension	Social Sector Scheme pertaining to Pension Sector
2.	Bachat Lamp Yojana	MoP	2009	Electrification	reduce the cost of compact fluorescent lamps
3.	Central Government Health Scheme	MoHFW	1954	Health	comprehensive medical care facilities to Central Government employees and their family members
4.	Deendayal Disabled Rehabilitation Scheme	MoSJE	2003	Social Justice	Create an enabling environment to ensure equal opportunities, equity, social justice and empowerment of persons with disabilities.
5.	Deen Dayal Upadhyaya Gram Jyoti Yojana [2]	MoP	2015	Rural Power Supply	It is a Government of India program aimed at providing 24x7 uninterrupted power supply to all homes in Rural India
6.	Deen Dayal Upadhyaya Grameen Kaushalya Yojna[3]	MoRD	2015	Rural Development	It is a Government of India Project to engage rural youth specially BPL and SC/ST segment of population, in gainful employment through skill training programmes.
7.	Digital India Programme [4]	MoC&IT	July 1, 2015	Digitally Empowered Nation	Aims to ensure that government services are available to citizens electronically and people get benefited from the latest information and communication technology
8.	Gramin Bhandaran Yojana	MoA	March 31, 2007	Agriculture	Creation of scientific storage capacity with allied facilities in rural areas to meet the requirements of farmers

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
					for storing farm produce, processed farm produce and agricultural inputs. Improve their marketability through promotion of grading, standardization and quality control of agricultural produce.
9.	Indira Awaas Yojana	MoRD	1985	Housing, Rural	Provides financial assistance to rural poor for constructing their houses themselves.[5]
10.	Indira Gandhi Matritva Sahyog Yojana	MoWCD	2010	Mother Care	A cash incentive of Rs. 4000 to women (19 years and above) for the first two live births [6]
11.	Integrated Child Development Services	MoWCD	October 2, 1975	Child Development	tackle malnutrition and health problems in children below 6 years of age and their mothers
12.	Integrated Rural Development Program	MoRD	1978	Rural Development	self-employment program to raise the income-generation capacity of target groups among the poor and The scheme has been merged with another scheme named Swarnajayanti Gram Swarozgar Yojana (SGSY) since 01.04 1999.
13.	Janani Suraksha Yojana	MoHFW	2005	Mother Care	One-time cash incentive to pregnant women for institutional/home births through skilled assistance
14.	Jawaharlal Nehru National Urban Renewal Mission (JnNURM)	MoUD	December 3, 2005	Urban Development[7]	a programme meant to improve the quality of life and infrastructure in the cities. To be replaced by Atal Mission for Rejuvenation and Urban Transformation.
15.	Kasturba Gandhi Balika Vidyalaya	MoHRD	July 2004	Education	Educational facilities (residential schools) for

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
					girls belonging to SC, ST, OBC, minority communities and families below the poverty line(BPL) in Educationally Backward Blocks
16.	INSPIRE Programme	Department of Science and Technology (India)			Scholarships for top Science students, Fellowships for pursuing PhD, Research Grants to researchers
17.	Kishore Vaigyanik Protsahan Yojana	MoST	1999		Scholarship program to encourage students to take up research careers in the areas of basic sciences, engineering and medicine
18.	Livestock Insurance Scheme (India)	MoA		Education	Insurance to cattle and attaining qualitative improvement in livestock and their products.
19.	Mahatma Gandhi National Rural Employment Guarantee Act	MoRD	February 6, 2006[8][9]	Rural Wage Employment	Legal guarantee for one hundred days of employment in every financial year to adult members of any rural household willing to do public work-related unskilled manual work at the statutory minimum wage of Rs. 120 per day in 2009 prices.
20.	Members of Parliament Local Area Development Scheme	MoSPI	December 23, 1993		Each MP has the choice to suggest to the District Collector for, works to the tune of Rs.5 Crores per annum to be taken up in his/her constituency. The Rajya Sabha Member of Parliament can recommend works in one or more districts in the State from where he/she has been elected.
21.	Midday Meal Scheme	MoHRD	August 15, 1995	Health, Education	Lunch (free of cost) to school-children on all

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
					working days
22.	Namami Gange Programme [10]	MoWR	March 1995	Clean & Protect Ganga	Integrates the efforts to clean and protect the River Ganga in a comprehensive manner
23.	National Literacy Mission Programme	MoHRD	May 5, 1988	Education	Make 80 million adults in the age group of 15 – 35 literate
24.	National Pension Scheme		January 1, 2004	Pension	Contribution based pension system
25.	National Scheme on Welfare of Fishermen	MoA		Agriculture	Financial assistance to fishers for construction of house, community hall for recreation and common working place and installation of tube-wells for drinking water
26.	National Service Scheme	MoYAS			Personality development through social (or community) service
27.	National Social Assistance Scheme	MoRD	August 15, 1995	Pension	Public assistance to its citizens in case of unemployment, old age, sickness and disablement and in other cases of undeserved want
28.	Pooled Finance Development Fund Scheme				
29.	Pradhan Mantri Adarsh Gram Yojana	MoRD	July 23, 2010	Model Village	Integrated development of Schedule Caste majority villages in four states
30.	Pradhan Mantri Kaushal Vikas Yojna [11]	MoSD&E[12]	April 2015[13]	SKILL DEVELOPMENT INITIATIVE SCHEMES	To provide encouragement to youth for development of employable skills by providing monetary rewards by recognition of prior learning or by undergoing training at affiliated centres.
31.	Pradhan Mantri	MoF	May 9,	Insurance	Accidental Insurance with

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
	Suraksha Bima Yojana [1]		2015		a premium of Rs. 12 per year.
32.	Pradhan Mantri Jeevan Jyoti Bima Yojana [1]	MoF	May 9, 2015	Insurance	Life insurance of Rs. 2 lakh with a premium of Rs. 330 per year.
33.	Pradhan Mantri Jan Dhan Yojana	MoF	August 28, 2014	Financial Inclusion	National Mission for Financial Inclusion to ensure access to financial services, namely Banking Savings & Deposit Accounts, Remittance, Credit, Insurance, Pension in an affordable manner
34.	Pradhan Mantri Gram Sadak Yojana	MoRD	December 25, 2000	Rural Development	Good all-weather road connectivity to unconnected villages
35.	Rajiv Awas Yojana [14]	MhUPA	2013	Urban Housing	It envisages a "Slum Free India" with inclusive and equitable cities in which every citizen has access to basic civic infrastructure and social amenities and decent shelter
36.	Rajiv Gandhi Grameen Vidyutikaran Yojana [15]	MoP	April 2005	Rural Electrification	Programme for creation of Rural Electricity Infrastructure & Household Electrification for providing access to electricity to rural households
37.	Rashtriya Krishi Vikas Yojana	MoA	August 1, 2007	Agriculture	Achieve 4% annual growth in agriculture through development of Agriculture and its allied sectors during the XI Plan period
38.	Rashtriya Swasthya Bima Yojana	MoHFW	April 1, 2008	Insurance	Health insurance to poor (BPL), Domestic workers, MGNERGA workers, Rikshawpullers, Building and other construction workers, and many other categories as may be identified by the

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
					respective states
39.	RNTCP	MoHFW	1997	Health	Tuberculosis control initiative
40.	Saksham or Rajiv Gandhi Scheme for Empowerment of Adolescent Boys	MoWCD	2014	Skill Development	Aims at all-round development of Adolescent Boys and make them self-reliant, gender-sensitive and aware citizens, when they grow up. It cover all adolescent boys (both school going and out of school) in the age-group of 11 to 18 years subdivided into two categories, viz. 11-14 & 14–18 years. In 2014–15, an allocation of Rs. 25 crore is made for the scheme.
41.	Sabla or Rajiv Gandhi Scheme for Empowerment of Adolescent Girls	MoWCD	2011	Skill Development	Empowering adolescent girls (Age) of 11–18 years with focus on out-of-school girls by improvement in their nutritional and health status and upgrading various skills like home skills, life skills and vocational skills. Merged Nutrition Programme for Adolescent Girls (NPAG) and Kishori Shakti Yojana (KSY).
42.	Sampoorna Grameen Rozgar Yojana	MoRD	September 25, 2001	Rural Self Employment	Providing additional wage employment and food security, alongside creation of durable community assets in rural areas.
43.	Swabhiman	MoF	February 15, 2011	Financial Inclusion	To make banking facility available to all citizens and to get 5 crore accounts opened by Mar 2012. Replaced by Pradhan

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
					Mantri Jan Dhan Yojana.
44.	Swarnajayanti Gram Swarozgar Yojana	MoRD	April 1, 1999	Rural Employment	Bring the assisted poor families above the poverty line by organising them into Self Help Groups (SHGs) through the process of social mobilisation, their training and capacity building and provision of income generating assets through a mix of bank credit and government subsidy.
45.	Swavalamban	MoF	September 26, 2010	Pension	pension scheme to the workers in unorganised sector. Any citizen who is not part of any statutory pension scheme of the Government and contributes between Rs. 1000 and Rs. 12000/- per annum, could join the scheme. The Central Government shall contribute Rs. 1000 per annum to such subscribers.
46.	Udisha	MoWCD		Child Care	Training Program for ICDS workers
47.	Voluntary Disclosure of Income Scheme		June 18, 1997		Opportunity to the income tax/ wealth tax defaulters to disclose their undisclosed income at the prevailing tax rates.
48.	National Rural Livelihood Mission(NRLM)	MoRD	June 2011[16]		This scheme will organize rural poor into Self Help Group(SHG) groups and make them capable for self-employment. The idea is to develop better livelihood options for the poor.
49.	National Urban Livelihood Mission(NULM)[17]	MoHUPA	24 Sep, 2013[18]		This scheme will reduce poverty of urban poor households especially

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
					street vendors who constitute an important segment of urban poor by enabling them to access gainful self-employment and skilled wage employment opportunities.
50.	HRIDAY – Heritage City Development and Augmentation Yojana	MoUD	Jan 2015[19]	Urban Development	The scheme seeks to preserve and rejuvenate the rich cultural heritage of the country.
51.	Sukanya Samridhi Yojana (Girl Child Prosperity Scheme)	MoWCD	22 Jan 2015[16]		The scheme primarily ensures equitable share to a girl child in resources and savings of a family in which she is generally discriminated as against a male child.
52.	Smart Cities Mission	MoUD	June 25, 2015	Urban Development	To enable better living and drive economic growth stressing on the need for people centric urban planning and development.
53.	Atal Mission for Rejuvenation and Urban Transformation (AMRUT)	MoUD	June 25, 2015	Urban Development	To enable better living and drive economic growth stressing on the need for people centric urban planning and development.
54.	Pradhan Mantri Awas Yojana (PMAY)	MoHUPA	June 25, 2015	Housing	To enable better living and drive economic growth stressing on the need for people centric urban planning and development.
55.	National Child Labour Projects(NCLP)	Ministry of Labour and Employment	launched in 9 districts in 1987 and has been expanded in January 2005 to		The objective of this project is to eliminate child labour in hazardous industries by 2010. Under this scheme, the target group is all children below 14 years of age who are working in

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
			250 districts in 21 different states of the country		occupations and processes listed in the Schedule to the Child Labour (Prohibition & Regulation) Act, 1986 or occupations and processes that are harmful to the health of the child.
56.	Antyodaya Anna Yojna	NDA government	25 December 2000		Under the scheme 1 crore of the poorest among the (Below Poverty Line)BPL families covered under the targeted public distribution system are identified. Issue of Ration Cards Following the recognition of Antyodaya families, unique quota cards to be recognized an "Antyodaya Ration Card" must be given to the Antyodaya families by the chosen power. The scheme has been further expanded twice by additional 50 lakh BPL families each in June 2003 and in August 2004,thus covering 2 crore families under the AAY scheme
57.	Pradhan Mantri Kaushal Vikas Yojana	MoSD&E	July 15, 2015	Skill Development	Seeks to provide the institutional capacity to train a minimum 40 crore skilled people by 2022 [20]
58.	National Food Security Mission	Government of India	2007 for 5 years		It launched in 2007 for 5 years to increase production and productivity of wheat, rice and pulses on a sustainable basis so as to ensure food security of the country. The aim is to bridge the yield gap in respect of these crops through

No.	Scheme	Ministry	Date of Launch	Sector	Provisions
					dissemination of improved technologies and farm management practices.
59.	Pradhan Mantri Ujjwala Yojana	MoP&NG	1 May 2016		Launched to provide free LPG connections to women from below poverty line families.

Annexure 7.2: IRC Codes with Hyperlink for Ease of Ready Reference

STANDARD	YEAR	TITLE
IRC 002	1968	Route Marker Signs for National Highways
IRC 003	1983	Dimensions and Weights of Road Design Vehicles
IRC 005	1998	Standard Specifications and Code of Practice for Road Bridges, Section I (General Features of Design) (Seventh Revision)
IRC 006	2014	Standard Specifications and Code of Practice for Road Bridges, Section II – Loads and Stresses (Fourth Revision)
IRC 007	1971	Recommended Practice for Numbering Bridges and Culverts
IRC 009	1972	Traffic Census on Non-Urban Roads
IRC 011	1962	Recommended Practice for the Design and Layout of Cycle Tracks
IRC 012	2009	Guidelines for Access, Location and Layout of Roadside Fuel Stations and Service Stations (Third Revision)
IRC 014	2004	Recommended Practice for Open Graded Premix Carpet (Third Revision)
IRC 015	2011	Standard Specifications and Code of Practice for Construction of Concrete Roads (Fourth Revision)
IRC 016	2004	Standard Specifications and Code of Practice for Prime and Tack Coat (Second Revision)
IRC 019	2005	Standard Specifications and Code of Practice for Water Bound Macadam
IRC 020	1966	Recommended Practice for Bituminous Penetration Macadam (Full Grout)
IRC 025	1967	Type Designs for Boundary Stones
IRC 028	1967	Tentative Specifications for the Construction of Stabilized Soil Roads with Soft Aggregate in Areas of Moderate and High Rainfall
IRC 031	1969	Route Marker Signs for State Routes
IRC 032	1969	Standard for Vertical and Horizontal Clearances of Overhead Electric Power and Telecommunication Lines as Related to Roads
IRC 034	2011	Recommendations for Road Construction in Areas Affected by Water Logging, Flooding and/or Salts Infestation
IRC 037	2012	Tentative Guidelines for the Design of Flexible Pavements
IRC 039	1986	Standards for Road-Rail Level Crossings (First Revision)

STANDARD	YEAR	TITLE
IRC 040	2002	Standard Specifications and Code of Practice for Road Bridges, Section IV (Brick, Stone and Cement Concrete Block Masonry) (Second Revision)
IRC 041	1997	Guidelines for Type Designs for Check Barriers (First Revision)
IRC 043	1972	Recommended Practice for Tools, Equipment and Appliances for Concrete Pavement Construction
IRC 045	1972	Recommendations for Estimating the Resistance of Soil Below the Maximum Scour Level in the Design of Well Foundations of Bridges
IRC 047	1972	Tentative Specification for Built-Up Spray Grout
IRC 050	1973	Recommended Design Criteria for the Use of Cement-Modified Soil in Road Construction
IRC 053	2012	Road Accident Recording Forms A-1 and A-4 (Second Revision)
IRC 054	1974	Lateral and Vertical Clearances at Underpasses for Vehicular Traffic
IRC 055	1974	Recommended Practice for Sand-Bitumen Base Courses
IRC 056	2011	Recommended Practice for Treatment of Embankment and Roadside Slopes for Erosion Control (First Revision)
IRC 060	1976	Tentative Guidelines for the Use of Lime-Fly Ash Concrete as Pavement Base or Sub-Base
IRC 062	1976	Guidelines for Control of Access on Highways
IRC 063	1976	Tentative Guidelines for the Use of Low Grade Aggregates and Soil Aggregates Mixtures in Road Pavement Construction
IRC 064	1990	Guidelines for Capacity of Roads in Rural Areas (First Revision)
IRC 066	1976	Recommended Practice for Sight Distance on Rural Highways
IRC 067	2012	Code of Practice for Road Signs (Third Revision)
IRC 071	1977	Recommended Practice for Preparation of Notations
IRC 072	1978	Recommended Practice for Use and Upkeep of Equipment, Tools and Appliances for Bituminous Pavement Construction
IRC 073	1990	Geometric Design Standards for Rural (Non-Urban) Highways
IRC 074	1979	Tentative Guidelines for Lean-Cement Concrete and Lean Cement-Fly Ash Concrete as a Pavement Base or Subbase
IRC 076	1979	Tentative Guidelines for Structural Strength Evaluation of Rigid

STANDARD	YEAR	TITLE
		Airfield Pavements
IRC 078	2014	Standard Specifications and Code of Practice for Road Bridges, Section VII – Foundations and Substructure (Revised Revision)
IRC 080	1981	Type Designs for Pick-Up Bus Stops on Rural (i.e., Non-Urban) Highways
IRC 081	1997	Guidelines for Strengthening of Flexible Road Pavements Using Benkelman Beam Deflection Technique (First Revision)
IRC 082	1982	Code of Practice for Maintenance of Bituminous Surfaces of Highways
IRC 083	2014	Standard Specifications and Code of Practice for Road Bridges, Section IX – Bearings, Part I : Metallic Bearings
IRC 083-1	1999	Standard Specifications and Code of Practice for Road Bridges, Section IX (Bearings), Part I (Metallic Bearings) (First Revision)
IRC 083-2	1987	Standard Specifications and Code of Practice for Road Bridges, Section IX (Bearings), Part II (Elastomeric Bearings)
IRC 083-3	2002	Standard Specifications and Code of Practice for Road Bridges, Section IX (Bearings), Part III (Pot, Pot-Cum-PTEE, Pin and Metallic Guide Bearings)
IRC 085	1983	Recommended Practice for Accelerated Strength Testing and Evaluation of Concrete for Road and Airfield Constructions
IRC 086	1983	Geometric Design Standards for Urban Roads in Plains
IRC 087	2011	Guidelines for the Design and Erection of Formwork, Falsework and Temporary Structures (First Revision)
IRC 088	1984	Recommended Practice for Lime Flyash Stabilised Soil Base/Sub-Base in Pavement Construction
IRC 089	1997	Guidelines for Design and Construction of River Training and Control Works for Road Bridges (First Revision)
IRC 090	2010	Guidelines of Selection, Operation and Maintenance of Bituminous Hot Mix Plant (First Revision)
IRC 092	1985	Guidelines for the Design of Interchanges in Urban Areas
IRC 093	1985	Guidelines on Design and Installation of Road Traffic Signals
IRC 099	1988	Tentative Guidelines on the Provision of Speed Breakers for Control of Vehicular Speeds on Minor Roads
IRC 101	1988	Guidelines for Design of Continuously Reinforced Concrete

STANDARD	YEAR	TITLE
		Pavement with Elastic Joints
IRC 102	1988	Traffic Studies for Planning Bypasses Around Towns
IRC 104	1988	Guidelines for Environmental Impact Assessment of Highway Projects
IRC 105	1988	Tentative Specification for Bituminous Concrete (Asphaltic Concrete) for Airfield Pavements
IRC 107	2013	Specification for Bitumen Mastic Wearing Courses (First Revision)
IRC 108	1996	Guidelines for Traffic Prediction on Rural Highways
IRC 109	1997	Guidelines for Wet Mix Macadam
IRC 110	2005	Standard Specifications and Code of Practice for Design and Construction of Surface Dressing
IRC 112	2011	Code of Practice for Concrete Road Bridges
IRC 113	2013	Guidelines for the Design and Construction of Geosynthetic Reinforced Embankments on Soft Subsoils
IRC 114	2013	Guidelines for Use of Silica-Fume in Rigid Pavement
IRC 115	2014	Guidelines for Structural Evaluation and Strengthening of Flexible Road Pavements Using Falling Weight Deflectometer (FWD) Technique
IRC 116	2014	Specifications for Readymade Bituminous Pothole Patching Mix Using Cut-Back Bitumen
IRC SP 004	1965	Bridge Loadings Around The World
IRC SP 008	1980	Type Designs for Highway Kilometre Stones (Second Revision)
IRC SP 011	1984	Handbook of Quality Control for Construction of Roads and Runways
IRC SP 013	2004	Guidelines for the Design of Small Bridges and Culverts
IRC SP 016	2008	Guidelines for Surface Evenness of Highway Pavements
IRC SP 018	1996	Manual for Highway Bridge Maintenance Inspection
IRC SP 019	2001	Manual for Survey, Investigation and Preparation of Road Projects (Second Revision)
IRC SP 020	2002	Rural Roads Manual
IRC SP 021	2009	Guidelines on Landscaping and Tree Plantation
IRC SP 023	1993	Vertical Curves for Highways

STANDARD	YEAR	TITLE
IRC SP 024	1984	Guidelines on the Choice and Planning of Appropriate Technology in Road Construction
IRC SP 025	1984	Gopi and His Road Roller - Guidelines on Maintenance of Road Rollers
IRC SP 026	1984	Report Containing Recommendations of IRC Regional Workshops on Rural Road Development
IRC SP 027	1984	Report Containing Recommendations of the IRC Regional Workshops on Highway Safety
IRC SP 028	1995	Road Transport and Energy (First Revision)
IRC SP 029	1994	Directory of Indigenous Manufacturers of Road/Bridge Construction Machinery and Important Bridge Components (First Revision)
IRC SP 030	2009	Manual on Economic Evaluation of Highway Projects in India (Second Revision)
IRC SP 036	1991	Guidelines on Format for IRC Standards
IRC SP 037	2010	Guidelines for Evaluation of Load Carrying Capacity of Bridges
IRC SP 038	1992	Manual for Road Investment Decision Model
IRC SP 039	1992	Guidelines on Bulk Bitumen Transportation and Storage Equipment
IRC SP 040	1993	Guidelines on Techniques for Strengthening and Rehabilitation of Bridges
IRC SP 041	1994	Guidelines for the Design of At-Grade Intersections in Rural and Urban Areas
IRC SP 042	2014	Guidelines on Road Drainage (First Revision)
IRC SP 043	1994	Guidelines on Low-Cost Traffic Management Techniques for Urban Areas
IRC SP 044	1996	Highway Safety Code
IRC SP 046	2013	Guidelines for Design and Construction of Fibre Reinforced Concrete for Pavements (First Revision)
IRC SP 047	1998	Guidelines on Quality Systems for Road Bridges
IRC SP 049	2014	Guidelines for the Use of Dry Lean Concrete as Sub-base for Rigid Pavement (First Revision)
IRC SP 050	2013	Guidelines on Urban Drainage (First Revision)

STANDARD	YEAR	TITLE
IRC SP 052	1999	Bridge Inspector Reference Manual
IRC SP 053	2010	Guidelines on Use of Modified Bitumen in Road Construction (Second Revision)
IRC SP 054	2000	Project Preparation Manual for Bridges
IRC SP 055	2014	Guidelines on Traffic Management in Work Zones
IRC SP 057	2000	Guidelines for Quality Systems for Road Construction
IRC SP 058	1999	Guidelines for Use of Fly Ash in Road Embankments
IRC SP 060	2002	An Approach Document for Assessment of Remaining Life of Concrete Bridges
IRC SP 061	2004	An Approach Document on Whole Life Costing for Bridges in India
IRC SP 062	2014	Guidelines for the Design and Construction of Cement Concrete Pavement for Low Volume Roads (First Revision)
IRC SP 063	2004	Guidelines for the Use of Interlocking Concrete Block Pavement
IRC SP 064	2005	Guidelines for the Analysis and Design of Cast-in-Place Voided Slab Superstructure
IRC SP 065	2005	Guidelines for Design and Construction of Segmental Bridges
IRC SP 066	2005	Guidelines for Design of Continuous Bridges
IRC SP 067	2005	Guidelines for Use of External and Unbonded Prestressing Tendons in Bridge Structures
IRC SP 070	2005	Guidelines for the Use of High Performance Concrete in Bridges
IRC SP 071	2006	Guidelines for Design and Construction of Pretensioned Girder of Bridges
IRC SP 073	2007	Manual of Standards and Specifications for Two Laning of State Highways on B.O.T. Basis
IRC SP 074	2007	Guidelines for Repair and Rehabilitation of Steel Bridges
IRC SP 075	2008	Guidelines for Retrofitting of Steel Bridges by Prestressing
IRC SP 077	2008	Manual for Design Construction and Maintenance of Gravel Roads
IRC SP 078	2008	Specifications for Mix Seal Surfacing (MSS) Close-Graded Premix Surfacing (CGPS)
IRC SP 079	2008	Tentative Specifications for Stone Matrix Asphalt
IRC SP 082	2008	Guidelines for Design of Causeways and Submersible bridge

STANDARD	YEAR	TITLE
IRC SP 083	2008	Guidelines for Maintenance, Repairs & Rehabilitation of Cement Concrete Pavements
IRC SP 084	2014	Manual for Specifications and Standards for Four Laning of Highways Through Public Private Partnership (First Revision)
IRC SP 085	2010	Guidelines for Variable Message Signs
IRC SP 086	2010	Guidelines for Selection, Operation and Maintenance of Paver Finishers
IRC SP 087	2013	Manual of Specification and Standards for Six Laning of Highways Through Public Private Partnership (First Revision)
IRC SP 088	2010	Manual on Road Safety Audit
IRC SP 090	2010	Manual for Grade Separators and Elevated Structures
IRC SP 092	2010	Road Map for Human Resource Development in Highway Sector
IRC SP 093	2011	Guidelines on Requirements for Environmental Clearance for Road Projects
IRC SP 094	2011	Material Testing Facilities for Highway Sector in National Capital Region
IRC SP 095	2011	Model Contract Document for Maintenance of Highways
IRC SP 096	2012	Guidelines for Selection, Operation and Maintenance of Concrete Batching and Mixing Plants
IRC SP 097	2013	Guidelines on Compaction Equipment for Road Works
IRC SP 098	2013	Guidelines for the Use of Waste Plastic in Hot Bituminous Mixes (Dry Process) in Wearing Courses
IRC SP 099	2013	Manual of Specification and Standards for Expressways
IRC SP 100	2014	Use of Cold Mix Technology in Construction and Maintenance of Roads Using Bitumen Emulsion
IRC SP 101	2014	Interim Guidelines for Warm Mix Asphalt
IRC SP 102	2014	Guidelines for Design and Construction of Reinforced Soil Walls

List of References

1.	Environment & Social Impact Assessment Authority
2.	Economic Analysis Study of three Sub-Region Growth Centres of Uttar Pradesh by Deloiitte (World Bank Project)
3.	Economic Growth Projections of three Sub-Region Growth Centres of Uttar Pradesh by Deloiitte (World Bank Project)
4.	Profile of Kanpur Region (CRISIL)
5.	Profile of Varanasi Region (CRISIL)
6.	Profile of Agra Region (CRISIL)Uttar Pradesh Pollution Control Board
7.	Good Practice Handbook for Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging markets, International Finance Corporation (IFC)
8.	Integrated Environment Management Information Series, Department of Environmental Affairs and Tourism, South Africa
9.	Environment Impact Statement for Landsborough to Nambour Rail Project, Queensland
10.	Haryana Pollution Control Board
11.	Punjab Pollution Control Board
12.	Central Pollution Control Board
13.	Ministry of Environment Forest & Climate Change
14.	Haryana State Industrial & Infrastructure Development Corporation
15.	Punjab State Industrial Development Corporation
16.	Punjab Small Industries & Export Corporation Ltd.
17.	Udhyog Sahayak, Punjab
18.	Uttar Pradesh State Industrial development corporation
19.	Office of Registrar General of India
20.	Guidelines for the Assessment of indirect and Cumulative Impacts as well as Impact Interaction, May, 1999, by Hyder commissioned by European Commission
21.	Project Design Document-Municipal Solid Waste Management Project at Aligarh, India by A2Z Waste Management (Aligarh) Ltd. (UNFCCC/CCNUCC)
22.	Ludhiana City Development Plan (Vision 2021), Initiative Under: JNNURM, Municipal Corporation, Ludhiana
23.	Proceeding of the meeting taken by the Hon'ble Chief Secretary to Govt. of Punjab, at 4.00 p.m on 19/1/2012 in the matter of CWP no. 7036 of 2005 titled as Nirbhai Singh V/s State of Punjab regarding Cleaning of Budha Nallah, Ludhiana
24.	Central Ground Water Development Board
25.	Meerut City Development Plan, Initiative Under JNNURM by BCEOM India Pvt. Ltd. & CRAPHTS Consultants (I) Pvt. Ltd.
26.	Status of Ground Water Quality in India-Part 1, CPCB, MoEF
27.	Ahmad, F., Ashfaq, A, Aug, 2014, AMU Aligarh, "Quality Assessment of Ground Water at Agra District, India", International Journal of Current Research and Academic Review
28.	District Agricultural Profile, Uttar Pradesh, Zonal project Directorate, Kanpur, ICAR
29.	Comprehensive Environmental Assessment of Industrial Clusters, Central Pollution Control Board, December, 2009
30.	Peace River Cumulative Impact Study, 2007, PBSJ
31.	Status of Compliance of MSW Rules, 2000, UP, In the compliance of order passed by NGT in application no-199/2014 Almitra H.Patel Vs Union of India and others
32.	Manufacturing, Uttar Pradesh, Creating a New Growth Story by Ernst & Young for Udyog Bandhu, Government of Uttar Pradesh
33.	Dutta, P., Mahatha, S., De, P., September, 2004, A methodology for cumulative impact assessment of opencast mining projects with special reference to air quality assessment-Open Cast Mining