

GOVERNMENT OF INDIA
DEDICATED FREIGHT CORRIDOR CORPORATION INDIA LTD.

Summary of Environment and Social Impact Assessment
(ESIA)
For the Dedicated Freight Corridor
(Western: Wamaj - Iqbalgarh Section)

December 2012

This summary explains main features of the final environmental and social impact assessment (ESIA) study carried out for the Dedicated Freight Corridor (Western: Wamaj - Iqbalgarh Section). This summary for final ESIA is distributed to the public as an information dissemination process under the project by the Dedicated Freight Corridor Corporation of India Limited (DFCCIL) as project implementing agency.

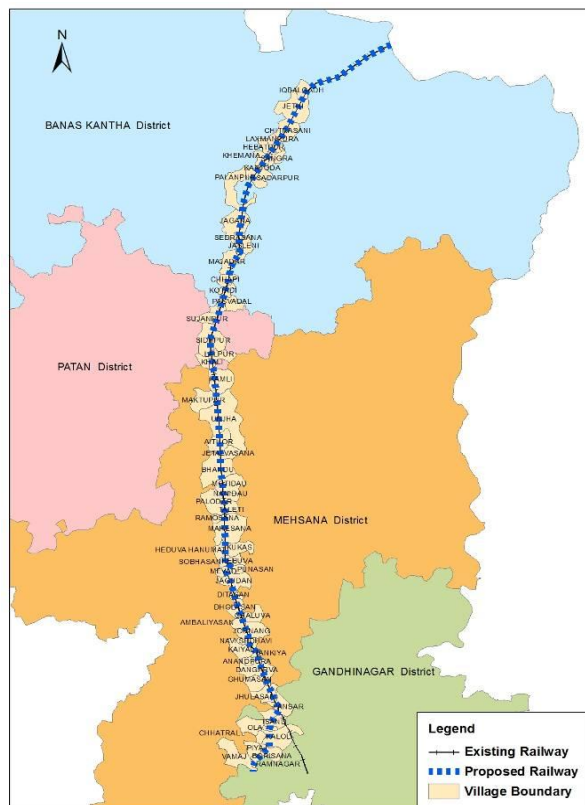
The Project Background

The Ministry of Railways (MoR) through the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a Special Purpose Vehicle (SPV), is implementing Computerized Multi Modal High Axle Load Dedicated Freight Corridor (DFC) Project between Delhi-Mumbai under the Western DFC. Considering the ever increasing freight traffic movement between the metros and their respective hinterlands, the DFC Project through adoption of improved technologies will result in a paradigm shift of freight transportation from road to the low carbon intensive mode rail transport and inherent improvement in energy efficiency of freight rail for transportation of bulk goods.

The Western DFC is designed to carry a total freight line of 37.7 million tonnes in fiscal year 2013-2014, which would increase to 140.4 million tonnes in 2033-34. Creation of rail infrastructure on such a scale, unprecedented in independent India, is also expected to drive the establishment of industrial corridors, logistic parks and other economic and trade centres along its alignment and will support India's growing economy as the second fastest in the world.

The Western DFC has two broad streams of traffic, one, between the terminal nodes at either end, Jawaharlal Nehru Port Trust (JNPT) in Mumbai and Dadri in Uttar Pradesh including Tuglakabad (TKD) in Delhi, and the other, the traffic entering from branch line feeder routes at the various junction points en route. Implementation of the DFC Project will result in reducing the carbon intensity of India's transport sector.

The Project Area



The Western Corridor has been divided into 2 phases, in which Phase 1 covers section between Vadodara and Rewari.

The Wamaj - Iqbalgarh section of Phase 1 of the DFC Western Corridor runs from Gandhinagar district to Banaskantha district in Gujarat state. The alignment passes through four (4) districts namely Gandhinagar, Patan, Mehsana and Banaskantha. Total length of the Wamaj - Iqbalgarh section is approximately 140 km. Figure 1 shows the location of the proposed DFC alignment of the Wamaj - Iqbalgarh section.

Some basic information on key parameters pertaining to the natural and social environment along the Wamaj - Iqbalgarh section is shown in Table 1.

Figure 1: Proposed Alignment of Wamaj – Iqbalgarh Section

Table 1: General Features along the Wamaj-Iqbalgarh Section

Items	Wamaj-Iqbalgarh Section
Affected States (No. of Affected Villages by District)	4 districts of Gujarat State– Banaskantha, Patan, Mehsana, Gandhi Nagar. Total Villages – 68.
Recorded Forest Area and Protected Area	No recorded forest in the alignment. A part of the proposed alignment (about 2.4km) will pass the Balaram Ambaji Wildlife Sanctuary.
Important Rivers	4 major rivers - Khari, Saraswati, Umardashi and Balaram.

Source: DFC and NKC

Salient Features of Alignment & Relevant Facilities

The project is planned as double line corridor with electrification and advanced signalling system to allow freight trains with an axle load of 25 tonnes and speed up to 100 km/h. The Road over Bridges (ROBs) and Road under Bridges (RUBs) are planned at road crossings to avoid any detention to either road or rail traffic. The major part of the alignment will have well landscaped out embankments.

Total length of the section is 139.894 km, out of it parallel section is 114.899 km and length of the detour section is 24.995 km. The details of parallel and detour section in the four affected districts of Gujarat are shown in Table 2.

Table 2: Details of Parallel and Detour Section in the Alignment

S. No.	District	Length of Parallel Section (km)	Length of Detour Section (km)
1	Banaskantha	45.949	0
2	Patan	11.518	0
3	Mahesana	55.600	12.817
4	Gandhinagar	1.832	12.178
Total		114.899	24.995

Source: DFC

The Right-of-Way (RoW) width of detour section is from 65.0 m - 90.5 m, while the RoW of parallel section is from 16.0 m - 74.5 m. There are 2 junction stations, 2 crossing stations, 3 important bridges, 128 RUBs, 2 ROBs, 2 Traction Sub-Station (TSS) and 3 Sub-Station Post (SSP) in the Wamaj - Iqbalgarh section.

Environmental and Social Impact Assessment (ESIA) Study

Considering the scale, nature and extent of activities envisaged as part of the DFC Project, a detailed Environmental and Social Impact Assessment (ESIA) study has been conducted on the proposed alignment and associated facilities in order to ensure that all potential environmental and social issues or concerns on various project components are addressed and integrated into the project's planning and design at an early stage in order to formulate the DFC Project in a more sustainable and effective manner.

In this connection, MOR/DFCCIL has conducted ESIA study for the DFC Phase 1 (Wamaj - Iqbalgarh section) of the Western Corridor following "JBIC Guidelines for Confirmation of Environmental and Social Considerations (2002)". The ESIA study consists of scoping, pollution control study, natural

environmental study, social environmental study, impacts identification and assessment, preparation of mitigation measures, preparation of Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP), and conducting of their public consultation meetings and information disclosure processes.

Procedure of ESIA Study

The process of ESIA study constitutes a systematic approach to evaluate a project comprehensively in the context of the natural, social environment of the project area. Basically, ESIA follows the steps mentioned in the following flow, i.e. 1) data collection for desk study, 2) preliminary site reconnaissance, 3) scoping for preliminary identification of potential impacts due to project implementation, 4) Public Consultation Meetings (PCMs) for sharing initial findings of potential impacts and receiving feedbacks on the proposed study scope, 5) detailed site survey on the preliminary identified impacts at scoping, 6) assessment of potential impacts, 7) examination of mitigation measures of the potential impacts, 8) preparation of ESMP and ESMoP, 9) preparation of Draft ESIA report, 10) PCMs for sharing draft results of ESIA study including proposed mitigation measures, and 11) preparation of Final ESIA report by incorporating received comments and suggestions.

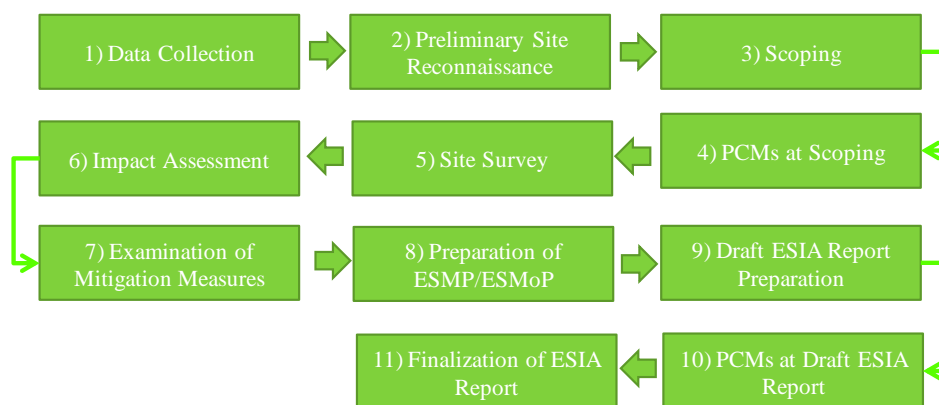


Figure 2: ESIA Study Flow

Following the above-mentioned ESIA procedure, in order to decide the ESIA study scope, potential impacts were identified with the secondary data and findings of the preliminary site reconnaissance in Scoping stage of Figure 2, and the major impacts are outlined in Table 3.

Table 3: Initially Identified Impacts

Categories	Initially Identified Impacts	Items to be Covered at Detailed Field Survey
Natural Environment	A part of the proposed alignment will pass the Balam Ambaji Wildlife Sanctuary. In addition, tree cutting along the proposed alignment will be required.	<ul style="list-style-type: none"> - Confirmation of fauna and flora and their habitats in the wildlife sanctuary along the alignment. - Implementation of tree census survey for confirmation of number of trees to be cut.
Pollution Control	- Some sensitive receptors and residential areas close to the proposed alignment may be impacted by noise & vibration during construction and operation	<ul style="list-style-type: none"> - Site measurement of noise & vibration levels at sensitive areas and/or populated areas. - Implementation of surface water sampling and measurement at important rivers.

	<p>phases.</p> <ul style="list-style-type: none"> - There is a possibility of water pollution in the rivers due to turbid water/wastewater inflow from i) construction activities and worker's camp during the construction phase, and ii) maintenance of trains at depo during the operation phase. 	
Social Environment	<p>It is expected to improve cargo transportation in a region as well as to increase job opportunities by the Project. Meanwhile, some impacts related to land acquisition such as involuntary resettlement would be caused.</p>	<ul style="list-style-type: none"> - Confirmation of socio-economic condition of Project Affected Persons (PAPs) by questionnaire survey (i.e. Baseline Survey and Census for the Rehabilitation & Resettlement Plan)

Methodology of Field Survey

Field survey for natural environment, pollution control and social environment was conducted based on the initially identified impacts as shown in Table 3. Methodology and location of the field survey are outlined in Table 4.

Table 4: Methodology and Location of Field Survey

Survey Item	Survey Methodology	Survey Location
Natural Environment		
Fauna, Flora and Biodiversity	<p>[Balaram Ambaji Wild Life Sanctuary]</p> <ul style="list-style-type: none"> - Visual check of fauna and flora, and its habitats conditions in two seasons, i.e. pre-monsoon season and monsoon season. - Conducting interview with academic persons on the fauna and flora situation in the survey area. <p>[Tree Census Survey]</p> <ul style="list-style-type: none"> - Conducting census survey of trees to be felled along the alignment. 	<ul style="list-style-type: none"> - Along the proposed DFC alignment in the Balaram Ambaji Wildlife Sanctuary where the exact location was selected based on interviews with the State forest authorities and other relevant maps. - The number of trees was counted at the area where the extra land acquisition would be necessary within the RoW.
Pollution Control		
Noise & Vibration	<p>[Noise]</p> <ul style="list-style-type: none"> - Measuring noise level applying international standards. <p>[Vibration]</p> <ul style="list-style-type: none"> - Measuring vibration level applying international standards. 	<p>[Noise]</p> <p>2 points at 3 locations: Palanpur, Sidhpur, and Mehsana locations considering population density and sensitivity such as facilities requiring silent.</p> <p>[Vibration]</p> <p>Same as noise survey.</p>
Water Quality	<ul style="list-style-type: none"> - Sampling surface water from the important river in the study area. 	<p>Three (3) locations (i.e. upstream, proposed alignment and downstream) in</p>

Survey Item	Survey Methodology	Survey Location
	- Analyzing samples of selected parameters.	the Balaram River. *There was no water flow in other 3 important rivers (i.e. Khari, Umardashi and Saraswati Rivers) in the study area.
Social Environment		
Baseline Survey & Census	- Collecting socio-economic information from project affected persons (PAPs) through questionnaire.	68 villages in 4 districts (Gandhinagar, Mehsana, Patan and Banaskantha).

Impact Assessment and Proposed Mitigation Measures

Based on the ESIA survey results and subsequent analysis, various potential environmental and social impacts of the DFC Project have been identified. Specific mitigation measures are proposed to minimize all such impacts in planning/design, construction and operation phases. Such measures for major items of the environmental and social impacts are summarised in Table 5.

Table 5: Major Potential Impacts and Proposed Mitigation Measures

Impact Item	Phase	Potential Impacts	Proposed Mitigation Measures
Natural Environment			
Fauna, Flora and Biodiversity	Construction & Operation	- Increasing risks of i) distraction/loss of habitat and wildlife, and ii) disturbance of wildlife movement.	- Compensatory plantation with local species. - Development of a green belt. - Provision of underpasses and culverts/pipes to facilitate wildlife movement.
Pollution Control			
Noise & Vibration	Construction	- Increasing noise & vibration levels due to operation of construction equipments.	- Advance notice of construction activities to neighbours. - Provision of enough distance between construction yards and residential areas. - Development of a green belt. - Provision of noise barriers at sensitive areas, if necessary.
	Operation	- Increasing noise & vibration levels due to train operation.	
Air Quality	Construction	- Generating dust from earthmoving and construction activities. - Emission from vehicles and machineries.	- Sprinkling of water. - Using low emission construction vehicles and machineries, and conducting regular maintenance of them.
Water Quality	Construction & Operation	- Deterioration of water quality such as turbidity by the earthworks. - Increase of spillage risks of petroleum, oil and lubricant (POL) products etc. into the surrounding water	- Appropriate treatment of wastewater from construction site and depot. - Appropriate management of stockpiled soil and loose materials. - Provision of oil catch/trap along the drainage channel.

Impact Item	Phase	Potential Impacts	Proposed Mitigation Measures
		bodies.	- Provision of emergency measures such as floating oil booms.
Social Environment			
Involuntary Resettlement	Planning/Design	- Land acquisition of private land and involuntary resettlement.	- Providing compensation for the affected land and structures as per the policy established in the Resettlement and Rehabilitation Plan (RRP).
Local Economy	Planning/Design & Construction	- Affecting sources of income at some extent due to land acquisition and involuntary resettlement. - Increasing local business opportunities due to construction activities.	- Awarding appropriate rehabilitation programs. - Providing job opportunities related to the Project to local people and PAPs to the extent possible.
Social Infrastructure	Construction	- Disturbed accessibility to local social infrastructure such as religious places, water pipelines for domestic water supply and irrigation system to some extent.	- Securing a temporary passage to local infrastructure and religious places during construction.
	Operation		- Securing access to local infrastructure including religious places by providing a road, bridge and/or underpass. - Arrangement of cross drainage works such as bridges and culverts.

Environmental and Social Management Plan (ESMP)

Environmental and Social Management Plan (ESMP) envisages the plans for the proper implementation of mitigation measures to reduce the adverse impacts caused by the project activities during planning/design, construction and operation phases. The ESMP has been prepared based on the above-mentioned mitigation measures consisting of the following components. The comprehensive ESMP is available in the ESIA report.

1. The Proposed Specific Management Plans in the ESIA Report

- a) Greenbelt Creation;
- b) Wildlife Habitat Restoration and Biodiversity Protection;
- c) Soil Erosion Control;
- d) Noise and Vibration Control;
- e) Waste Management including construction waste and hazardous waste/materials;
- f) Land Acquisition and Resettlement Management (see details in RRP Report);
- g) Occupational Health and Safety (OHS) Management;
- h) Construction Camp Plan for its Development/Management and Demobilization; and
- i) Borrow Area (and Quarry Site) Management.

2. The Proposed Phase-wise ESMP in the ESIA Report

a) Planning/Design Phase

1) Land acquisition and resettlement management, 2) Tree cutting control and green belt development, 3) Construction yard and camp management, 4) Construction vehicle, equipment and machinery management, 5) Borrow area and quarry site management, 6) Labor management, and 7) Disaster management.

b) Construction Phase

1) Tree cutting control and green belt development, 2) Noise and vibration control, 3) Air pollution control, 4) Siltation control, 5) Petroleum, Oil and Lubricant (PLO) management, 6) Waste management, 7) Construction yard and camp management, 8) Slope protection, 9) Stock pile management, 10) Borrow area and quarry site management, 11) Public health and safety risks management, and 12) Occupational health and safety (OHS) management.

c) Operation Phase

1) Monitoring of operation performance, 2) Monitoring of environment parameter, 3) Noise control, 4) Green belt management, 5) Borrow area and quarry site rehabilitation (post-closure management), and 6) Disaster management.

Environmental and Social Monitoring Plan (ESMoP)

The purpose of the Environmental and Social Monitoring Plan (ESMoP) is to ensure the effective implementation of ESMP in order to achieve overall objective of the Project in a more sustainable and effective manner. The ESMoP monitors the results and effectiveness mitigation measures and suggests additional measures, if required, to enhance the project's benefits. In addition, ESMoP includes parameters to be monitored, monitoring methods, location of the monitoring areas/sites, frequency and duration of monitoring, institutional responsibilities for implementation and supervision, and estimated cost. The ESMoP consists of routine supervision of the work and environmental and social impact/mitigation monitoring as summarized below:

1. Routine supervision of the work: Observation of the construction and operation performance to ensure mitigation actions as follows:

- Mitigation measures on impacts on natural environment (tree cutting and green belt development (plantation), soil erosion, landslide)
- Mitigation measures on pollution control (noise and vibration, air pollution, water pollution-siltation and wastewater, waste disposal)
- Mitigation measures on impacts on social environment (land acquisition and resettlement, agricultural area and crop, social infrastructure, public health and safety)
- Other mitigation measures (construction yard and camp, and earthwork operation)

2. Environmental and social impact/mitigation monitoring: Observation of the actual environmental and social parameters as follows:

- Natural environment (fauna and flora, biodiversity)
- Pollution (Noise and vibration, air quality, water quality)
- Social environment (socio-economic conditions, public health and safety)

Public Consultation Meetings (PCMs)

The Public Consultation Meetings (PCMs) primarily aim at providing a platform for the PAPs and different stakeholders to express their views on possible impacts. The PCMs for ESIA were held at two different stages in order to receive opinions and feedback of the public and to disseminate information on the project and ESIA study. The PCMs were conducted district-wise in all four districts.

- The first stage of the PCM for ESIA was conducted in the month of September, 2011 (and supplemental PCM for two villages in Mehsana in October, 2011) at the time of environmental scoping as the initial stage of the ESIA study. Information on the Project and scope of the ESIA study was disseminated to the public, and their comments and opinions were collected to be incorporated in the study scope of the ESIA.
- The second stage of the PCM for ESIA was conducted in the months of November 2011 for Banaskantha, Mehsana and Patan districts and of July 2012 for Gandhinagar district at the time of preparation of draft ESIA report as the final stage of the ESIA study. Information on findings of draft ESIA study including proposed mitigation measures was disseminated to the public, and their comments and opinions were collected to be incorporated in the environment and social mitigation measures, and management and monitoring plans in the Final ESIA report.

The first and second stage PCMs were attended by mainly PAPs and other villagers, representatives from Gram Sarpanch, Village Patwari, administrative officers and DFCCIL officers etc. Major opinions and issues raised in the first and second stage PCMs were - mainly compensation issues such as compensation by market rates or land for land, and employment opportunities. Other issues were clarification on the proposed alignment such as discrepancy in land records, width of the RoW, impacts on domestic water pipeline and irrigation system, provision of accessibility to service roads, drainage, water resources and community facilities; and potential impacts related to noise and vibration due to train operation.

Information Dissemination in ESIA Process

The ESIA study findings were disseminated to the PAPs and relevant stakeholders so that preventative measures can be taken for the successful implementation of the Project. The information disclosure is implemented at two stages for the ESIA study.

- The first stage of information dissemination was conducted when the draft ESIA was prepared. The full sets of draft ESIA (main report and appendices) in English were delivered and placed at DFCCIL Head office, CPM Ahmedabad office, CPM Ajmer office, major existing railway stations and 4 district authorities offices along the DFC proposed alignment for Wamaj - Iqbalgarh section. Additionally, the summary of the draft ESIA report was prepared in English and Gujarati and delivered to all the project affected villages along the proposed DFC alignment. No comment or opinion on the draft ESIA was received through post, fax, email or hand delivery at DFCCIL Head office and CPM offices.
- The second stage of information dissemination is conducted at final ESIA study stage. The full sets of final ESIA (main report and appendices) in

English is delivered and placed at DFCCIL Head office, CPM Ahmedabad office, CPM Ajmer office, major existing railway stations and 4 district authorities offices along the proposed DFC alignment for Wamaj - Iqbalgarh section. Additionally, the summary of the final ESIA report (this report) is prepared in English and Gujarati and is delivered to all the project affected villages along the proposed DFC alignment.

Availability of Final ESIA Report

- Final ESIA Report is available for public viewing at the following locations: DFCCIL Head office (New Delhi), CPM Ahmedabad office, CPM Ajmer office, major stations along the proposed DFC alignment, and respective District offices from **January, 2013** onwards.
- Summaries of Final ESIA in English and Gujarati are also available at Sarpanch/ Village Head offices of all the project affected villages along the DFC alignment from **January, 2013** onwards.

Address of the DFCCIL Head Office and CPM Offices

- ❖ **Dedicated Freight Corridor Corporation of India Limited (DFCCIL) Head Office**
(Under Ministry of Railways), Fifth Floor, Pragati Maidan, Metro Station Building Complex, New Delhi – 110 001
(Tel: 91-11-23454700; Fax: 91-11-23454701)
- ❖ **CPM Office Ahmedabad**
1st Floor, Old DRM Office Bldg., Kalupur, Ahmedabad-380002, Gujarat
(Tel: (0)79-22175107, Fax: (0)79-22163101)
- ❖ **CPM Office Ajmer:**
42 A/3, Civil Lines, Ajmer-305001, Rajasthan
(Tel & Fax: (0)145-2630360)

Major Stations where the Final ESIA Report is available

- ❖ **Gandhinagar District**
Pansar
- ❖ **Mehsana District**
Mehsana, Unjha
- ❖ **Patan District**
Sidhpur
- ❖ **Banaskantha District**
Palanpur, Chitrasani