

# Cumulative Impact Assessment (CIA) of Eastern Dedicated Freight Corridor (DFC), India

## Draft Terms of Reference

### I. Introduction and Rationale

1. These terms of reference (ToR) describe the scope of work for carrying out Cumulative Impact Assessment (CIA) and management of the suite of projects supporting the Eastern Dedicated Freight Corridor (EDFC) system of Government of India.
2. The objective of CIA is 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. The CIA should also consider the 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.
3. 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.

### II. Background and Project Information

4. 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<sup>1</sup>) 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<sup>2</sup>. 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.
5. 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

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<sup>1</sup> Traffic-km are passenger-km plus freight ton-km.

<sup>2</sup> Assuming a typical elasticity of 1.25 for this stage of development

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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.

6. 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)* and is in the early stages of implementation. The Eastern Corridor is 1,839km and extends from Ludhiana to Kolkata<sup>3</sup>. The World Bank is supporting construction of the Eastern Dedicated Freight Corridor (EDFC) through a series of loans as shown in Figure 1 (total length 1,133km).

**Table 1- World Bank Funded Eastern Dedicated Freight Corridor (EDFC)**

Projects	Section	Length (km)	Number of Tracks	Approx. Cost (US\$ m)
EDFC1	Khurja- Kanpur	343	Double	1,453
EDFC2	Kanpur- Mughal Sarai	402	Double	1,670
EDFC3	Ludhiana- Khurja- Dadri	447	Single	1,439
Program		1,192		4,562

7. The GOI has adopted a new institutional framework to deliver and operate the DFC network. The Dedicated Freight Corridor Corporation of India Ltd. (DFCCIL) has been set up as a special purpose company under the Companies Act (1956) to deliver and manage the freight corridor.
8. In brief, the development objective of the Eastern DFC Program is to meet growing freight demand on the Eastern Corridor with an improved level of service, and develop institutional capacities of DFCCIL and IR to build, maintain and operate the entire DFC network.

### **III. CIA Definition and Requirements**

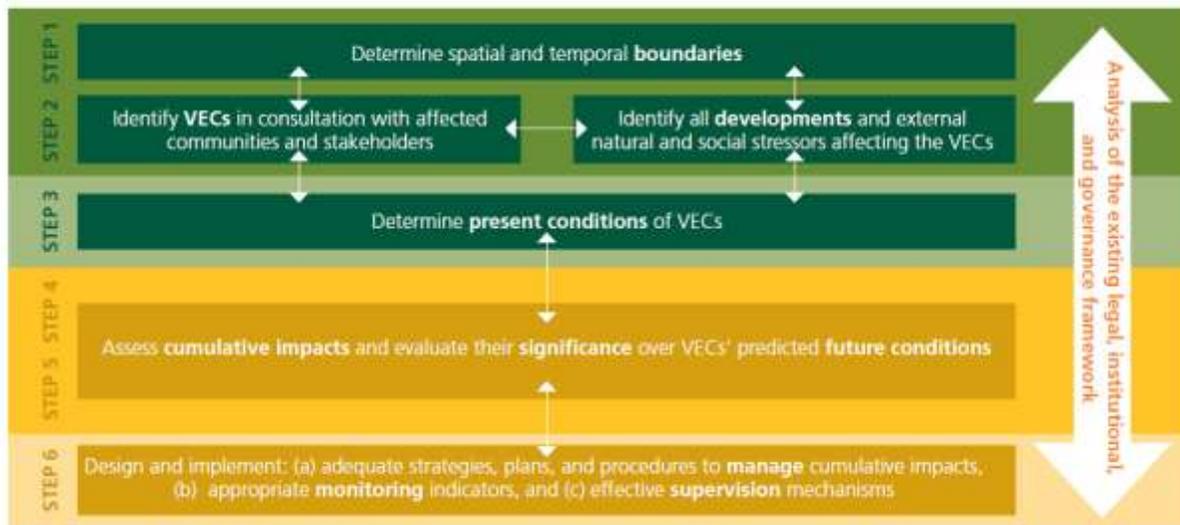
9. “CIA is the process of (a) analyzing the potential impacts and risks of proposed developments in the context of the potential effects of other human activities and natural environmental and social external drivers on the chosen Valued Environmental and Social Components (VECs) over time, and (b) proposing concrete measures to avoid, reduce, or mitigate such cumulative impacts and risk to the extent possible. 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 that affect them. For example, periodic extremes of precipitation (droughts or floods), temperature (extreme cold or heat), or fluctuations in predators all affect the condition of biological VECs. Today and into the future, global warming (climate change) can be expected to have substantial impacts on the condition of VECs.”
10. “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;

<sup>3</sup> Main cities are cited to aid geographic understanding; the precise route sections are provided in the text.

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- 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.

**FIGURE 1. RCIA: SIX-STEP APPROACH**



### Step-wise Approach to CIA Analysis

The six objectives of the CIA as noted above correlate loosely with the Six-Step Approach noted in Figure 1 above.

- Step 1: Scoping phase I – VECs, spatial and temporal Boundaries
- Step 2: Scoping phase II – Other activities and environmental drivers
- 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 following ToR sections provide a brief outline of the work to be undertaken in conducting RCIA for the Eastern Dedicated Freight Corridor Program.

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

Tasks:

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- Identify the VECs to include in the CIA.
- Identify the spatial boundaries of the CIA.
- Identify the temporal extent of the CIA.

### Note:

- VECs to include are those that would be affected by the project. Thus VECs for which an impact was deemed insignificant in the ESIA(s) are not to be included in the CIA;
- If the number of VECs is too large to conduct an analysis of all, then priority for analysis should be given to those for which there is existing regional concern, as reflected in the regional baseline information.

### Step 2: Other Activities and Environmental Drivers

#### Tasks:

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

#### Note:

- Developments that could be reasonable expected to be induced by the projects are considered to be reasonably predictable;
- Where there is a significant potential for further development, but not specific development proposals in place, a scenario of potential development may be considered.

### Step 3: Establish Information on Baseline Status of VECs

#### Tasks:

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

### Step 4: Assess Cumulative Impact on VECs

#### Tasks:

- 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;
- 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
- Estimate the cumulative impact on VECs—the total impact on the VECs when the impacts of the development are combined with the future baseline.

### Step 5: Assess Significance of Anticipated Cumulative Impacts

#### Task:

- Assess the significance of the foreseen cumulative impacts on the VECs;

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Notes:

- When the cumulative impact on VEC condition will approach, be near to, or exceed a threshold, the impact is significant; and
- The analysis may reveal that significant cumulative impacts will exist without the project

### Step 6: Management of Cumulative Impacts: Design and Implementation

Task:

- 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;
- If necessary, identify the potential, or need for, additional mitigation of other existing or reasonably predictable future projects;
- Identify the potential for other regional strategies that could maintain VECs at acceptable conditions; and
- Undertake best efforts to engage, enhance, and contribute to a multistakeholder collaborative approach for the implementation of management actions that are beyond the capacity of the project proponent.

### Step 7: Stakeholder Engagement

Stakeholder engagement is critical to the success of the CIA. Engagement should start early in the process, i.e., in Scoping (Steps 1 and 2) and continue throughout the CIA process. It will be essential to collect the information needed for the CIA analysis and likely also to secure cooperation in implementation of mitigation of the impacts of other projects, and/or identification and design of regional cumulative impact management strategies that may be needed to avoid unacceptable cumulative impacts

Stakeholder engagement should be designed and implemented to:

- Clarify stakeholder roles and responsibilities in the RCIA process; and to
- Establish and maintain a constructive relationship with government and other stakeholders.

The second point is essential when additional mitigation is needed for other projects. Engaging in assigning blame for cumulative impacts is likely to be counterproductive. Cumulative impacts are, by their multiparty nature, a collective responsibility and in this regard maintaining a constructive relationship is essential.”

11. 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.
12. This study should take into consideration the effects that the new DFC will have on the modal share between the new freight corridors and the adjoining rail systems or feeder rail links. The review will also consider the broader impact of the new DFCs on the road transport network (including impact on

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supply roads, origins and destinations, traffic flow, ways in which this track might impact bottlenecks elsewhere in the system).

### **IV. Supporting Project Documentation**

13. Cost-Benefit Analyses, which includes economic and financial analysis for EDFC1, EDFC2 and EDFC3 as presented in the project appraisal documents and the Business plan for DFCCIL. These sources can be used to check the underlying assumptions of the cost and benefits along with the traffic projections and the direct impacts of the new DFCs.
14. Environmental and Social Impact Assessments and Management Plans (ESIAs/ESMPs), review of the existing Environmental and Social Impact Assessment studies carried out for EDFC 1, EDFC 2 and EDFC 3, will assist significantly to identify VECS as well as to understand the cumulative environmental and social impacts of the eastern freight corridor.
15. GHG Analysis. Reports prepared by DFCCIL on GHG reductions that will result from construction of the DFCs should be appropriately integrate them in the overall CIA for the eastern corridor.
16. Analysis of Development Opportunities of DFC. The report produced as the technical assistance provided by the World Bank to the Government of India captured the economic and physical development opportunities associated with the improvements in connectivity through the Eastern Dedicated Freight Corridor, as well as the identification of options in terms of policies and programs aimed at maximizing the realization of the opportunities identified.

### **V. Deliverables**

17. The first deliverable should be **an Inception Report**, to be delivered within 1 month of commencement of this consultancy assignment. This Inception Report should include the following: (1) a first iteration on Steps 1, 2, and 3 above that should be done in a participatory manner, ideally including a stakeholder workshop for establishing the VEC's to be considered in the analysis; (2) an outline of the content for Steps 4-7; as well as (3) a comprehensive timescale to proceed with the final report, including stakeholder consultations to be held. The consultant is expected to provide evidence of understanding of issues deemed critical to successful delivery of the assignment. The Inception Report will enable consultant and client to agree on the (time and geographical) scoping, the selected VECs, and the approach moving forward.
18. The second deliverable should be **a Draft Final Report** which is to cover all tasks in the scope of work as outlined above. The **Draft Final Report** should incorporate updated information relative to Steps 1, 2, and 4 as well as draft final content relative to Steps 4-7.
19. The third deliverable should be a final **Consultations & Workshop**. The consultant shall review and discuss the findings of the draft final report with MOR, DFCCIL and other stakeholders and arrange a one day workshop to present the findings of the study. Feedback from the workshop should be incorporated into the final document.
20. The fourth deliverable should be the **Final Report**. The consultant shall prepare a final report that incorporates the findings of the assignment, the Draft Final Report and the consultations.
21. The total duration of the consultancy is expected to be three (3) months and carried out according to the annotated timetable presented in, as well as agreed to by all parties, in the **Inception Report**.

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**VI. Reporting and Client Support**

22. The consultant will be accountable to DFCCIL and will report to General Manager (SEMU) for day-to-day co-ordination.

**VII. Consultant Qualifications and Study Team**

23. The consultants should have adequate experience in Environmental and Social Assessment (ESA) of highway / linear projects. Firms with experience of conducting CIA studies for Infrastructure Projects will be preferred.
24. The consultant's team should comprise the following specialists in their team.
- **Team Leader** with 15 years of experience in conducting ESA studies for linear projects. Experience of carrying out CIA for liner or major infrastructure projects will be given additional weightage;
  - **Senior Transportation Planner** with 10 years of experience in transport modelling for development / infrastructure project. Experience in Railway sector will be given additional weightage;
  - **Senior Environmental Planner / Engineer** with 10 years of experience in conducting EA studies for linear projects and understanding of CIA studies for infrastructure projects;
  - **Senior Social Development Specialist** with 10 years of experience conducting SA studies in for linear projects and understanding of CIA studies for infrastructure projects;
  - **Senior Development Planner** with 10 years of experience in assessing the development impacts of the major infrastructure projects;
25. Depending on the study requirements, the consultant should draw necessary inputs from other experts on from transportation and railway sector, including adequate support staff to deliver the study outputs.